The Arnold Arboretum

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Cathaya Comes to the Arnold Arboretum

Stephen A. Spongberg, Horticultural Taxonomist

The Arnold Arboretum of Harvard University has recently received fifty seeds of *Cathaya argyrophylla* Chun & Kuang, a rare and endangered conifer endemic to China, which has not been grown or cultivated previously outside of the People's Republic. Like the dawn redwood, *Metasequoia glyptostroboides,* which was known as a fossil before living trees were discovered in China in the early 1940s and subsequently introduced into cultivation by the Arnold Arboretum in 1948, *Cathaya* is known as a fossil from Tertiary sediments in Eurasia and was only discovered as a living plant by Chinese botanists in the early 1950s.

Small native populations of this unusual cone-bearing tree are now known to exist in six counties in Guangxi, Hunan, Sichuan, and Guizhou provinces in China, yet the tree ranks as a rare and endangered species and is listed in the *China Plant Red Data Book.*

Likuo Fu (left) and Nan Li (center) from the Institute of Botany, Academia Sinica, Beijing, with Peter Del Tredici and Kim Tripp of the Arnold Arboretum and conifer specialist John Silba. It was wonderfully serendipitous that Professor Fu was visiting the Arboretum when the *Cathaya* seeds arrived in Jamaica Plain from Edinburgh.

Cathaya is intriguing from an evolutionary perspective inasmuch as its embryo and pollen are similar to those of the true pines (species of *Pinus*), while its wood resembles that of the Douglas firs (species of *Pseudotsuga*), and its overall habit and seed-producing cones are much like those of the spruces (species of *Picea*).

The consignment of seeds received at the Arnold Arboretum was forwarded from the offices of the Conifer Conservation Programme at the Royal Botanic Garden, Edinburgh, where a quantity of seed collected from one of the native populations was provided by Professor Likuo Fu, Director of the Herbarium and Laboratory of Taxonomy and Plant Geography, Institute of Botany, Academia Sinica, in Beijing. Professor Fu had requested that the seeds be shared with other botanical institutions in Europe and North America.

While these seeds provide the first opportunity to attempt germination of *Cathaya* at the Arboretum, the propagation staff is optimistic that plants will result. Diverse treatments will be applied to induce germination, but it may be six to eight months before it is known if plants will result. If plants are successfully grown, asexual propagation will be under-

taken to increase their numbers. The young trees will ultimately be included in the living collections of the Arboretum to evaluate cold hardiness and performance under New England climatic conditions.

Material of *Cathaya* will also be available for further botanical and horticultural investigations by scientists utilizing the Arboretum's collections. It is hoped that the success rate with the Cathaya seeds will be similar to the high germination levels obtained with the *Metasequoia* seeds received in 1948 and that this unique conifer will be preserved in cultivation as well as in nature in China.

Plant Sale Ends Drought

This summer's forty-day drought came to a spectacular end on the day of the 1995 Fall Plant Sale. Despite the downpour, the event was a great success. Over six hundred members and friends participated in the sale, Rare Plant Auction, and Plant Society Row.

John Furlong

A Visit From Mike Dirr

Dorothy Littel Greco

This fall Mike Dirr (center), author of *Manual of Woody Landscape Plants* and former Arboretum Fellow, gave a lecture and led two walks through the living collections for over two hundred students. Here, Gary Koller (left) enters into an animated exchange on the virtues of various cultivars.

How to Create a Logo

Bob Cook, Director

There comes a time in the life of every institution when it confronts the logo issue, that desire to project a modern, with-it image. Such times typically follow the arrival of a new administration. The usual procedure is to put a blank check in the hands of highly paid consultants who will bring a progressive understanding of marketing to the design of an emblem that—once created—will be ridiculed by your entire staff and vilified by at least half your constituency.

Instead, about a year ago we decided to tackle this issue ourselves with the help of *Arnoldia* designer, Andy Winther. Our first decision was recognition of reality: If one's institution is an arboretum, one can hardly avoid a tree in the logo. Next we asked whether there was something lying around that we already liked. Our attention immediately turned to an old, much-loved bookplate used by our first director, Charles Sprague Sargent. Could it be modified to enhance its symbolic content and simplify its design while retaining the quality of antiquity appropriate for the oldest public arboretum in the country?

With a reduction in ornamentation, we decided to keep the Victorian frame and banners but to seek a different, more emblematic tree. We quickly chose *Metasequoia glyptostroboides,* more popularly known as the dawn redwood, to replace the nondescript pine in the bookplate.

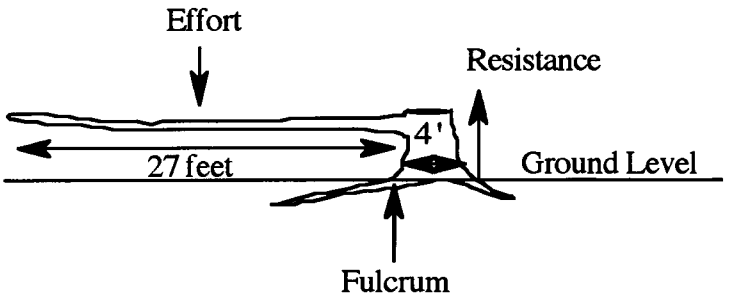
This species was once abundant in the forests of North America millions of year ago, known to Western science only as an extinct species preserved in fossilized stone. During World War II the dawn redwood was discovered growing in a remote river valley of central China, and an Arboretum-sponsored expedition was sent late in 1947 to retrieve seed. Following the arrival of the first shipment in early 1948, the Arboretum distributed the newly discovered species to over six hundred botanical institutions around the world. The first dawn redwood repatriated to North America after an absence of several million years is growing in the Arnold Arboretum today.

By choosing this species for our new logo, we hope to symbolize our traditional mission to support research and education through the collection of trees from distant lands. At the same time, by setting the dawn redwood against a rising sun, we hope to signal a new dawn for the future programs of the institution.

Cork Tree's Last Hurrah Provides a Science Lesson on Leverage

Christopher Randall

Can there be a silver lining to the passing of an old friend? As someone who has spent more than ten years teaching in the science classroom, my first reaction after an initial sadness was to consider the toppling of the cork tree in terms of a science lesson. Soon after hearing the news, I was bursting with questions: How many girls were on the branch? How much does a sixth grader weigh? How long was the branch they were sitting on? This tragedy was shaping up into a great lesson on levers and leverage.



Cork tree and branch depicted as a lever.

The cork tree was a classic example of a lever. The tree was similar to a seesaw, albeit a very unequally proportioned one. This seesaw had one incredibly long side, the branch, and a phenomenally short side, roughly the diameter of the tree. The roots at the base of the trunk directly under the branch were the fulcrum at the "center" of this lopsided seesaw.

Intuitively, we know that on a seesaw, the farther out we sit or the more weight we add to our side, the easier it is to lift our partner. Furthermore, if we place a great deal of weight at the extreme position of our seesaw, we can lift even an enormous partner. To determine the effect of a particular force (the weight of the girls in this case) at a certain position, one can use the following equation, known in physical-science parlance as the Law of the Lever:

Effort Force	×	Effort Distance	=	Resistance Force	×	Resistance Distance
(Girl's Weight)		*(Girl's Position)*		*(Force on Roots)*		*(Root's Distance from Fulcrum)*

That fateful day, 22 sixth-grade girls seated themselves along the branch, as had been the custom each year at the end of their class visit to the Arboretum. Let's assume that the average sixth grader weighs 100 pounds and that the branch is 27 feet long—quite close to the actual situation. To calculate the cumulative force the group developed, the force each girl contributed must be calculated. Since each girl sat at a different distance from the fulcrum, the force each girl contributed must be calculated individually, and then each of these forces must be added together to find the total force on the effort side of the above equation. Assuming the girls were equally spaced along the branch, this force amounts to 31,050 foot-pounds!

Let's now assume that the tree was four feet in diameter, again not far off the actual dimension. According to the Law of the Lever, the relationship between the two sides of the fulcrum can be stated as:

31,050 foot-pounds = 4 feet × ? Resistance Force

Dividing this through yields:

Resistance Force = 15,600 pounds (or 7.8 tons)

By using leverage, 2,200 pounds worth of sixth graders translated themselves into 7,763 pounds of force. Add to this the considerable weight of the branch itself, and it is no wonder the tree roots gave way. Interestingly, the fact that the tree's central leader and a large lateral branch had been removed a few years ago meant that the appreciable counterbalancing effect of the original trunk was absent. Additionally, the rot affecting the roots on the opposite side of the limb may have weakened the roots' ability to support the girls that day. I am not sure anyone approves of extending this lesson to other trees in the Arboretum, but I am sure that our beloved friend would appreciate knowing that we could leverage this calamity into a corker of a science lesson.

Chris Randall taught science for more than ten years in Baltimore, MD, and Cambridge, MA. Currently at the Center for the Enhancement for Science and Mathematics Education (CESAME) at Northeastern University, he works with math and science teachers on program implementation.

The cork tree's very long, horizontal branch has been left in place on the ground, one end still attached to its foreshortened trunk, the other propped up by a log. The Arboretum staff sought to make the death of "Corky" an educational experience by describing the negative effects of soil compaction on tree health. When heavy loads—or lots of small loads—are applied over the tree roots, the pores between soil particles are compressed and the amount of oxygen available to the roots is diminished. Over time, the effect on a tree can be lethal.

The Arboretum was among a select group of American museums to receive a grant for general operating support from the federal government's Institute of Museum Services. The grant of $112,500 is awarded through a peer review process that evaluates general standards in collections management, education, and other areas of museum operation.

The New England Chapter of the Victorian Society in America recognized one of the Arboretum's most outstanding landscape features, **the Eleanor Cabot Bradley Garden of Rosaceous Plants,** with their 1995 Preservation Award. Funded by the late Eleanor Cabot Bradley, it was designed by Gary Koller and Stephen Spongberg in the spirit of the larger Olmsted/Sargent landscape.

Jack Alexander, Chief Plant Propagator, has been elected a Fellow of the Eastern Region of the International Plant Propagators' Society. He is one of twenty-six to receive the honor since it was instituted in 1990 to recognize outstanding contributions to plant propagation through research, teaching, or leadership.

Peter Del Tredici, Assistant Director for Living Collections, was awarded a Presidential Citation at the annual Presidents' Conference of the Garden Club Federation of Massachusetts, Inc., by President Arabella Dane, for his significant work in documenting, managing, propagating, and reintroducing the endangered *Magnolia virginiana* at its only verified Massachusetts location Peter reported on the initial stages of this work in *Arnoldia,* March/April 1981

Kim Tripp, Putnam Fellow, has won the 1996 Research Grant of the International Plant Propagators' Society–Eastern Region for a collaborative project with Dr. Anne Stomp of the Department of Forestry, North Carolina State University. The grant will be used to test the influence of *Agrobacterium rhizogenes* on the rooting of stem cuttings in woody ornamentals that do not respond to standard propagation techniques (for instance, *Cercis* and some *Prunus*).

Autumn Beginnings for Visitor Learning

Richard Schulhof, Assistant Director for Education and Public Affairs

As we began testing two new programs this fall, ideas about education at the Arnold Arboretum grew by leaps and bounds. Over the past ten years, the Arboretum has reached thousands of adult and elementary school students with classroom courses, lectures, and field studies in horticulture and life science. On a drizzly Saturday afternoon in October, we broke new ground by testing programs designed to provide visitors to the grounds with equally rich opportunities for discovery and learning

As part of our Fall Open House event, Candace Julyan and Diane Syverson of the Community Science Connection (CSC) project set out to enable parents and their children to explore the diversity of maples and the wonder of fall color change in leaves. The hands-on activity, called Reading

Maples, included a tabletop exhibit of maple specimens, products, books, and a treasure hunt map that guided families in the search for leaves and data from a number of maple species. Created for Arboretum visitors as well as CSC participants, the program tested strategies that utilize the living collections to foster exploration and the exchange of observations and ideas about the natural world.

On the same afternoon, outreach horticulturist Chris Strand asked visitors to help test new orientation signage for the grounds. Consisting of "you are here" maps and roadside location markers, the system is designed to encourage visitors—particularly those visiting for the first time—to more confidently explore the Arboretum's full 265 acres. With installation scheduled for 1996, we envision the new signs and maps greatly improving access to the diverse collections and natural sites of the Arboretum landscape.

In the jargon of the museum world, these efforts seek to support "informal learning," the kind of exploration that occurs around exhibits and in discovery rooms, in which learners investigate at their own pace, responding to their own curiosities and interests In keeping with Charles Sargent's vision for the Arboretum as a "great museum of public instruction," such are the kinds of experiences we wish to make available for our visitors and the surrounding community.

Remembering Buzzy

On a beautiful Sunday in October, well over a hundred friends of Albert W. Bussewitz gathered in remembrance at the Arboretum. Many spoke eloquently of Buzzy, who died of heart failure this past August. Included in this group were associates from his years with the Massachusetts Audubon Society in Sharon and Norfolk and his earlier years spent in Rochester, New York, as well as Arboretum staff, volunteers, and friends.

Director Bob Cook, who hosted the occasion, announced that the Bussewitz family will give Buzzy's many superb photographs of woody plants to the Arboretum. The collection will eventually be housed here and made available for educational use. The family asks that donations in remembrance of Buzzy be sent to the Arboretum, where they will be designated for the curation of his photographic legacy.

Arboretum Cleanup

As it has for more than a dozen years, the Arnold Arboretum Committee, a community support organization, recently coordinated a fall cleanup of perimeter areas of the Arboretum. Working with City Year, an organization for volunteer youth, over 125 volunteers removed woody weeds and general debris from the abutting state-owned parcel as well as the Arboretum's South Street tract.

We are indebted to volunteers from Keyport Life Insurance Company of Boston and to Mercer Management of Lexington, which contributed a second year of service. Compliments and thanks are also due to the staff of the State Laboratory Institute and to Arboretum staffers Julie Coop, Kit Ganshaw, Jim Papageris, and Patrick Willoughby.

Grow with us . . .

When you give cash, stock, or other property to a life income plan supporting the Arnold Arboretum, you will:

- receive income for life
- realize an income tax deduction
- avoid capital gains tax
- save on gift and estate taxes
- benefit from Harvard's professional investment management at no cost to you
- invest in the future of the Arboretum

There are several plans in which you can participate. For more information, please contact:

Lisa M. Hastings, Development Officer
Arnold Arboretum
617/524-1718 ext. 145

or

Anne D. McClintock, Director
Planned Giving Office, Harvard University
800/446-1277 or 617/495-4647

Flora of the Lesser Antilles

Copies of the six-volume *Flora of the Lesser Antilles,* a long-term project of Dr. Richard A. Howard, former director of the Arnold Arboretum, is still available in limited quantities.

These six volumes constitute the first comprehensive flora of the area, and the treatments present keys to the genera as well as the species for easy identification. For each genus and species a complete modern description is provided; it includes coloration as well as measurements of floral parts. The descriptions are followed by geographic distribution both within and without the Lesser Antilles. All volumes are abundantly illustrated with line drawings that are both botanically correct and highly artistic. All species known in the Lesser Antilles, both native and introduced, are included.

The six volumes are available either individually or as a complete set. For the complete set a special price of $260 is offered that includes shipping and handling within the USA. (Add $5 for shipping outside the USA.) For volumes 4, 5, and 6 only, the special price is $205.

Individual volumes may be purchased at the prices given below, plus $2 per volume for shipping and handling:

Volume 1: Orchidaceae	$20
Volume 2: Pteridophyta	$25
Volume 3: Monocotyledoneae (other than Orchidaceae)	$35
Volume 4: Dicotyledoneae 1	$75
Volume 5: Dicotyledoneae 2	$85
Volume 6: Dicotyledoneae 3	$85

Checks should be made payable to the Arnold Arboretum, and all orders should be addressed to the attention of Frances Maguire, Arnold Arboretum, 125 Arborway, Jamaica Plain, MA 02130, USA.