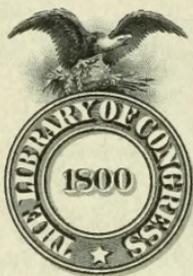


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FACTS
AND
INFORMATION

IN RELATION TO

THE CATALPA TREE.

(CATALPA BIGNONIOIDES.)

Its Value, and importance of its extensive
cultivation in groves.

E. E. BARNEY,
DAYTON, OHIO.

J. W. JOHNSON, PRINTER, 32 N. JEFFERSON STREET.

1878.

CATALPA SEED.

The earlier blooming variety of catalpa, named the hardy by Mr. Foster of Muscatine, Iowa, seems to be the most desirable for planting. L. & M. Woodhull, of Dayton, O., dealers in seeds, have collected pods from a few trees known to be of that variety. They will to a limited extent, send to any address by mail, postage paid, 2500 seeds of that variety, sufficient to plant one acre four feet each way, on receipt of fifty cents. Next spring they will carefully mark a large number of the finest trees of that variety when in bloom, and in the fall collect enough seed to supply any demand.

The first of January I collected seed pods from very fine, thrifty, tall, straight catalpa trees. I did not know then that the earlier variety was considered by some preferable, and do not know that these are of that variety, but think they are. I selected them from their fine appearance, under the impression that "like produces like." I will send by mail, postage paid, to any one wishing the seed, enough to plant one acre four feet each way, and a copy of this pamphlet, on receipt of fifty cents.

E. E. BARNEY, DAYTON, O.

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THE CATALPA.

Thirty years ago Dr. Job Haines, of this city, a horticulturist of rare discrimination and sound judgment, to whom I applied for shade trees, called my attention to two varieties of catalpa, varying two weeks in time of blooming; the earlier variety bearing large, nearly white, very showy blossoms in great profusion; the later blooming variety bearing a smaller flower of same general appearance, except darker color and less profuse in blooms. As each remained in bloom two weeks, he suggested the planting of the varieties alternately, and thus secure a month of flowers.

A thousand or more catalpa trees, of both varieties, have been growing on our side-walks for the past twenty to thirty-five years. Of their value, except for shade, I knew nothing until within the last eight years. Since then I have from time to time published such information as I obtained in relation to its very great value, for its wonderful durability, and the ease with which it may be propagated, at any point south of 42° latitude.

Recently I have been requested to publish in pamphlet form, for more general distribution, these articles, and such other information bearing on this subject as I have been able to gather. As nearly all I have written has been obtained from others, in complying with this request I prefer to give it as obtained from them, and in the order published, at the expense of some repetition, rather than on my own authority, that each may be able to judge for himself of its value. All I have written previous to 1876 has been re-written, enlarged and re-published since then, so I will not go back of that date.

[From the RAILWAY AGE, Chicago, Nov. 9, 1876.]

Mr. E. E. Barney, of Dayton, Ohio, the veteran car builder, in a conversation with a representative of this paper, recently, stated it as his belief that the catalpa tree will one of these days work a revolution in the matter of railroad ties. He says that in an agricultural

address at Carthage, Ohio, in 1825, General Harrison insisted that there was nothing like it for posts and like uses, and urged the farmers to plant and cultivate it.

At Vincennes, Indiana, there are posts of the catalpa tree that have been in the ground for many years, and are still in a perfect state of preservation. Mr. Barney states that in twenty years after the planting of the seed the tree will make four ties. This is a subject well worthy thorough investigation, and we shall be glad to hear from any of our readers who, from experience or observation, are able to throw any light upon it.

THE CATALPA—ITS VALUE.

To the Editor of the Dayton Journal:

The following statements, made by Dr. J. A. Warder, President of the Ohio State Horticultural Society, in his annual address before the society, in Toledo, in relation to the catalpa, are of interest:

“Another tree of rapid growth and with a promise of great utility, is the catalpa, of which wonderful stories are told as to its powers of resisting decay. General Harrison, when Governor of the Northwest Territory, found catalpa pickets in the old French stockade at Vincennes, that were still sound. One of the early settlers of Knox county, Indiana, found a catalpa log that had fallen across a stream in such a way that it served as a bridge, and had evidently been thus used by the aborigines for so long a time that it was quite flattened by the pressure of their feet. He asked an old Indian how long that bridge had been there. The reply was, ‘My father’s father crossed on that log.’ Recently some persons have set it out in timber plantations. My own plantations are very promising.”

The following communication to the *Railway Age*, by James M. Bucklin, C. E., on the catalpa, will also be read with much interest. Mr. Bucklin was an engineer on the Miami Canal, and let the water into the Middletown feeder in 1826. The information he gives is very valuable. Those wishing to plant the catalpa seed this spring should gather the pods this month, as they will begin to open and drop off next month. I shall be pleased to give seed pods to all wishing to plant and have not time to gather them, if they will call at the office of the car works.

E. E. BARNEY.

The Catalpa for Railway Ties.

KNIGHTSVILLE, Clay Co., Ind., November 15, 1876.

To the Editor of the Railway Age:

I am glad to observe a call for light in the columns of your widely-spread journal on the subject of the catalpa. As it is possible that it may be attended with useful effect, and in order to contribute something toward this desirable result, I will try to communicate facts with regard to it which will enable you to investigate a subject well worthy of examination by all who are interested in railroad construction and maintenance. Its importance has for a long time impressed itself so strongly on my mind that I have repeatedly, for the last forty years, urged upon railroad companies the great advantage to be derived by them from the propagation of this tree in large bodies—in one instance with such effect that the Board of Public Works of Illinois, in charge of the prosecution of the “internal improvement system of 1835,” ordered me to select lands for that purpose on the routes of the various railroads then in process of location and construction. Accordingly, I made the required selections in several localities well adapted to its propagation and rapid growth, on the Sangamon, the Embarrass, the Little Wabash, and the Big Muddy rivers; but unfortunately for the State, this project failed with the internal improvement system, and was never carried out. Had it been done, the catalpa would now be flourishing on all these rivers, and probably disseminated in all favorable localities throughout the State, on the same streams where, in all probability, it grew in 1799, at which time “its discovery as a southern tree” was first announced by a French naturalist.

When we take into consideration the important fact that the employment of so durable a material would prove as beneficial as the use of steel in point of economy in the maintenance of railroads, and that it would dispense with the enormous cost of *labor* in the constant replacement of ordinary wooden structures, we are forcibly struck with the conviction that if the unfortunate failure of the State in the prosecution of the internal improvements had not occurred, and the Board of Public Works had only carried into effect their intention to introduce the general propagation and production of the catalpa for railroad and other incidental purposes, the whole State would have been amply remunerated by the success of their efforts in that direction for all the money expended in their attempt to carry out the internal improvement system.

You will understand why I entertain these views when you read the annexed copy of a letter to Mr. John Simpson, then Superintendent of the Terre Haute & Indianapolis Railroad, on the subject of the catalpa, addressed to him a year ago last July.

Knightsville, Clay Co., Ind., July 15, 1876.

Mr. John Simpson, Terre Haute, Ind. :

DEAR SIR—I have lately seen in the public prints of the State frequent disparaging allusions to the catalpa, even from the learned editor of the Indianapolis *Journal*, who styles it the “*stinking catalpa*.” Now, this astute gentlemen, even if he can not see beyond his nose, ought to know something about the most remarkable natural production of his own State.

The most durable of all species of timber, so much so that I have long desired to call your attention to it, on account of its perfect adaptation to railroad and telegraph purposes, especially as it is indigenous in this State, and is as prolific as the ailantus, when propagated. By botanists it is called a “Southern tree, first discovered in 1779 by a French naturalist.”

It is found in the South, but it is by no means confined to the southern States, for the finest specimens in the world, probably, are now growing in Missouri, three and four feet in diameter; and in 1828, while Captain Smith, of the United States army, and myself were exploring the obstructions to the navigation of the Wabash river, we unexpectedly discovered a lofty forest of catalpa of large size, at the mouth of White river, below Vincennes, Indiana. But for its large leaves and bunches of long seed-pods it could not be identified with the crooked specimens ordinarily reared for their floral appendages. We were not then aware that the timber was of any particular value, but having occasion to return to the locality in 1834, I found that nearly all the trees had disappeared, having been cut down and hauled off for posts, even to great distances. Subsequently I was informed by old French residents of St. Louis and Portage des Sioux that at one time it abounded in St. Charles County, Missouri, at the mouth of the Missouri, and was highly valued for its durability. In 1866 I found it in large bodies and of enormous height and size, three and four feet in diameter, and fifty feet without a limb, in the dense forests which extend south of Poplar Bluffs, south-eastern Missouri, between the Big Black and St. Francis rivers. I was then exploring a route for the Iron Mountain & Helena (Ark.) Railroad, a

report on which, describing localities, etc., I inclose (see page 9). Throughout that region the peculiar value of the tree is well known, not only for its durability, but for other properties invaluable to early settlers. Canoes are used exclusively on these rivers, and when made of catalpa, never crack in seasoning, or rot. Henly, the ferryman at Poplar Bluffs, had a canoe, perfectly sound, three feet across the gunwales, which he assured me had been in use twelve years. He afterward informed me that he had seen catalpa trees, perfectly sound, back of New Madrid, on the Mississippi River, that had been killed by the eruptions of 1811. This statement was too incredible to make a note of, but it has since been confirmed by respectable citizens of New Madrid, who stated, also, that all the catalpa trees were killed at that time.

In a congenial soil, similar to that which I have observed in many localities on the Wabash, the growth of the catalpa is exceedingly rapid, and when propagated should be suffered to grow as thick as possible, so as to confine the growth to the trunk, and give it an upward bearing, the natural habit of all forest trees.

The general extirpation of the tree in this State, and in some parts of Illinois, is readily accounted for when we reflect that the wood is peculiarly adapted to all domestic uses, that it probably was the canoe wood of the Indians and of the early settlers, and subsequently in great demand for posts all over the country.

There are probably two varieties of the wood, like the blue and white ash; the fibers of one are oblique and is difficult to split. For cross-ties and platforms it would be specially adapted, and last, probably, until it wore out. There are many exposed places about depots where it would be of great value.

In 1836 I earnestly recommended the propagation of the tree to the Board of Public Works of Illinois, and selected lands, by their order, on the routes of the various roads then in course of location and construction, for the purpose of raising this timber.

Respectfully,

JAMES M. BUCKLIN.

As a precautionary measure, observation has taught me that we must imitate nature in rearing this tree, or any other, for the value of its timber—not isolate them, but let them grow as if they were designed for hoop poles. They will then grow straight and erect, to a great height, without a limb.

These trees are now growing indigenously in the creek bottoms, within sight of the place where I am now writing this letter, and when

they are transplanted for ornamental purposes, their growth is as rapid as the ailantus.

All roads, in point of economy, will find it advisable to plant the catalpa, and thus avoid the enormous cost and annoyance of constant replacement, and liability to accident from the unexpected failure of decaying timber; and surely it is in accordance with reason and common sense that the value of the stock of any railroad company would be enhanced and confidence inspired by a knowledge of the fact that provision had been made to reduce the usual cost of maintenance, which now absorbs so large a proportion of the gross receipts of roads, to the lowest possible terms.

Very respectfully,

JAMES M. BUCKLIN,
Civil Engineer.

More Testimony in Favor of the Catalpa.

The following communication is from a prominent official of the St. Louis, Iron Mountain & Southern Railway:

December 15, 1876.

To the Editor of The Railway Age:

In your issue of November 30 is a letter from James M. Bucklin, C. E., upon the value of catalpa timber for railway uses. In an editorial in the same paper you refer to some private letter of his, and publish his assertion that this railroad, though passing through a country which, he says, is well supplied with this timber, has made no use of it unless by accident. He expresses the belief that the officers of the road know nothing of the tree.

Major Bucklin has not said too much in praise of this invaluable timber. It is beyond question the most durable of all species growing in this country, excepting, perhaps, the cedar. He is, however, greatly in error in supposing that our officials are in ignorance concerning its value. The tree is known, and its value appreciated. It has been in use here for a long time. There are miles of fencing, built years ago by the company, in which none but catalpa posts were used, and now it is being used alone for that purpose.

While building the Belmont line, efforts were made to procure it for ties and telegraph poles. The same scarcity of trees large enough for ties, that prevented them from getting more than a limited supply

then, has since been found to exist all along the lines in Missouri. In Arkansas the road may be more fortunate. A careful examination of every forty acre tract of the company's land grant of two million acres undoubtedly shows to what extent it can be utilized.

THE CATALPA.

Further Information about this Invaluable Tree—Almost as Durable as Iron—How to Propagate it—Ties that will Diminish Repairs \$200 per Mile.

DAYTON Ohio, December 11. 1876.

To the Editor of the Railway Age:

I am much gratified that the notice of the catalpa, in the issue of November 9, has called forth much valuable information on the subject. Allow me to add a few more facts, which I trust may call forth more information as to the invaluable properties of the catalpa. In the spring of 1871, in conversation with Wm. R. Arthur, formerly superintendent of the Illinois Central Railroad, he stated that the catalpa would make a tie for railroads that would last forever; that it was easily cultivated, was of rapid growth, and when planted in groves grew straight and tall as any forest tree; that he had several groves then growing on his farm that had been planted but four years and were twenty feet high; that he had planted them for fence-posts, but had subsequently learned that they would hold a spike as well as oak and would not split. Hence their value for cross-ties.

In answer to my inquiry how he knew the catalpa would last indefinitely, he replied he had asked the same question of the party who gave him the information, and that he replied: "Seeing is believing. Go with me to Cairo, up the Ohio River twenty miles, and back from the river eight miles." They went, and found on a farm belonging to his father a gate post which, he stated, he had assisted his father to put in position forty-six years previously. They dug around it and examined it carefully to the bottom, and found it as sound as the day it was planted—no signs of decay whatever. Subsequently I stated these facts to Judge Upsher, of Indiana, and spoke of their impor-

tance to railroads. He said the statement recalled what he had been told by old citizens of Vincennes, Indiana, in relation to the old stockade built by the first French settlers of that place, of logs cut from the catalpa tree, that grows native in the forest there. These, when removed from the ground nearly one hundred years after they had been placed there, were perfectly sound, and gave no indication of decay. Subsequently I wrote to C. M. Allen, of Vincennes, for such information as he could give in relation to the catalpa for cross-ties and posts. He replied:

“Your inquiries as to the durability of the catalpa tree I can only answer in a general way and for a limited time, having been a resident here only for thirty years. During that period of time I have seen much of it in posts and timbers of buildings coming in contact with the ground, and my observation is that it is the most durable of all timber. For railroad cross-ties it is better than either mulberry or cedar. A gentleman has just stepped into my office who informs me that he has it in fence posts of twenty-two years’ standing, and that they are as sound and firm apparently as the day they were put in. It may be regarded as next to iron for railroad cross-ties, if the wood is firm enough to hold a spike. In fact, it may be regarded as imperishable under or lying on the ground.”

I have seen it stated in the papers that the State agricultural societies of Delaware and Michigan had recommended farmers to plant the catalpa for fence posts, as being for durability quite equal to red cedar. I saw in one of the Detroit papers, last of April, 1876, in answer to an inquirer what tree he should plant to mark the centennial year, an editorial paragraph directing him to plant the catalpa, for its durability.

In an essay on the best practical means of preserving and restoring the forests of Ohio, by Daniel Millikin, Hamilton, Ohio, in the Ohio Agricultural Reports of 1871, second series, (a very valuable essay), he says of catalpa (*catalpa bignonioides*):

“This handsome and valuable tree is native in all the southwestern States, but is everywhere rare. The few ancient groves in southern Indiana and Illinois may be native, and at all events the tree is hardy in any part of Ohio. The tree is not a large one, at maturity, but makes a fine trunk in groves. (A. M. Brown, in Ill. Hort. Rep. for 1868, p. 148). The rapidity of its growth in youth is astonishing, and it seems to grow equally well on any soil. Catalpa wood is coarse in the grain, light and brittle. Its value arises from its great durabil-

ity, even when exposed in air and damp at the same time. This quality of the wood was pointed out by General Harrison, as long ago as 1825, in an address delivered at Carthage, Hamilton County, Ohio. He became acquainted with the tree at Vincennes, Indiana, where there are some aged trees at this time, and where he was once resident as governor of the Northwest Territory. The durability of catalpa wood has been pointed out by planters in more recent times, but the tree has not been much grown. It is to be recommended for fence posts. The seeds are borne in long pods, and are small and delicate affairs. I have found them to germinate in ordinary garden soil, and in the full glare of sunlight. The young plants are so sturdy that I recommend the planting of seeds where the trees are desired, notwithstanding their smallness. Sow in spring, and cover not more than one-fourth of an inch."

Thomas Brown, an old citizen of Dayton, says that twenty-five years ago he planted a large number of catalpa trees on his suburban place; that while planting, several then old citizens commended his selection of catalpa, saying it was the most durable of trees, and would outlast red cedar.

Last February, William P. Huffinan, of this city, had the long, bean-like seed pods hanging from a catalpa shade tree growing on his grounds plucked, and in April planted the seeds contained in them, as apple seeds are planted in rows for a nursery. They all germinated and grew vigorously, many of them three feet in height. Three years ago I cut from a catalpa tree, that had been cut down after growing thirty years as a shade tree, two railroad cross-ties, and placed them in a track over which trains pass every hour, one under a rail joint. The spikes show no signs of loosening. The catalpa does not hold a spike as well as oak, but sufficiently well for all practical purposes. It does not split easily. While not as tough as some woods, it should not be termed brittle, as stated in above extract from Millikin's essay. I subjected pieces of catalpa, oak, and ash, one inch square, to a breaking pressure twelve inches between supports. The catalpa broke under a pressure of 703 pounds; ash, 890 pounds; one piece of oak at 577, one at 709, and one at 1,141 pounds. The catalpa deflected three times as much as the oak or ash before breaking.

Catesby speaks of the catalpa as native in the Carolinas in 1726, where it is also called catawba. It is distinguished by its silver-gray, slightly furrowed bark, its wide-spreading head, the fewness of its branches, and the fine, pale green of its very large, heart-shaped

leaves. It is a very profuse bloomer, except in wet summers. The flowers are very showy, large, bell-shaped, white, slightly tinged with violet, and dotted with purple and violet in the throat. They are succeeded by long, bean-shaped seed pods, which hang till the next spring, when they open, and the small, thin, broadly-winged seeds are borne away on the winds. The "Farmers and Planters' Encyclopædia" says the rapid growth of the catalpa in almost every situation in which it can be placed in the Middle States, and the adaptation of its wood to fence posts and other useful purposes, make it deserving the attention of farmers. The wood, though light, is very compact, of fine texture, and susceptible of the most brilliant polish, its fine straw color producing a fine effect in cabinet work and inside finish for houses.

Those wishing to propagate the catalpa should gather the seed pods this or next month; put in a dry place secure from mice. They may be found hanging from the catalpa tree, planted as a shade tree in most of the cities and towns in Ohio. There are fifty or more seeds in each pod. Plant in spring, in good soil, in rows three or four feet apart, six inches in the row, and thin down to one foot. Keep the ground clean and let them grow three years; then transplant, placing them in rows ten feet apart north and south, and six feet apart east and west. In from twelve to fifteen years remove each alternate tree in rows running north and south for fence posts and telegraph poles, leaving the remaining trees ten feet apart one way and twelve feet the other, 363 to the acre. In from twelve to fifteen years more these will be large enough to make four to eight railroad ties each, if they have been planted in good ground. They should be split or sawed through the middle and the round side placed on the ground. The catalpa has only a film of sap $\frac{1}{10}$ thick.

Each acre and a half of ground thus planted and properly cared for, will furnish enough fence posts and telegraph poles in from twelve to fifteen years to pay for the land and all expense of planting, care and protection; and in from twenty-five to thirty years furnish railroad ties for one mile of track, which at fifty cents each (cheap considering their quality) will pay \$25 per year on each acre of ground for each year the trees have been growing. Can a farmer make a better investment for himself and family than to plant ten to twenty acres in catalpa trees? A railroad once tied with catalpa will find its annual expenses for repairs diminished \$200 per mile, a saving that would add ten per cent. to the value of the property.

Respectfully,

E. E. BARNEY.

Instructions about Propagating the Catalpa.

Knightsville, Clay Co., Ind., Feb. 3, 1876.

To the Editor of the *Railway Age*:

I have received several letters of inquiry about propagating the catalpa, "How far apart to plant the trees?" and then "How to obviate the crooked, stunted growth characteristic of the tree?" or "Where to procure the seed of the tall, straight kind of catalpa?"

In a previous letter, when speaking of the catalpa *as a forest tree*, I described it as of large size, tall and straight, such as I saw on the Wabash in 1828, and on the route of the Iron Mountain & Southern Railroad, in South Missouri, in 1866, especially in the last named locality, where they are still growing, although possibly in diminished numbers. I also remarked, "that as a precaution, we must imitate nature in rearing such trees, not isolate them, but suffer them to grow as thick as possible, so as to *confine the growth to the trunk*, the natural habit of all forest trees." I said this to call attention to a fact, which I supposed was generally known, that nature has a process of her own, by which, if not interrupted, she confines the growth of the tree to the trunk and impels it upward—a process essentially necessary to adapt the trunks of all trees to a servicable purpose.

This process of nature is density of growth, and its effect is manifested in the spontaneous growth of all those tall densely growing forests, from which are procured all our supplies of timber, adapted by their large dimensions to practical use; and if we admit, as it seems we must, that the useful effect of this density of growth is to shorten the period of maturity and produce an early adaptation to practical use, then we ought to imitate nature and adopt a process so invariably successful, for, by this natural process, it is evident that the vegetable fluids of the young tree and its consequent growth are attracted in the direction of light and impelled upward by other coercive vital forces, and, as this upward tendency increases and the growth of the tree advances, the lower limbs, for want of light and sustenance, die and fall off, and thus the concentration of growth results, by a natural process, in the enlargement of the proportions of the tree, its early development and consequent adaptation to useful purposes. Not only this, density of growth produces density of shade and atmospheric conditions by which the ground is always kept moist, *irrigated* and in a state highly favorable to the decomposition of vegetable matter, the formation of vegetable mold and its solubility and absorption

by the roots of the tree, which, besides being productive of the rapid growth and early maturity of timber, continually increases the fertility of the lands upon which those dense bodies of timber are growing, until they attain the utmost limits of fertility. Hence it follows that the best and most speedy results may be reasonably expected in propagating the catalpa, the black locust, or, indeed, any forest tree, by selecting a tract of land either recently cleared or only partially so, and after planting the seed superficially and propagating a *thick stand* of plants, to let them alone and trust to the discriminating powers of nature, for she does her own thinning out and her own transplanting by smothering all weakly shoots and re-energizing the strong to supplant superfluous or abortive plants.

Under the continual operation of this natural process the number of trees in a given space are gradually diminished until they arrive at maturity tall, straight and fit for service.

A striking example of the effect of density of growth is seen in the post oak under different circumstances. On the Trinity river, in Texas, and on the Cross Timbers, its growth is scattered and detached. Its appearance is that of an apple tree, and it will not make more than two cross-ties; but when found in the dense forests of Arkansas, Missouri, or in Illinois, it is a straight tree, and long enough in the trunk and large enough to make ten cross-ties. It is not a large tree under any circumstances, but it is the most durable in the ground of all species of oak.

Having seen the pernicious effects of thinning out young forest trees and groves of black walnut, I can not approve of it, and believing, as I have good reasons to do, in the efficacy of the density of growth, I question the propriety and prudence of any interference whatever with the operations of nature after we have succeeded in establishing a thick growth of trees on a young plantation, until the trees arrive at a certain state of maturity, a period of usefulness which may be greatly protracted, but which can not possibly be accelerated by any interference on our part, however we may *improve upon nature* in the practice of horticulture, or in the propagation of shade and fruit trees by an artificial process, and for an entirely different purpose.

The object of employing a natural mode of culture for the catalpa is to enlarge the dimensions of the tree, to accelerate its growth and maturity, and, at the same time, correct its tendency to a low, shrubby growth when isolated—the effect of transplanting and re-transplanting.

JAMES M. BUCKLIN.

The Culture of the Catalpa.—Further Facts.

KNIGHTSVILLE, Clay Co., Ind., February 22, 1876.

To the Editor of the Railway Age:

The subject of adopting a natural mode of culture for the catalpa is to enlarge the dimensions of the tree, to accelerate its growth and maturity, and at the same time to correct its tendency to a low, shrubby growth where isolated, in a great degree the effect of transplanting, which seems to exert a greater influence on the growth of the catalpa than upon many other trees, by permanently impairing its recuperative power to *produce wood*. However this may be, all who wish to insure the rapid and early maturity of a young plantation of forest trees, should bear in mind that after following the precepts of nature in propagating the tree, we must pursue the same means, or mode of culture by which a rapid and uninterrupted growth is preserved and maintained by nature. But to understand this thoroughly we must examine the remains of those primeval forests which once covered the whole country, and observe the exuberant growth of the timber and the condition of the soil, which, untrampled except by the surveyor, the hunter, or by wild animals, is covered with mold as soft and elastic as a sponge, and in a perfect state of adaptation to the assimilation of nutriment by the roots of the tree. Then compare the fresh luxuriance of the timber and the absorbent soil of these dense forests with the state of the woodland pastures around us, whose every tree exhibits evidences of premature decay, and where the soil, impacted by the feet of animals, is almost impervious to moisture, and however rich the soil may be in plant food the trees are starving to death, because the roots of the trees can not digest their food.

This is a state of things that would certainly arrest the growth of a young tree. We are therefore admonished, not only to follow the precepts of nature in the propagation of the tree, but to prevent the possibility of any interruption to her operations. Therefore the tract of land selected for a young plantation should be securely inclosed, and no stock of any description allowed access to the grounds; for it is only under such conditions that we can expect *timber trees* to arrive at a maturity of usefulness in the *shortest possible time*, or indeed, ever to attain the dimensions required to adapt them to a useful purpose.

In my next I will describe the peculiar character of the soil which should be selected, and upon which we may reasonably expect to raise

catalpa trees of sufficient dimensions for railroad cross-ties, etc. As for telegraph poles and posts, it would seem to be a waste of valuable material to cut them down prematurely for such purposes, when red cedar can be procured at less cost than the prospective value of catalpa: *that is*, if the latter is planted on a congenial soil, capable of producing a tree of the requisite size for cross-ties and platform plank.

I have had some reasons to suspect that there may be two varieties of the wood of the catalpa, like the varieties in the ash, the *blue* and the *white*, the latter "being of a straight grain, the former oblique." It is very questionable with regard to the catalpa, but it may be important to ascertain the facts.

I have seen it stated on high authority that the "*Paulonia*, a Japan tree," is a *congener* of the common catalpa, and, like it, of rapid growth and a profuse blossomer, but that the flowers of the former diffuse far around the tree the fragrant odor of violets, an attribute which cannot be claimed for the latter.

JAMES M. BUCKLIN.

Further Important Facts about the Catalpa —Its Wonderful Longevity—How to Raise It.

Dayton, Ohio, Oct. 20, 1877

To the Editor of The Railway Age:

Since last writing you on the value of the catalpa tree, and the great importance of its general cultivation, by railroad companies, for ties, posts, etc., I have gathered some further facts that may be of interest to railroad managers, which I herewith submit.

Prof. John Collet, in the report of the Geological Survey of Indiana for 1873, says on page 364 :

"Catalpa trees, two and three feet in diameter, are found in Knox county. One twenty-five inches in diameter had thirty-seven rings of annual growth, indicating an increase in size during that time of over 0.67 of an inch per annum. A catalpa gate-post set in the ground by Col. Decker, in 1780, near the school house on Deshee creek, was cut up for firewood in 1871, and was found in fair condition after doing service for nearly a century. President Harrison, on his visit to Vincennes, in 1840, publically called attention to the fact that a picket fence, built by him along the river front of his former residence, was

in good order after forty years' service. The portions of the posts (catalpa and mulberry) buried in the earth were found as sound as if cut yesterday. Catalpa posts set by General Harrison about the governor's house in 1808, were taken up. Mr. Pidgeon informs me, a few years ago, and, being sound, were reset in another place."

On pages 416 and 417 the professor says :

"Mr. W. A. Walters has measured catalpa trees, in the original forest, near Owensville, three and four feet in diameter. Mr. R. E. Starnate has measured catalpa trees, in the White river bottoms, two and a half, three, and even four and a half feet in diameter. This timber is universally credited with wonderful power to resist decay and time. Col. Cockrum has known it in use, without stain of decay, for fifty years; and Capt. Kurtz knows catalpa trees dead, but still standing in the overflowed bottoms of the Wabash, which were killed by the ice in the great January flood of 1828. The tree is of rapid growth, offensive in odor and taste, is not liable to be destroyed by insects or animals. flourishes best in bottom lands, but will grow in any soil or position."

If the first year's growth freezes down, as it may north of 40° latitude, it will spring from the root and grow vigorously the next year, and grow readily up to 42° of latitude.

J. M. Bucklin, civil engineer, of Knightstown, Indiana, writes that in 1854 he went to Carmi, Ill., with Governor Davidson and others to plan a bridge across the Little Wabash. While there they saw many wagon loads of catalpa timber hauled by farmers more than twenty miles from the mouth of White river, and found on inquiry that it was deemed invaluable for fence and sign posts, on account of its extraordinary durability. Mr. Bucklin suggested the use of this timber, and the construction of a cheap, open-trestle bridge instead of the more expensive covered one they had intended to erect. On visiting Vincennes for further information, their preconceived opinion of the remarkable durability of the catalpa was fully confirmed, and the bridge company adopted his recommendation. At that time the durability of the catalpa was notorious and unquestioned. Dr. John A. Warder, president of the Horticultural Society of Ohio, writes from North Bend, Ohio :

"So well satisfied am I of the great durability of the catalpa, the fine polish it will take, its great beauty as a cabinet wood, and its value for railroad purposes, that I wish myself a young man that I might plant a quarter section with catalpas, four feet each way. I have

several groves of four years' growth from Dayton seed, planted on the hillside, seventeen feet high and twelve and a half inches in circumference one foot from the ground."

The report of the department of Horticulture in the Illinois University, says; "The catalpa planted two feet by four feet has made the greatest growth, an average of four feet per year, and was very little injured by the severe winter of 1872-3, when the thermometer marked 30° below zero. It is the only kind of which none have died. It is also one of the cheapest of the various kinds of trees planted, and is noted for the durability of its wood."

There is in our office a catalpa fence post taken from a post-and-rail fence in Indiana, that J. S. Miller, Sup't, Richmond, Ind., vouches for as having been placed two feet in the ground *seventy-five years ago*, where it has remained till quite recently, when it was taken up and sent to me by him as a sample of the durability of catalpa. It is worn away below the surface of the ground nearly one-fourth of its diameter. It is perfectly sound in every part. Mr. Miller also sent me some catalpa logs, from which I have had cut a dozen railroad ties and placed in a track over which trains pass hourly. Thus far the spikes seem to hold well, and the ties show no signs of giving under the rail.

Some inquiry has been made for catalpa trees, of two or three years growth, for transplanting. A number of persons within the last two or three years have planted the seed largely for trees for their own transplanting. Nurserymen have heretofore grown them only in limited numbers to sell for shade trees.

Those wishing to plant in large quantities for growth for future use can only obtain them by raising from the seed. The long bean-like pods that hang suspended from the catalpa tree may be gathered any time in December or January, and stored in a dry place. As early in the spring as the ground is in suitable condition, take the seeds from the pods and plant in rows three or four feet apart, and one to three inches in the row. If all grow they should be early thinned out to one foot. Those taken up may be replanted. The ground should be kept clean. When they are two to three years old replant in rows, four feet each way, that they may grow tall and straight. After twelve to fifteen years each alternate row should be cut out for fence-posts and telegraph poles. In from twelve to fifteen years more the remaining trees will make six ties each if they have been planted in good ground. The first two lengths should be split or sawed through the middle, the

next two flattened on the sides. The catalpa is particularly well adapted to this mode of manufacture, as it has only the merest film of sap, not thicker than paper.

There will be 2,640 trees on an acre if planted four feet apart each way. The fence posts and telegraph poles obtained from cutting out each alternate row after twelve to fifteen years will pay the entire expense of planting and cultivation and manufacture of ties, so that each acre of land planted with catalpas will furnish ties enough for three miles of road free of cost, that will not require to be renewed for the next fifty years. This estimate is made on planting closer than recommended in my former communication, but is given on authority of those having practical experience in such matters.

E. E. BARNEY.

Mr. Suel. Foster, of Muscatine, Iowa, writes: "Twenty-three years ago, among a lot of nursery stock received from northern Indiana, were several catalpa trees. A portion of them bloomed two weeks earlier than the rest. Subsequently severe killing winters destroyed most of the late blooming catalpas, but did not injure a twig of the early blooming. The flowers of the earlier blooming catalpas are larger, more profuse, and whiter than those of the later blooming. The seed-pods are longer and larger, and fewer on a tree. I have named the earlier blooming variety *the hardy*, as both true and appropriate. The later blooming I call the common. My hardy catalpas, six years' growth, are two to three inches in diameter two feet from the ground, and eight to thirteen feet high. I think when planting for timber two by four feet better than four by four feet. If the trees are cut close down to the ground the second spring, the little stump will throw up a straight and thrifty shoot, and often outgrow those not cut down. For some years I have had much confidence in the hardy variety of catalpa, as a beautiful ornamental tree, and a most valuable timber for fence posts and railroad ties. For some years I have been distributing the few seeds I have to those who would appreciate them, in Iowa and Illinois, and to the east. I think the common or tender variety should not be planted north of St. Louis."

From Mr. Foster's statement above, it appears both varieties, what he calls the hardy or early blooming, and the later blooming, which he calls the common, are grown in Dayton, of which equally handsome specimens of both are on our streets as shade trees. Our latitude is 39° 40'. When Dr. Haines introduced the early blooming variety to

us thirty years ago, he spoke of it as more thrifty and as bearing more showy and more profuse flowers. Mr. Foster's experience is very important in determining which can be planted farthest north. So far as the trees in Dayton are concerned I discover nothing to distinguish the varieties except the time of blooming. Some trees of both varieties have short, and some long pods. Some trees of both varieties have few, others great numbers of pods. The color of the bark and texture of the wood seem to be the same. Mr. William P. Huffman, of this city, planted seeds for 2,000 catalpa trees two years ago. They grew nicely, but were frozen down to the ground the first winter, which was a severe one. Last spring he transplanted them, cutting them all down to the ground. They grew nicely and perfectly straight last year, and now look handsomely, three to four feet high. He is not certain from which variety he took the seed. I shall look with much interest for the blooming of the trees next spring. If it proves of the later variety Mr. Foster's theory will be confirmed.

The Forestry Annual of the Iowa Horticultural Society, of Iowa, for the year 1877, says of the catalpa :

“ Experience has demonstrated this tree to have special value for extended planting. Although naturally a tree indigenous farther south, it seems to have a peculiar tendency to adapt itself to northern limits. A variety now grown quite extensively in central Iowa seems as hardy as our native trees, (This is Mr. Foster's hardy catalpa.) The writer has trees now five years old large enough for small posts for wire fences, which have had open exposure north of 42° parallel during the past severe winters. In Cedar County are to be seen many trees, which have been out from ten to fifteen years, which show its habit of rapid growth to continue after it attains considerable size. In its native forests it attains considerable size, growing from fifty to eighty feet in height, with diameter of from eighteen to twenty-five inches. Its flowers are very showy, and its odd cylindrical pods attract much attention. It is very durable for posts. Posts are yet sound in Illinois which have been set, it is claimed, forty years. The plants are very easily to grow from seeds, which may be kept until time of sowing. But in all cases secure seed grown on northern trees. In Cedar County, near Muscatine, seeds are abundant. The trees flower and bear seeds abundantly when quite young.”

Prof. T. J. Burrill, of the Illinois Industrial University, at Urbana, writes :

“ From the experiments so far at this University the catalpa tree is

one of the cheapest and easiest to grow, and one of the most rapidly growing of our forest trees, native or introduced. In our plantation, containing about twenty selected species, only the soft maple and white willow have in eight years time surpassed it. It has outgrown the white or American elm, white ash, European larch, osage orange, black walnut, etc., upon the same ground and under similar treatment. It is not attacked by any insect, nor does it appear to be subject to any disease whatever, except a white mildew upon the leaves late in the season, which does no appreciable damage. Our trees were raised from seed planted in the spring of 1869, and replanted in the spring of 1871. When reset the top was cut to the ground, because they were crooked and much branched. They were from seed collected from trees on the farm of Hon. W. C. Flagg, near Alton, Ill., were set 2x4 feet in the plantation, to induce erect growth, cultivated like corn for three years, and plowed once each of the two following years, since which time nothing has been done to them, except a very little pruning. Next spring every other row will be removed, and used for stakes in vineyard, fences, etc. The average height is now as nearly as can be ascertained 16 feet 3 inches, and average diameter 3 inches. Some are much larger. They are as straight and erect as can be desired, and grew in 1877 an average of 33 inches. They have never suffered from winter killing until November, 1876-7, and then not enough to interfere with their growth as timber trees. But single trees planted for ornament in home grounds have frequently suffered so severely from frost as to very much damage them, and to cause them to be often discarded.

“While collecting specimens of the trees of Illinois for the centennial, I found some boards, sawed from a catalpa log, some two feet in diameter, (so that the boards were nearly two feet), which was known to have lain on the ground one hundred years. - One man had known the log to have thus lain during forty years of this time, and he had the information directly from another as to the previous sixty years. This was in the extreme southern portion of Illinois, about twelve miles from Cairo, in the Mississippi river bottoms. The wood is still sound and strong, and susceptible of a fair polish, though not as good as fresh specimens. Judge Brown, of Villa Ridge, Ill., thinks the wood more durable in wet places than in dry—posts lasting better in wet ground.

“Suel. Foster, of Muscatine, Iowa, has long grown the catalpa from seed, and believes he has secured a variety quite hardy in his latitude.

I know of no one else who has given so much attention to the nursery growth of the catalpa as Mr. Foster. In this locality most people are inclined to look upon the experiment with the catalpa as a foolish one, and I have frequently been told that we were wasting our time and money. We are satisfied the plantation will pay for itself, even though there comes as much winter killing each year as occurred in 1876-7."

Joseph S. Fay, of Boston, Massachusetts, writes :

"I have a farm in Falmouth (Cape Cod) where my tree planting has been done, and in that town I know of two good sized catalpa trees, very thrifty, grown from seed that came from Cincinnati about twenty-five years ago. This would show that sea air is not injurious to it, and as Cape Cod is surrounded by water the climate is softer and less extreme than in the interior of Massachusetts, it may do better there than farther inland and to the northward."

Dr. John A. Warder, President of the Ohio State Horticultural Society, writes :

"The natural history of the catalpa tree is peculiar, especially in its limited range of habitat, being essentially western and southern, or more correctly south-western, being found in the Wabash valley farther northward than elsewhere, and making the finest trees, thence toward the mouth of the Mississippi. On the Savannah River it is said to be a scraggy tree. Like many other plants, however, it appears to have a much wider possible range, and the reports from Iowa inform us that they have a hardy variety that has withstood the severe winters of that region, as far north as latitude 42°. You have in Dayton a variety that blossoms two weeks earlier than others. In this neighborhood are some trees that are very much stunted and scraggy, though the soil is rich enough, others are upright and thrifty. At Terre Haute, Indiana, most of the catalpas are remarkable for their upright habit and thrift.

"We may be encouraged to plant the catalpa largely on account of its rapid growth and the good qualities of its timber. The seeds should be sown rather thickly in drills, covered about an inch with fine soil, and well cultivated for one year, during which time they will attain a height of twelve to twenty-four inches. The following spring they may be set out four feet apart each way, and cultivated as a crop of corn. This culture may be continued the following year, but the dense, or rather the broad foliage effectually subdues the weeds. Planted thus thickly the young trees spire upward, and the side

branches are smothered. It must be remembered that on account of the triple system of its physiology, this tree is very prone to branch in triplets, and thus prevent the formation of a good straight stem. It should also be borne in mind that the rapid growth, at first soft and yielding, and heavily laden with wide leaves, which become much heavier when wet by showers, is often unable to sustain its own weight, and bends down, causing the young tree to be crooked.

“In regard to your inquiry about thinning the trees, I have found already after six or seven years’ growth, they begin to die out, the weaker plants that are overshadowed by the stronger. My trees planted as above indicated, will not pay for thinning out at eight years, but might be better for having say one-fourth hacked down, but I think it will be cheaper to let them die and fall. Nor do I expect to find a profitable thinning in less than ten years, and only poles and stakes then.

“At twenty years there might be a cutting of posts and possibly of cross-ties, but not so many to a tree as you name. I think you under-rate the proportion of sapwood. I have a log that was twenty years old when cut, that has lain on the ground five years, and the outer layers, the sapwood, are crumbling with decay. My older trees have suffered in a peculiar way. In midsummer whole branches suddenly fail, the leaves wilt and drop, and presently dry up and fall, and the limb is dead as with blight, without any appreciable cause not yet seen in my plantations.

“By all means urge close planting, and the use of yearling trees, to be set with a spade, in the slit formed by it, at the rate of a thousand per day easily, after ground has been marked off with a light furrow or by a corn marker. They all grow whether cut down or not, but should be sorted for an even stand.”

Mr. Kramer near Dayton, writes:

“The catalpa seed you furnished me last spring, I planted in rows four feet apart and eight to ten inches in a row. It all germinated and grew beautifully, shooting up perfectly straight from three to five feet in height. I have two thousand as handsome trees as I would wish to see.”

Mr. Mumma, also near Dayton, writes:

“The catalpa seed I received of you last year I planted in rows four feet apart, six inches in the row. I think there was not a single seed that failed to germinate, and all grew splendidly from three to four feet in height. I have sold most of them to go west for transplanting. I shall plant largely next spring.”

Mr. Bear, of Heikes' Nursery Co., writes :

"I would transplant after first years growth, in rows four feet each way, cutting down to the ground, to secure more erect and more rapid growth. The seed may be soaked in tepid water, if thoroughly stirred every few hours, until the wings of the seed begin to turn towards each other, when they should all be planted within a few hours. To be successful, the process must be managed skilfully."

From observation and all the information I have been able to gather thus far, in planting catalpas I would select the earlier blooming variety of the catalpa for seed. Plant in deep, mellow, rich soil, three or four feet apart in rows, and leave the plant to stand not nearer than one foot in the row. I prefer this, from having seen them planted in one case in some places one foot apart, and in others in bunches and one to three inches apart. When in bunches and close together the shoots were one-fourth inch in diameter and twelve inches high; when a foot apart, they were three to four feet high and one inch in diameter. In another seed-bed, where they were all four feet by one foot apart, the first year's growth was four to five feet high and one inch in diameter. The ground was equally favorable in both cases.

At the end of the first year they are more easily transplanted. If they are left to remain two years in the seed-bed, they occupy less room and will grow as well. I would transplant at end of one or two years, as most convenient, but in either case I would cut down to the ground.

While the catalpa will grow in almost any soil, the deeper and the better the soil the more rapid the growth. River bottoms are deemed the best adapted to its rapid growth.

I would plant two by four or four by four feet. I think they will grow well two by four feet for eight years, at which time the Illinois Industrial University reports them large enough for stakes for fences and vineyards, and cut out alternate rows for that purpose. I prefer two by four or four by four feet to insure upward growth. After a certain period I think this too thick to secure the best development of the tree.

Dr. Warder and Mr. Bucklin, as will be seen by reference to what they have written, prefer to let nature do her own thinning and pruning. It is still my impression that at a proper period, whether this be eight, ten or more years, must be determined in each case by exercising sound judgment, I would cut out possibly each alternate row one way, and at the proper time each alternate row the other way, using what is

cut out for such purposes as it is suitable. Several of the largest and most successful planters of forests, practice and recommend this thinning out process, as the trees grow larger, and claim what is thus cut out more than pays all expenses of land and cultivation, thus securing a much larger growth and more valuable timber, at a clear profit. If this mode works well as to other kinds of trees, I see not why it will not work equally well in growth of catalpa.

If planted in rows, they can be cut out when pretty large, without injury to the remaining trees, by beginning at one end of a row, trimming up the first tree, and cutting off all large limbs, fastening a rope near the top, and bending the tree in the right direction as it is cut, and so with each successive tree.

It is my impression that eight feet each way is quite as close, if not closer than will enable the trees to develop best after twenty years or more. But this must be determined by observation.

Very recently I tested pieces of catalpa cut from different trees, with a variety of wood, with the following result:

Pieces of catalpa one inch square broke—with a pressure applied at the center between supports twelve inches apart—at 540, 500, 790, 500, 575, 752 and 762 pounds respectively. Black walnut, under same circumstances, broke at a pressure of 1042 and 848 pounds. Ash, 1216, and 1040 pounds. Oak at 932 and 1008 pounds. Yellow pine, 624 and 848 pounds. Norway, 384, 548, 584, and 640 pounds. White pine, 448 and 384 pounds. White walnut, 608 and 480 pounds.

Five thousand pounds pressure on a block of oak one inch square, resting horizontally on a solid foundation, compressed it to $\frac{5}{8}$ inch, another pressed to $\frac{5}{8}$ inch, and another to $\frac{1}{2}$ inch. Same weight compressed one piece of catalpa to $\frac{7}{16}$, one to $\frac{7}{16}$, one to $\frac{9}{16}$, and one to $\frac{7}{16}$. White pine was compressed to $\frac{5}{16}$. Norway to $\frac{6}{16}$. White walnut to $\frac{5}{16}$. Yellow pine $\frac{6}{16}$. Black walnut $\frac{10}{16}$ and $\frac{8}{16}$. Ash compressed one way only to $\frac{14}{16}$, another to $\frac{6}{16}$.

These samples were taken at random, and would indicate that catalpa will bear the pressure to which it is subjected when used as railroad ties. Two catalpa railroad ties have been in use near our office over four years, and twelve others for the last five months. All hold their spikes well, and show no indications of mashing more than oak each side of them, and over both of which heavily loaded trains pass almost hourly.

There cannot be less than 200,000,000 ties in the various railroads in the United States. At 200 ties per acre, it has required 1,000,000 acres of well timbered land to furnish them. The average life of ties is hardly more than five years. It requires 200,000 acres of land each year to keep up the supply. Three times that amount is required each year to furnish the lumber used in bridges and rolling stock. It requires the lumber on 1,000,000 acres of land each year to supply the wants of our railroads for all purposes.

If the foregoing facts have demonstrated that the catalpa will resist decay equal to any, if not better than any other timber, that it is suitable for ties, that it can be readily cultivated and grown in very large quantities—is it not an exemplification of that wisdom that forecasts the future and provides for its necessities, that all railroads in that portion of the country where it may be grown, plant at once enough at least to provide for their own future wants? Is it not equally wise for farmers to plant not only enough for their own needs but enough to supply their less provident neighbors, and also to supply the wants of the numerous railroads, who for various reasons do not provide for themselves, but depend on others for their supply.

I have done what I could to collect information on this subject, and shall continue to be under great obligation if any one having knowledge of facts bearing on this subject, will communicate them to me.

What I have done has been with a desire to disseminate valuable information, and if good shall be accomplished by it, to any, I shall be amply paid for my trouble.







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