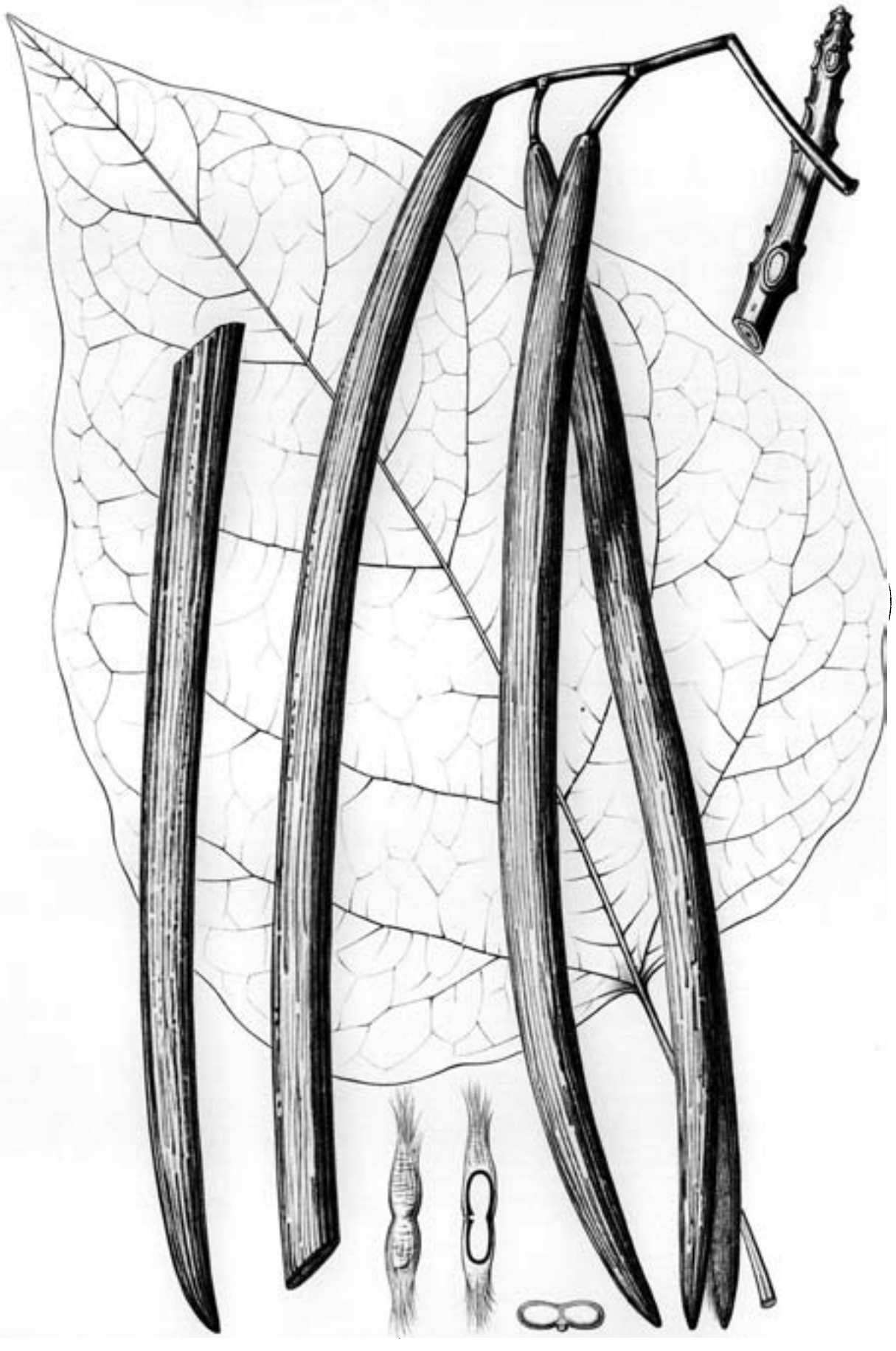

# The Great Catalpa Craze

*Peter Del Tredici*

**Zealous promoters once made claims about the value of the hardy, or western, catalpa that far exceeded the tree's true economic potential, obscuring its real worth**

Horticulturists, who make it their business to pass judgments on plants, generally consider the catalpa tree a disaster. Although very beautiful, its large, heart-shaped leaves create a major litter problem when they fall. And during the growing season, their lovely, soft-green tints are generally masked by infestations of powdery mildew. The catalpa tree is among the last to leaf out in the spring, and in the autumn its foliage turns brown and shrivels in response to the first touch of frost.

The catalpa is sparsely branched; consequently, for six months of the year it presents a very stark, almost gawky, appearance. Its long pods, which provide the reason for the plant's common name, the Indian bean tree, add a note of interest to the winter silhouette, but in the spring, when they fall, they provide the home owner with yet another reason to curse the tree. To top off this bleak situation, catalpa wood is quite brittle, and small branches regularly break off during storms.

Without a doubt the flowers are the primary ornamental feature of the catalpa. They are produced in early summer and rival those of the common horse-chestnut (*Aesculus hippocastanum*) in showiness, being quite large, pure white, and lightly speckled with purple and yellow spots arranged in parallel bands. Unfortunately, this bloom period lasts only about a week or so, depending on the weather.

Opposite: *Leaf, shoot, fruits, seeds, and ovule of* Catalpa speciosa *From* The Silva of North America, *by Charles Sprague Sargent Drawing by Charles E. Faxon.*

In short, the catalpa has too many black marks against it to win favor with modern horticulturists. Yet, this was not always the case. There was a time, in the late 1800s, when planting catalpa was the thing to do, and people up and down the East Coast, across the Great Plains, and as far as California were madly planting the tree everywhere. The movement to plant catalpa was a fad not dissimilar to the one of planting *Paulownia* in the middle Atlantic states today or *Ailanthus* in urban areas, from the early to mid-1800s.

While the active planting of catalpa has by and large ceased, the tree has managed to increase its range on its own, as spontaneous seedlings sprout up along highway embankments, roadsides, and stream banks throughout the East Coast. In some towns, spontaneous catalpa is so well established that one is tempted to look upon it as part of the native vegetation.

## The Two Species

There are two distinct species involved in the parentage of these escaped catalpas. Both are native to the eastern United States and, while very similar, occupy nonoverlapping ranges in their wild state and have quite distinctive growth habits. The first, the southern catalpa, *Catalpa bignonioides*, occupied a rather limited range before the European settlement, growing along river banks from central Alabama and Mississippi to western Florida. Because of its showy flowers, catalpa was very quickly and widely planted throughout the south, so that even the early

botanists could not determine its original range with certainty.

The second species, the western, or hardy, catalpa, *Catalpa speciosa*, is geographically separated from its southern cousin, growing in a small area encompassing southern Indiana, Illinois, Missouri, western Kentucky and Tennessee, and northeastern Arkansas. This disjunct population of catalpa was not recognized as distinct until 1853, when Dr. John A. Warder of Cincinnati, Ohio, first described it. While it is difficult if not impossible to distinguish the two species in the herbarium, they are fairly easy to separate in the field. For one thing, *Catalpa speciosa* blooms in late May or early June in New England, a good two weeks before *Catalpa bignonioides* does. For another thing, *Catalpa speciosa* usually is a tall, narrow tree, upwards of 80 feet in height, with a straight trunk, while *Catalpa bignonioides* is considerably smaller, usually around 40 feet, with a contorted or low-branched trunk and a wide spreading crown.

In areas where the two species are planted together, there is often an overlap in the end of the *Catalpa speciosa* bloom and the start of the *Catalpa bignonioides* bloom. This raises the distinct possibility of hybridization, which, if it occurred, would give rise to trees intermediate between the parents in stature and in time of bloom. It is quite possible that some of the spontaneous plants one sees along the roadsides are of hybrid origin, in contrast to the cultivated plants, which are usually identifiable as one species or the other.

The question remains as to why and how these two species of catalpa came to be so widely planted that they became part of the spontaneous flora of the East. The answer eluded me for many years, until I consulted the fountainhead of information on trees, *The Silva of North America*, by Professor Charles Sprague Sargent. This many-volume work is special because it was produced at a time when botany, horticulture, and forestry were not seen as separate specialties; it contains, therefore, everything that was known about trees through 1894.

### Apostles for Catalpa

According to Sargent, two men, E. E. Barney of Dayton, Ohio, and Robert Douglas of Waukegan, Illinois, became apostles for the western catalpa during the 1870s, the former writing and publishing a book about the virtues of *Catalpa speciosa*, while the latter was the principal contractor for the actual planting of catalpa on large tracts of prairie owned by various railroad companies. By his own reckoning, Douglas had planted over two and a half million seedlings throughout Kansas and Missouri in less than six years. Barney's pamphlet of 1878, *Facts and Infor-*

*Several fruits of* Catalpa speciosa *Photograph from the Archives of the Arnold Arboretum*

*mation in Relation to the Catalpa Tree,* offers a clear picture of the catalpa gospel of the day.

A railroad man, Barney saw the catalpa as solving the specific problem of obtaining railroad ties for the construction of new lines across the treeless Great Plains. Barney felt that catalpa wood was the ideal solution to this problem because it was extremely resistant to decay. Catalpa was further suited to the task since it grew incredibly fast and was not particular about what type of soil it required. Barney predicted that seedlings planted in good soil would produce four to eight ties each after twenty-five to thirty years of growth.

In addition, Barney advocated its use for poles, fence posts, and, because of its beautiful flowers, general civic beautification. He also stressed the fact that while there were two distinct varieties of catalpa, only the hardy, or western, variety grew fast enough and straight enough to have any economic potential. The southern variety, while it was equally beautiful in flower, was a much smaller, less straight tree that was useless for railroad ties or poles. In the second edition of his pamphlet, published in 1879, Barney included articles by both C.S. Sargent and J.A. Warder, which made it much more scientific than the earlier work.

Barney did much more than attempt to convince people to plant the tree; he actually offered them seeds of *Catalpa speciosa*: "I will send by mail, postage paid, to anyone wishing the seed, enough to plant one acre four feet each way (2500 seeds), and a copy of this pamphlet, upon receipt of fifty cents." There can be little doubt that this early, at-cost distribution of seed played a key role in helping *Catalpa speciosa* to get established throughout the country. Catalpa seeds have no dormancy requirements; they germinate immediately upon sowing. No doubt this ease of cultivation also contributed to its successful establishment.

**An Experimental Planting**

A year after the second edition of Barney's pamphlet appeared, the most famous planting of western catalpa was undertaken by Horatio Hollis Hunnewell, Charles Sprague Sargent's friend and relation. Hunnewell was first and foremost a businessman who served either as director or president of some thirty-four different railroads between 1852 and 1901. He was also deeply interested in plants. In 1880, at the age of sixty-five, he managed to merge these two interests by commissioning Robert Douglas to plant four hundred acres of *Catalpa speciosa* and one hundred acres of *Ailanthus altissima* on a tract of prairie near Farlington, Kansas. The trees were planted on four-foot centers, which gave a density of two thousand per acre. The seedlings grew very rapidly at first, reaching an average height of twenty-two feet, three inches in diameter after only nine years. This growth rate was sufficient to have the experiment hailed as a success by all those who saw it (and some who didn't), and led to the planting of many more plantations by other railroad companies.

*Horatio Hollis Hunnewell (left) and Charles Sprague Sargent in Horticultural Hall, Boston Photograph from the Archives of the Arnold Arboretum.*

Unfortunately, the growth rate of the trees in the Hunnewell plantation slowed down considerably after the first nine years as overcrowding became an inhibiting factor. When the trees were last measured in 1898, at eighteen years of age, the average height was only thirty feet and the average diameter slightly less than four inches. In other words, after showing an average height increase of 2.4 feet per year during the first nine years, the trees slumped to an average height increase of only 0.9 foot per year during the second nine years.

In 1902, William L. Hall, superintendent of tree planting for the U.S. Department of Agriculture's Bureau of Forestry, estimated the average value of the Hunnewell plantation to be about $400 per acre. When the trees were finally cut in 1905, the actual gross profit was near $500 per acre. Hall calculated the expense of establishing and maintaining the plantation at about $115 per acre. Subtracting this figure from the $500 gross leaves a net profit of $385 per acre after twenty-five years.

Interestingly, almost all of the harvested trees were made into fence posts, while a few of the tallest and straightest trees were made into telephone poles. According to A. E. Oman, writing in 1911, none of the plantation trees ever grew big enough to make railroad ties. On three other Kansas plantations that Oman looked at, totalling approximately one thousand acres, the story was repeated — plenty of fence posts, a few poles, and no railroad ties.

While fence posts were not exactly what had been envisioned when the catalpa plantations were set out, they did make a reasonable profit for their owners. Unfortunately, the twenty to twenty-five years that one had to wait for it was too long for most farmers (and businessmen) to wait. And so corn and wheat were planted instead of catalpa.

Once the initial publicity blitz for western catalpa was started by Barney, planting of the species seems to have attained a momentum all its own. The fact that the plantations produced fence posts rather than railroad ties after twenty-five years was not, of course, fully appreciated when the seedlings were set out.

### A Practical Experiment

Even before the harsh economic realities of planting catalpa were fully appreciated by people, Hunnewell's cousin, the indefatigable Charles Sprague Sargent, raised serious questions about the widespread assumption that catalpa timber made good railroad ties. In 1886, Sargent published the results of an experiment that had been set up eight years earlier to test the practicality and longevity of catalpa ties:

> The Boston and Providence Railway Corporation began in 1878, at my suggestion, an experiment for the purpose of determining the value of different woods for cross ties. Fifty-two ties were laid on the 12th and 13th of December, under the direction of Mr. George F. Folsom, master carpenter of the corporation, who has had, from the beginning, the entire charge of the experiment, in the main outward track, at a point beginning 775 feet west of the Tremont Street crossing in Boston. The traffic at this point is very heavy, an average of sixty-five trains passing over this track daily. The following ties were laid:—
>
> Nos. 1 to 3, American Larch.
> Nos. 4 to 12, White Oak.
> Nos. 13 to 18, European Larch.
> Nos. 19 to 24, Western Catalpa.
> Nos. 25 to 30, Ailanthus.
> Nos. 31 to 36, Black Spruce.
> Nos. 37 to 38, Southern Hard Pine.
> Nos. 39 to 40, White Elm.
> Nos. 41 to 46, Hemlock.
> Nos. 47 to 52, Canoe Birch.
>
> The catalpa ties were furnished by the late E. E. Barney, of Dayton, Ohio, who for many years before his death was zealously engaged

in making known the value of the catalpa tree, and the remarkable durability of its wood.

Upon completion of the experiment, Sargent found that western catalpa had failed to live up to its press releases:

> The behavior of the catalpa is one of the most interesting features in the experiment. . . . The catalpa is a soft, light wood, with a specific gravity of only 0.4165; and it has not shown its ability to resist the heavy and constant traffic of the Providence Railroad as well as white oak and other heavier and harder woods. The two catalpa ties taken from the track in October, 1885, that is, after four years and eight months' service, are perfectly sound except under the direct bearing of the rails. These had cut down into the wood to the depth of five-eighths of an inch, while the whole mass of wood under the rail is reduced nearly to pulp by the separation of the layers of annual growth and the breaking of the fibre. This disintegration has penetrated so deeply that if the ties, otherwise perfectly sound, were turned over, the wood which would then come under the rail would not have sufficient thickness to hold the spikes. The pressure, however, to which these ties have been subjected has been unusually severe, and there is nothing in the behavior of these catalpa ties to show that they would not, in a road with lighter traffic, have stood for a number of years, and resisted as well and probably better than ties made from any other equally soft and less durable wood.

Sargent concluded that white oak made the best ties of any of the species included in his experiment. He noted, however, that

*A view from beneath of the coarse branch structure of* Catalpa speciosa. *Photograph by Peter Del Tredici*

*The two* Catalpa speciosa *trees received as plants in 1886 from Robert Douglas of Waukegan, Illinois. The trees are now about fifty-five feet tall. Photograph by Peter Del Tredici.*

American chestnut, which unfortunately was not tested, was to be preferred because it allowed the spikes to be removed more easily than did white oak, when the time came to move or change the rails.

Yet even this clear statement of the facts seems to have gone unheeded, as John P. Brown of Chicago, editor of *Arboriculture*, continued to advocate in his journal the planting of catalpa for railroad ties well into the 1900s. A very high percentage of the early numbers of *Arboriculture* were devoted exclusively to the "wonders" of hardy catalpa. Brown's efforts, like Barney's twenty years earlier, no doubt greatly stimulated the planting of the tree.

### Legitmate Uses for Catalpa

All of this is not to say that the widespread planting of *Catalpa speciosa* was a mistake to be regretted. To the contrary, the plant contributes significantly to the beauty and diversity of the countryside, whether in flower or in leaf. Belonging to a family of plants that is primarily tropical, the *Bignoniaceae*, it adds an exotic appearance to eastern and midwestern roadsides. Two stately specimens of *Catalpa speciosa* at the Arnold Arboretum (2776-A and 2776-B) show just how spectacular the tree can be when grown as a specimen. They were received in 1886, exactly one hundred years ago, as plants from the "Johnny Appleseed" of hardy catalpa, Robert Douglas of Waukegan, Illinois. Towering above the lilac collection, they are both about fifty-five feet tall with very straight trunks thirty-two and thirty-five inches in diameter, respectively. Dripping with long pods against the winter sky, they make a particularly dramatic impression. Nearby is a specimen of *Catalpa bignonioides* (12926-A) planted in 1891, that is forty-three feet tall, with a broad crown and a short trunk twenty inches in diameter.

The hardy catalpa can be a superb landscape plant *in the proper location*. It is not a good shade or street tree because of all the litter it drops. But in a parkland situation, where the tree can develop as a specimen, its showy flowers, distinctive foliage, and unique growth habit can add considerable interest to the landscape. In addition, its tolerance of poor, sandy soils, as well as of soils that are periodically inundated with water, makes the tree ideal for planting in habitats that have been badly disturbed or where spring flooding is a problem.

Catalpa also does well in cities. In downtown London, for example, *Catalpa bignonioides* is widely planted and seems to grow quite well. When I asked an English horticulturist why this was so, given that I hadn't seen it anywhere in the countryside, he replied that downtown London was the only place in England hot enough in summer for catalpa to grow. It's an odd twist of fate that a tree considered a weed by many in the United States should be a pampered prize in England.

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Peter Del Tredici, assistant plant propagator for the Arnold Arboretum, writes often on horticultural subjects for *Arnoldia* and *Horticulture* magazines. Not long ago, Theophrastus published his book, *St George and the Pygmies*, a study of *Tsuga canadensis* 'Minuta'.

## A Word about the Cover Artist and Her Work

*Arnoldia* is privileged to have for the cover of this issue an elegant watercolor painting of *Catalpa speciosa* by the distinguished botanical artist, Esther Heins of Marblehead, Massachusetts. Together with some sixty-seven other equally superb watercolors, this painting will be published during the spring of 1987 by Harry N. Abrams, Inc., of New York City under the title, *Flowering Trees and Shrubs*.

Educated at the Massachusetts College of Art and the School of Vision, Salzburg, Austria, Esther Heins studied painting with Ernest L. Major and Oskar Kokoshka. Her work has been displayed in many exhibitions, including three one-woman exhibitions. Paintings by her are part of the permanent collections of the Museum of Fine Arts, Boston, the Hunt Institute for Botanical Documentation, Pittsburgh; and the Boston Public Library. Previously, her work has been published by *Horticulture*, *Arnoldia*, *JAMA* (the journal of the American Medical Association), and the Hunt Institute, among others. *Arnoldia* is pleased again to share Mrs. Heins's work with its readers.

## Corrections

Because of an editor's error, the captions for *Daphne odora* 'Ringmaster' and *D. odora* 'Zuiko Nishiki' (*Arnoldia*, Volume 45, Number 2, Spring 1985, page 14) were transposed. *Arnoldia* regrets the error.

Through an oversight, Theodore R. Dudley's name was absent from the list of American members of the 1980 Sino-American Botanical Expedition given on page 13 of *Arnoldia*, Volume 45, Number 4, Fall 1985. Dr. Dudley, Research Botanist at the U. S. National Arboretum, who was especially interested in Chinese species of *Ilex* and *Viburnum* during the Expedition, informs *Arnoldia* that the painting printed on page 16 of that issue and attributed to "an unknown artist" was in fact done by Xin Ke-jing of the Creation Group of the Bureau of Culture, En-shi Xian ("County"), Hubei province. *Arnoldia* thanks Dr. Dudley for having passed this information along.