

Silva

The Arnold Arboretum
of Harvard University

2021 SPRING | SUMMER MAGAZINE



The ARNOLD
ARBORETUM
of HARVARD UNIVERSITY



Visit our Landscape Safely THIS SPRING AND SUMMER

The Arnold Arboretum landscape remains open to the public. The Hunnewell Building and Visitor Center at 125 Arborway are closed to the public until further notice. Check out the “Plan a Visit” page on our website for any changes with respect to health and safety guidelines.

Enjoy nature while protecting yourself and our community

- The Arboretum landscape is free and open daily from dawn to dusk.
- As long as the City of Boston requires masks be worn in public spaces, all Arboretum visitors must wear a mask or cloth face covering in addition to maintaining a social distance of at least six to ten feet at all times. This is in accordance with Centers for Disease Control and Prevention (CDC) pandemic safety guidelines.
- To ensure the safety of visitors, water fountains are currently not operable.
- If you require assistance while on the grounds, please call the Arnold Arboretum Ambassadors (857.268.3185).
- Look for our Visitor Engagement staff in the landscape this spring and summer at our gates.

Thank you for the role you play in keeping the Arnold Arboretum open and sharing its treasures with Boston and the world.

Visit us online at arboretum.harvard.edu



The Arnold Arboretum of Harvard University

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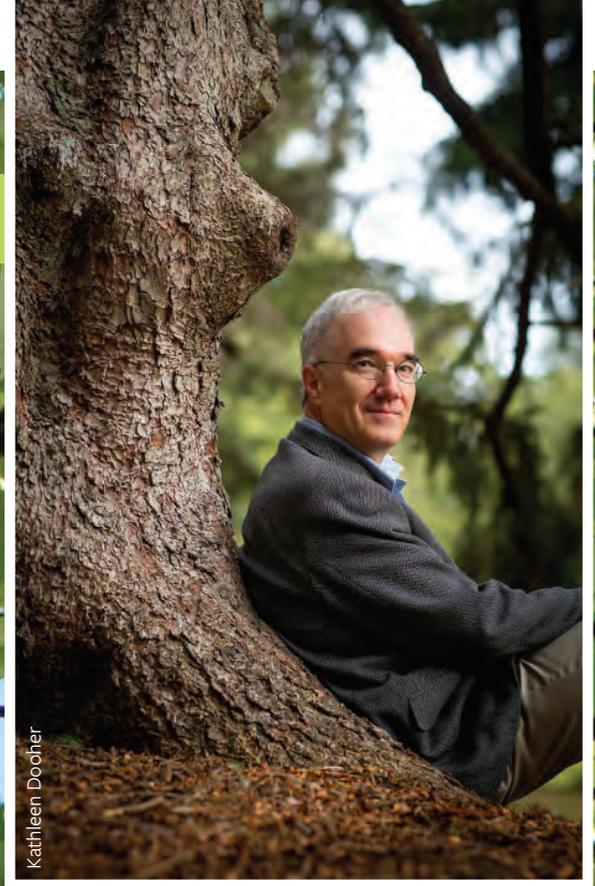
On the cover
 Farges catalpa (*Catalpa fargesii* 17664*A) by Jon Hetman. Photo of flowering dogwood (*Cornus florida* 523-82*A) at left by Danny Schissler.

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FROM THE DIRECTOR

Kathleen Doohier



Through the generosity of a friend of the Arboretum, a new mobile visitor center (conceptual image below) under construction this winter will soon provide a new way for visitors to interact with our Visitor Engagement staff in the landscape. Its portability and adaptable design will allow staff to help visitors via a retractable window and—when pandemic conditions ease—by inviting the public inside to see displays up close.





When Charles Sprague Sargent recruited Frederick Law Olmsted to help him design an arboretum for Harvard University in the 1870s, America's famed landscape architect had spent nearly two decades creating beautiful and bucolic spaces for the public including New York's Central Park and initial planning for Boston's Emerald Necklace. Olmsted was instrumental in convincing Sargent to negotiate the Arboretum's indenture with the City of Boston, which made the land holding Harvard's plant collections a public park for at least 1,000 years. The scheme they devised for the Arnold Arboretum grouped related plants for study while valuing a naturalistic aesthetic that would appeal, and be inspiring and restorative, to all visitors. Thus the Arnold Arboretum—America's first public “tree museum”—became Boston's first, and perhaps to this day only, completely free cultural institution.

This foundational value of free and equal access guides so much of what we do each and every day. Our learning programs in elementary science for students in Boston Public Schools have gone remote over the past year (see “Learning Together in the Landscape” on page 7), but these offerings continue to enrich and inspire without cost, subsidized wholly by the Arboretum and our supporters. In fact, since last spring, we have eliminated all paid programming from our public outreach to all ages. This spirit also pervades our research and horticultural missions, from awarding research funds and opening our collections and archives to scholars for study (see “A Case for Exploration” on page 12) to the extensive plant testing and evaluation work performed by our plant production team to bring new plant introductions to the nursery trade (see “Bringing the Arnold Home” on page 18). We are unwavering in our commitment to share our landscape and living collections as essential treasures of biodiversity, held and preserved for the benefit of society.

Olmsted and Sargent envisioned the Arnold Arboretum as a place where America's democratic ideals would become manifest, allowing all classes to intermingle and enjoy the profound lessons and graces of the natural world. At a very basic level, these values call on us today to pay closer attention to how we meet the community that visits our landscape, and to make the experience more equitable and welcoming for all. We started this process last spring by moving our visitor engagement staff from our closed Visitor Center to locations around our landscape, inviting socially-distanced interactions at many of the dozen gates that serve as portals to our landscape from surrounding neighborhoods. This will continue to be amplified in 2021, with the addition of a new mobile visitor center and unveiling of a new entrance and path from Arboretum Road in Roslindale. As spring and summer work their magic in the collections, I hope you too will endeavor to experience the Arboretum in diverse and novel ways, both in person and online, to discover the wonder of trees and nature anew. 🌿

—William (Ned) Friedman
Director of the Arnold Arboretum &
Arnold Professor of Organismic and Evolutionary Biology, Harvard University

Emerging leaves and flowers of pignut hickory (*Carya glabra*) photographed by Arboretum Tree Spotters. Read more on page 16 about this citizen science project to document life cycle changes in Arboretum plants for climate change research.

Of Memories and Plants

Suzanne Mrozak

Getting up close and personal with our Nationally-Accredited hickory collection

by Michael S. Dosmann, Keeper of the Living Collections

In a field behind my childhood home in Indiana, a huge shagbark hickory (*Carya ovata*) stands sentinel. As a little kid, I knew the tree marked the half-way point to the woods beyond the pasture—a route I often wandered (sometimes without permission). When I reached the tree, I would lean back, rest my head on the trunk, and look up, mesmerized by the coarse shags of bark and network of branches beyond. This tree grew to be a St. Joseph County champion and now measures 90 feet (26.8 m) tall and 31.5 inches (80 cm) in diameter. To this day when I visit my parents, I strike the same pose with my head against the trunk. The perspective never ceases to grip my imagination.

This tree instilled an early fondness for hickories, and the nursery rhyme line of “Hickory, Dickory Dock” probably helped me quickly learn its common name. The tree’s leaves showed up in multiple school projects including my herbarium collection in seventh grade. As I first spelled out C-A-R-Y-A on a label for that project, I could not have guessed that some thirty-five years later I would still be spelling the genus name in collection notes, in the same poor penmanship.

Carya includes nearly 20 species. Most are native to North America, including all of those alive in the Arboretum’s living collections. Although a handful of species occur in parts of eastern and southeastern Asia, their mostly frost-free origins mean they are not suited to Boston’s winters. Beyond the beloved shagbark, other common species include the shellbark (*C. laciniata*), which at times has peeling bark rivaling that of the shagbark (often leading to misidentifications); the notably hairy mockernut (*C. tomentosa*); and the highly variable pignut (*Carya glabra*). In addition to these and other “true hickories,” the genus also comprises the “pecan hickories,” of which the pecan (*C. illinoensis*) is most admired and the bitternut (*C. cordiformis*) the most northern and widespread.



The pecan (*Carya illinoensis*), seen here with its golden fall foliage, is a North American hickory species represented at the Arnold Arboretum by 18 accessioned trees, clustered primarily in the hickory collection near the Centre Street Gate and in a grove near the Mendum Street Gate on Peters Hill.

Our 2021 Director's Lecture Series, **Pecan: The Intersection of Biodiversity and Human Diversity**, entwined the histories of the pecan tree and humans over three lectures in February and early March. From the migrations of this quintessential American tree to its place in Indigenous culture and a searing memory of enslavement, James McWilliams, Robin Wall Kimmerer, and Tiya Miles explore the deeper meanings of human relationships with trees.

View recordings of all three 2021 Director's Lectures online on our Watch with Us webpage.

The Arboretum's connection to hickories and pecans goes back to the beginning of the institution. At one point, in those early years, the pace of collection reached a level that prompted Charles Sprague Sargent to refer to it as "hickory fever." (Jonathan Damery's 2018 article about this prolific history is a must read.*) In our nearly 150 years, we have cultivated more than 500 hickories, starting with two shagbarks in 1873. Today, we grow nearly 175 in the permanent collections, and another 30-40 will move out from our nurseries in the next few years. We cultivate ten different species (plus a few hybrids), each with multiple accessions collected from different parts of their native ranges. (Almost 70 percent of our trees are of wild origin.) This yields one of the finest collections of its kind on Earth. Because of this, the *Carya* collection received National Accreditation in 2002, and is one of seven others (like *Acer*, *Ginkgo*, and *Stewartia*) at the Arboretum that are part of the Plant Collections Network.

The Arboretum's first pecan accession arrived on April Fools Day 1881, sent from George Letterman in St. Louis, Missouri. It no longer survives, but the following year ornithologist Robert Ridgeway sent seed for a specimen that is now the Arboretum's finest. Standing at more than 95 feet (29 meters) in height, accession 12913*A towers over many other trees in the hickory collection, not far from an enormous Persian ironwood (*Parrotia persica*) and a smattering of wingnuts (*Pterocarya* spp.). Despite being almost 140 years old, this pecan is perfectly healthy, a fact I attribute to provenance and over a century of care. Ridgeway made the collection near the Wabash River in Mount Carmel, Illinois, one of the northern-most populations within the species' range. No doubt, a population that endured frigid midwestern winters would be content dealing with Boston's.

In our nearly 150 years, we have cultivated more than 500 hickories, starting with two shagbarks in 1873. Today, we grow nearly 175 in the permanent collections, and another 30-40 will move out from our nurseries in the next few years.

Among our 18 accessioned pecans are some younger individuals collected on expedition. These include several that Jonathan Damery and I collected in 2013 near Horseshoe Lake in Southern Illinois, about 140 miles southwest of Ridgeway's location. Tiffany Enzenbacher and Kia Woodruff made another collection in 2018 from Humnoke, Arkansas—about 400 miles to the south of Ridgeway's collection. We have individuals from these recent acquisitions sited not only in the main hickory collection, just off the Centre Street Gate, but in an expanding collection of hickories on the southern edge of Peters Hill.

When you next visit the Arboretum, check in on these young trees as well as their bigger brethren. Or, if you are from farther afield and cannot make the trip, perchance you can find a hickory near you to admire, maybe even shuck a few nuts to sample (assuming the squirrels have not beat you to it). And, don't forget to lean back and look up—you too will be captivated by the perspective. 🌿

* Damery, J. 2018. Hickory fever: Doing taxonomy by mail. *Arnoldia*, 76(1): 32-43.



William (Ned) Friedman



Jonathan Damery

The fruits of shagbark hickory (*Carya ovata* 22868*N) seen maturing on an Arboretum accession in the hickory collection in mid summer, contrasted with the remnants of pecan fruits (*Carya illinoensis*), gnawed open by foraging squirrels.

LEARNING Together IN THE Landscape



David Ascher

How many Field Study Guides does it take to photograph a flower? In this case, four. **From left**, Field Study Guides Catherine Donaher, Pat Suhrcke, and Carol Kuo hold a branch of Persian ironwood (*Parrotia persica*) steady for Dave Ascher to capture a close-up of the tree's emerging flowers (inset photo). Photographs of plants like this are used in Field Study Experiences programs to show children the temporal story of how various kinds of flowers form, blossom, interact with pollinators, and give way to fruits and seeds over the course of the growing season.

Tania Eriji

Spring, summer, fall, and winter! Even though the Arnold Arboretum's formal Field Study Experiences for Boston Public School students have been suspended during the health crisis, our dedicated corps of volunteer guides have gathered weekly to learn together in the Arboretum. Organizing independently, guides have roamed every section of the landscape to discover the diversity of the collections and build on their knowledge of the life cycles of temperate trees. By magnifying, photographing, and drawing in league with one another, our guides have employed and exercised a repertoire of skills for investigating plant biology and sharing their explorations with visiting schoolchildren. Brought together through a love of nature, their bonds as a community of learners as well as their commitment to the Arboretum's educational mission have only deepened during this challenging time. —Nancy Sableski, *Manager of Children's Education*

Learn more about our children's programs for elementary school nature study with Boston Public Schools, offerings which have gone virtual over the past year, on our website at arboretum.harvard.edu/educators. Free resources include a suite of virtual programs—from explorations of tree bark and Arboretum wildlife to read-alouds of illustrated nature stories—available for teachers and parents alike to engage kids in fun and illuminative nature exploration. 

Owls Well AT THE ARBORETUM

by Brendan Keegan, Arboretum Horticulturist



A northern barred owl basks in the sunshine at the Arboretum. Barred owls often move into urban areas in winter, expanding their hunting grounds during a season when prey may be difficult to find. Although this species is not known to nest in the Arboretum, staff installed specialized nest boxes this year as an enticement for future efforts. Their distinctive mating calls sounds something like “Who cooks for you? Who cooks for you all?” and resound during late winter and early spring in dense, wet forests.

The Arboretum landscape provides natural shelter and sustenance for a wide variety of hardy, urban-adapted wildlife. Our horticulture staff also purposefully cultivate and enhance habitat for species which might find city life more challenging. Building nest boxes for cavity-nesting songbirds, reintroducing native plants for specialist insects, leaving the leaves and decomposing logs for salamanders, and creating no-mow meadows for birds and mammals are a few of the ways we manage our collections for ecological benefit.

Enhancing nest habitat for resident owl species is another relatively recent example. At various times since its founding in 1872, the Arboretum provided habitat for species including barn owls, snowy owls, long-eared owls, great horned owls, screech owls, and barred owls, with the diminutive saw-whet owl an unconfirmed but likely presence. Today, the most common species, and only confirmed nesting residents, include great horned owls and screech owls. Increasingly common in urban environments, these two species benefit from local prey abundance such as rabbits, mice, and voles.

Urban habitat is fragmented, consisting of small patches of greenspace with constricted hunting and breeding territories. Nest site availability is likely an issue for all large raptors, but especially for owls as they do not build their own nests. Instead, they most often occupy tree cavities, utilize nests built by other birds or mammals, or even find openings in vacant structures. Nest sites such as these are in short supply even at the Arboretum, as deep cavities often indicate a tree ready for removal by our arborists. Other nests vary seasonally and deteriorate over time.

In 2018, Arboretum arborists began installing artificial nest structures to encourage owl nesting attempts in our landscape. These include screech owl boxes, barred owl

boxes, and great horned owl nest platforms and baskets. The installations help test our hypothesis as to whether resident species might benefit from additional nest sites. In addition, they offer us an opportunity to gather data on nesting attempts at known locations.

During late spring and summer, these structures provide support for other organisms. House wrens and great crested kingbirds use the screech owl boxes for raising their young while squirrels build drays on the platforms in the fall. Owls while squirrels build drays on the platforms in the fall. Owls begin their residence during winter and early spring. In recent years, a pair of great horned owls successfully raised a trio of owlets in one of our nesting baskets. The basket provided a safe nest site for the young birds, and gave us the pleasure of observing their nesting cycle from a safe distance.

Not every landscape is suitable to promote owl habitat. An important consideration is the impact owls may have on other wildlife, as great horned owls in particular may prey on species including osprey and peregrine falcons in addition to their preferred diet of rodents. Also, most owls prefer avoiding the prying eyes of humans, especially during the breeding season. Accordingly, the Arboretum does not disclose the location of owls or active owl nests in our landscape, and we encourage all visitors to practice ethical birding. For owls, this includes keeping your distance, keeping your volume low, and keeping photos of actively nesting owls off of social media.

A surprising diversity of species can adapt to meet the unique challenges of urban life. Green oases like the Arboretum already provide a helpful haven for many creatures, and this diversity contributes to the health of our landscape as an ecosystem. Careful actions such as habitat enhancements, combined with monitoring and studying the animals that take advantage of them, help us do a better job of enriching and sharing a landscape important to us all. 🌿



Three great horned owlets curiously look about in one of several artificial nests installed in 2018 by Arboretum arborists. At six weeks old, they keep busy eating leftover food, picking at one another, flapping their wings, and preening their feathers. In New England, this species begins laying eggs in January and February and young owls fledge by late April. This photo, by Head Arborist John DelRosso, was snapped more than 100 yards from the nest.

Over Time

From the outset of her exhibition proposal, artist Ginny Zanger was interested in looking further into the impact that global warming has had on plants. This concern brings an additional and ongoing focus to her work. The exceptional charcoal drawing, *False Spring/Fatal Budburst*, based on a photograph provided by researchers, is a haunting image that brings us a reminder of the consequences brought on by climate change. It also shows the power of art to move and inform us. As in Zanger's other works, an impression of fleeting time, and a somewhat tenuous hold to earth, conveys the prospect of impermanence. Her observations culminate in art that reflects a moment, a moment that in another time could be lost.

Q: *You have been active in climate change issues for years. How has your involvement in that activism and subsequent talks with Arboretum scientists informed the evolution of this exhibition?*

When the idea of this show came up, you put me in touch with Arboretum scientists, including Cat Chamberlain, an Arboretum Fellow and PhD candidate. She generously shared her phenology research with me in addition to some photographs that I found compelling and heartbreaking.

Bringing together my activist life and my artist life is a work in progress and harder than I would have imagined. As an artist, I identify with the natural world and see my role as protector. My drawing, *False Spring/Fatal Budburst*, visually warns us that plants can be fooled by spring-like weather in February. One of my own favorite pieces in the show is *Trees of Ancient Memory*. This piece reflects what Cat shared with me about the shape of trees and how they may become an ancient memory. Instead of growing straight up, climate change seems to be causing more lateral branching, which will weaken the trees.

Q: *The essence of plant life in the Arboretum is obvious in each of your works. There is a quiet energy in the art of Over Time. You mentioned that this past year the Arboretum was even more of a needed "sanctuary" for you. Talk about that and how your long relationship with the Arboretum has evolved and influenced your art.*

I moved across the river from Cambridge to Jamaica Plain fifty years ago and have been walking in the Arboretum regularly ever since. I raised my children here, snowshoe here, and I practice qi gong and tai chi on a weekly basis in the conifers. During this pandemic I owe a great debt to the Arboretum both in a personal sense and artistic sense.

Through Art, the Impact of Change in the Arboretum Landscape

Interview with artist Ginny Zanger by Sheryl L. White,
Coordinator of Visitor Engagement and Exhibitions



Images in Ginny Zanger's online Arboretum exhibition include *Trees of Ancient Memory* (spanning these pages) and *False Spring/Fatal Budburst*, inset at left.



I have maintained my sanity and my productivity during the pandemic because of the Arboretum's welcoming presence. During this past year, the landscape became studio, gym, and social venue. I began a practice of painting *en plein air* several times a week, sometimes every day. From there I've been able to grow a whole new body of work through my appreciation of the energy inherent in the individual trees.

Q: *The majority of your work in this exhibition is executed on Yupo paper with watercolors, a technique you call monotype painting. How does it work and what does it allow you to do?*

This is part of a process that I have been developing and has been evolving over the years. Although I thought I had discovered it myself, it was invented in France in the nineteenth century, popularized by Surrealists in the 1920's, and is known as decalcomania.

Yupo is a plastic polypropylene that is purportedly degradable and has a slippery surface that doesn't absorb paint like typical cotton rag paper. With Yupo, you can remove paint and apply again. It follows the dynamics of water on plastic. I apply a second sheet, and then I peel it off. I have either two paintings or the beginnings of two paintings, and it does things to the images that I couldn't have dreamed of doing myself. It's that serendipity, that accident, that spontaneity that I find really fascinating. 🌀

View **Over Time: Through Art, the Impact of Change in the Arboretum Landscape** by Ginny Zanger online via arboretum.harvard.edu/events

A Case for Exploration

Arboretum Sargent Awardee traces the history of the Wardian Case

by Luke Keogh, Visiting Scholar



Angela Kreutz

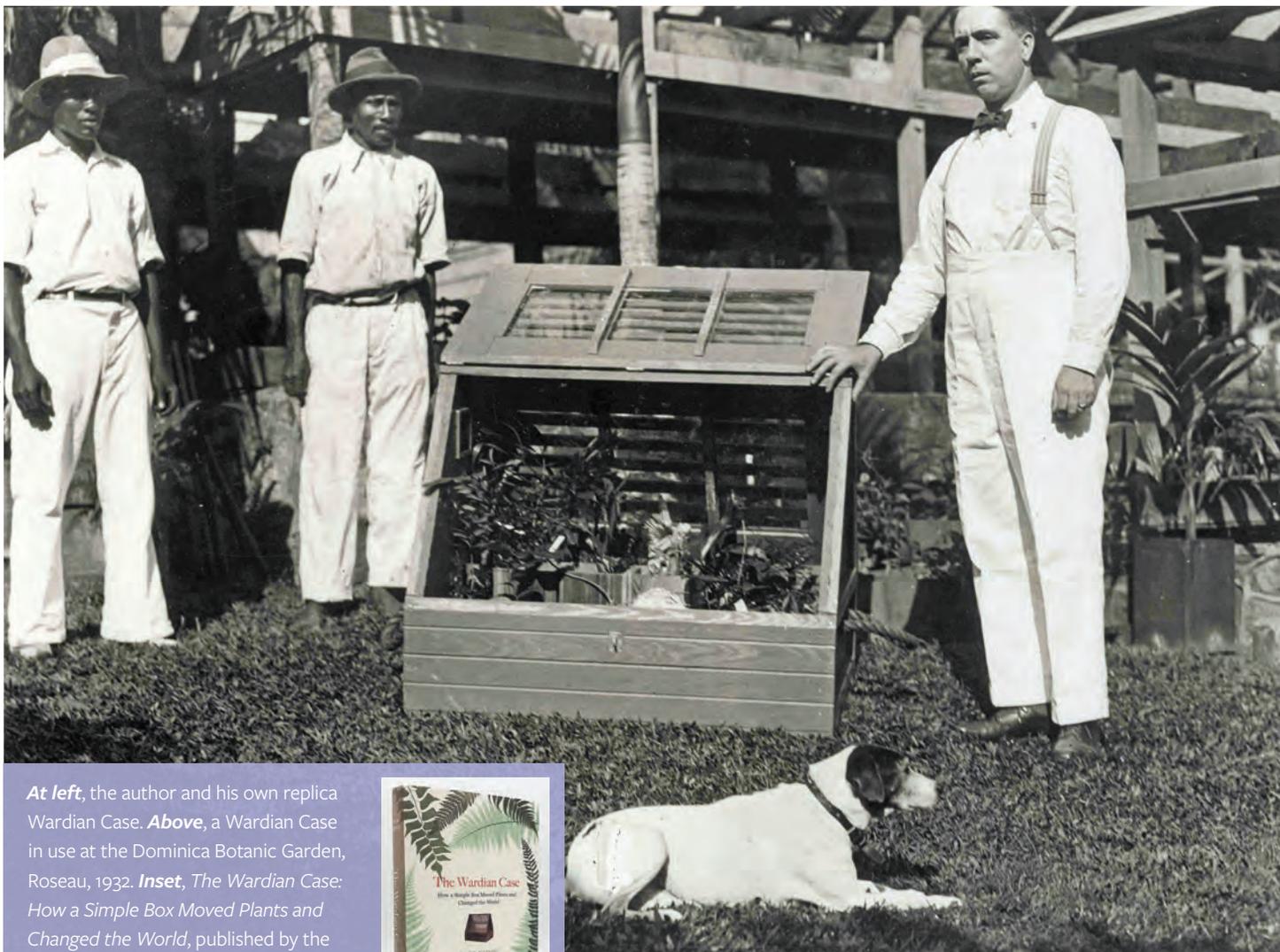
The first journey of a Wardian Case was an experiment.

In 1829, the surgeon and amateur naturalist Nathaniel Bagshaw Ward discovered—quite accidentally—that plants enclosed in airtight glass cases can survive for long periods without watering. Ward subsequently tested his case to transport live plants from England to Australia and back, and found great success. The Wardian Case, as it became known, revolutionized the movement of plants around the globe, and for more than a century aided the work of global plant explorers. The Case allowed a human-facilitated movement of nature unprecedented in history, with significant commercial, industrial, and environmental consequences.

Through the study of botanical archives, I wanted to understand how nature was moved and landscapes were transformed through the use of Wardian Cases. My investigation aimed at assessing not only the scale, movement and transfer of plants in Wardian Cases, but also researching how they were utilized by networks of British, German, and North American scientists and the role these groups played in global transfers. I also hoped to illuminate how the movement of nature was facilitated by

both local knowledge and global interconnection. Though a grant from the Gerda Henkel Foundation supported my archival research in London, Berlin and Singapore, the Sargent Award for Visiting Scholars at the Arnold Arboretum enabled me to bring the significance of North American scientists and horticulturists into this global project. The extensive library and archival collections of the Arnold Arboretum provided a primary focus for this aspect of my study.

Investigations at the Arboretum transpired over two trips, in October 2015 and March 2016. I hoped that historical accession records would reveal evidence of the Wardian Case as an important resource, but this was not the case. While the records at the Arnold Arboretum represent one of the oldest continuous sets of plant documentation in North America, they are very particular in detail. While precise in dates and locations of where incoming plants originated and where they were planted in the Arboretum landscape, the records do not note *how* plants arrived at the Arboretum, a key aspect of quantifying the use of the Wardian Case. While I discovered mention of Wardian Cases in correspondence—for example, the director of Kew Gardens mentions sending two Wardian Cases of rhododendrons to Charles Sprague Sargent in August 1873,



At left, the author and his own replica Wardian Case. **Above**, a Wardian Case in use at the Dominica Botanic Garden, Roseau, 1932. **Inset**, *The Wardian Case: How a Simple Box Moved Plants and Changed the World*, published by the University of Chicago Press in November 2020, represents the culmination of the author's research on its history and use.



only a year after the establishment of the institution—there is no mention of these Cases or any others arriving at the Arnold Arboretum. The reasons for this are numerous: woody plants are easier to transport as seeds and the climate of Boston required very hardy plants. Sargent preferred seeds and did not like the use of extravagant Wardian Cases. While I discovered few details of the Wardian Case, it actually provided an important turning point in my research, prompting greater focus on the networks of scientists who moved plants around North America and the globe.

Much of my time in the Arboretum Archives was devoted to investigating a two-part inquiry to understand the actions and aspirations of scientists and horticulturists who utilized Wardian Cases. The first part involved analyzing the correspondence between Wardian Case inventor Nathaniel Ward and famed Harvard botanist Asa Gray, which resides in the collection of the Harvard Botanical Library in Cambridge. Very little of Ward's correspondence remains which makes this quite a valuable resource.

The second part involved exploring Sargent's extensive correspondence with scientists and plant collectors, which reveals a critical period in the environmental history of the United States related to plant introductions. Of particular importance is Sargent's correspondence with Joseph Hooker, David Fairchild, Ellen Willmott, Harry Veitch, and Horace Macfarland; as well as his correspondence with scientists in the field including Ernest Henry Wilson, Frank Meyer, Joseph Rock, and William Purdom.

As an early career researcher, the Sargent Award has been of enormous benefit in my work. Importantly, by allowing me to spend more time in the United States it allowed me to extend the global focus of the project. Additionally, it offered me the opportunity to be part of the vibrant community at one of the United States' greatest gardens. One of the great pleasures of working at the Arnold Arboretum was the close contact I was able to enjoy with its expert staff. As a historian, I am often surrounded by humanities scholars, but at the Arboretum I also worked closely with botanists, horticulturists, and ecologists. This diversity of experience and opinion in plant exploration and collection not only enriched the project but also helped me become a more rounded scholar. 🐾

CONCERNING OUR Threatened Plants

Spring | Summer 2021

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visit us at arboretum.harvard.edu

The results are in! The Arboretum’s annual conservation review shows that ten percent of the plants growing in the collection—over 1,200 individual plants outside natural areas—are threatened in the wild. This is a pretty staggering number, but not surprising considering scientists estimate that one in five plant species on Earth is threatened with extinction. At the Arboretum, our next step is to put this knowledge to work to make informed decisions about the plants we grow, how we care for them, how we promote them to scholars, and how we engage the public in protecting biodiversity.

Some species are under greater threat than others, and while we track these various conservation rankings in our plant records database (BG-BASE), we also simplify things by bundling all plants of global “conservation concern” into this one, inclusive category. As a plant-collecting museum, the Arboretum’s most basic application of this label is to target acquisitions from the wild through expeditions. Fieldwork—gathering observations, photographs, and herbarium vouchers—plays an important role in our documentation process. And, of course, the seeds we collect from the wild and send to our Dana Greenhouses grow up to be future specimens in the living collections.

The Arboretum’s horticulture staff use a suite of digital resources to manage our landscape and provide comprehensive collection care. One of these is ArbDashboard, which integrates maps and collections data including conservation status. With a click of a button, staff can see which plants in our landscape are under threat in the wild. This may trigger prompt action from our horticulturists and arborists, from monitoring or providing extra horticultural care to requesting repropagation of the lineage through cuttings or grafting if the plant is in severe decline.

Our collections serve scholars from all over the world. We provide conservation information to all scholars requesting research material, whether

Among the threatened plants collected and preserved in the Arboretum’s living collections is white ash (*Fraxinus americana*), seen in decline at left. An exotic pest, emerald ash borer, has devastated wild and cultivated ashes in the midwestern and northeastern United States. The Arboretum has participated in efforts to collect ash germplasm from wild populations to aid preservation, research, and replanting efforts.

by Michael Dosmann, Keeper of the Living Collections,
and Kathryn Richardson, Curatorial Assistant

conservation is a focus of their study or not. Sometimes, when scholars are undecided about what species to include in their research, we direct them whenever possible to those of conservation concern. Why? Because any research done on a rare species benefits its conservation, even if it is simply to improve the awareness of the investigator and those who read the published paper (assuming conservation status gets a mention). To increase awareness and make plant selection easier, Conservation Concern is a filter offered on the Plant Search tool on our website (which provides records data on all living and historic accessions) and our map application, Arboretum Explorer.

Lastly, our annual audit helps us share more conservation stories, not just often-told tales like Franklin tree (*Franklinia alatamaha*) and dawn redwood (*Metasequoia glyptostroboides*). Public programs staff use the data to promote the importance of conservation and highlight specific plants through interpretive signage, online and in-person tours, and offerings like Tree Mobs. Whether you visit as a student, scholar, or everyday tree enthusiast, take note of the many plant species that are disappearing from nature. Like the conservation label we apply to these plants, awareness is crucial to make sure these plants aren't lost forever. 🌿

A QUARTET OF THREATENED PLANTS IN OUR COLLECTIONS

Maple-leaf oak (*Quercus acerifolia*)

Native to Arkansas, the maple-leaf oak is among the most threatened trees in the United States. This oak was first described in 1926 by botanist Ernest Palmer, one of the Arboretum's most prolific collectors. More recently, Keeper of the Living Collections Michael Dosmann collected maple-leaf oak on the Arboretum's 2014 Expedition to the Ozarks. An accession collected by Palmer—likely the oldest in cultivation—has been a frequent source of material for research projects on topics that span conservation biology to insect herbivory of leaves.



Pirate bush (*Buckleya distichophylla*)

One of the Arboretum's oldest accessions (245-46*A) is also of conservation concern. This specimen growing on Hemlock Hill was collected by famed Harvard botanist Asa Gray 178 years ago and requires extra care and attention due to its conservation status and advanced age. This species was also targeted on Arboretum expeditions to Tennessee in 2016 and 2019.



White ash (*Fraxinus americana*)



Since emerald ash borer was discovered in Detroit in 2002, this insect from east Asia has devastated ash populations across much of North America (it reached Boston and the Arboretum in 2014).

In just over a decade, white ash changed in status from “globally secure” to “threatened with extinction.” Not only has the Arboretum collected and preserved germplasm from the wild, but vouchers from our living trees are deposited in our Herbarium of Cultivated Plants and the Dried Emerging Leaves (DEL) collection to aid research. A wild-origin accession has also been highlighted on the Keeper's tour on our website.

Zhejiang hop-hornbeam (*Ostrya rehderiana*)



This tree, whose Latin name honors former Arboretum taxonomist Alfred Rehder, is critically endangered in its native China. Due to its conservation value, a 2002 accession in our living collections has been marked as a high priority for care and repropagation. Cloning this lineage (through cuttings, grafts, and even tissue culture) helps preserve it both in our collections and at other gardens through plant exchanges.



For the past six years, volunteers in the Arnold Arboretum Tree Spotters citizen science project tracked and documented seasonal change in Arboretum plants to aid climate change research. Here a Tree Spotter notes spring leaf-out on an oak on Bussey Hill. The multi-seasonal aspect of the program is further illustrated (*next page from top*) with Tree Spotters observing yellow buckeye in summer, changing leaf color in red maple in early fall, and the desiccated inflorescences of witherod after a second flowering in autumn was cut short by frost.

All images by Suzanne Mrozak

Observations by a Citizen Scientist

Arboretum Tree Spotters project closes, but volunteers begin a new chapter

by Suzanne Mrozak, Arnold Arboretum Tree Spotters Volunteer Coordinator

The Tree Spotters program began in 2015 as an initiative of the Temporal Ecology Lab at the Arnold Arboretum, under the direction of Assistant Professor Elizabeth Wolkovich. Lizzie's research at the Arboretum focused on plant responses to climate change. To gather and tap into data to support these studies, the Tree Spotters program partnered with the National Phenology Network (NPN) to train volunteers to collect data from 15 species of native woody plants at the Arnold Arboretum. For me, this marked the beginning of six memorable years with this terrific initiative for citizen science.

Subject: "Are you interested in having volunteer help?"

Little did I know when I emailed Lizzie back in January 2014 how much my simple query would change my life! On the eve of retirement, I read in *Silva* of Lizzie's faculty appointment, the establishment of her Temporal Ecology Lab, and her plans to pursue research programs related to climate change. I live close to the Arboretum's Weld Hill

Research and Administration Building in Roslindale, love the Arboretum, and like many I am very concerned about the climate crisis. I wondered if there was something I could do to support Lizzie's important work, and was absolutely thrilled when she replied "Let's talk!"

The following spring, Lizzie started the Arnold Arboretum Tree Spotters Program to engage the public in collecting seasonal information about woody plants, enlisting the help of Research Intern (now Associate Project Manager) Danny Schissler and Research Assistant Jehane Samaha to organize the program and me to coordinate the program's volunteer "Tree Spotters." Jehane worked to establish our program's presence in Nature's Notebook, NPN's online database, making all the data we collected at the Arboretum available to Lizzie's team and climate scientists around the world. We officially launched the program that May with thirteen enthusiastic volunteers.

We worked in pilot mode that first year, building the program as we went along. The first improvement we sought was to post signs to help the Tree Spotters

During the program's run, 227 Tree Spotters observed 75 plants representing 15 different species, and submitted more than 334,327 phenological observations.

locate our trees easily. The Arboretum later replaced these with more durable and visible signs—white and red trunk labels that included both accession information and Tree Spotter details.

Observing plants is an inherently solitary activity, so we developed a newsletter and various educational and social activities to help us all stay connected. We found fellowship in potluck parties and spent winters brushing up on our plant knowledge through “Botany Blasts” seminars and a book club. By the fall of 2019, we had established a diverse community connected through a love of plants and a concern for the environment. We celebrated our efforts with the “Fabric, Fiber, and Phenology” exhibit in the Arboretum’s Visitor Center in 2019, which featured the artwork of Tree Spotter Steffanie Schwam and a series of displays highlighting various aspects of our citizen science program.

But the time had come to wind down. With Lizzie’s lab relocated to the University of British Columbia and Cat Chamberlain (who had replaced Jehane on the Tree Spotters team) wrapping up her own research, there would be no projects at the Arboretum directly connected to the Tree Spotters data. Determined to get another year of good data into Nature’s Notebook, we volunteers continued to make observations on our own through 2020. We celebrated six years of Tree Spotting with a virtual wrap-up party last October that focused on our accomplishments: during the program’s run, 227 Tree Spotters observed 75 plants representing 15 different species, and submitted more than 334,327 phenological observations to the NPN’s database. Very impressive!

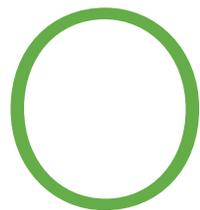
While this may sound like the end of the story, it’s really only the end of the first part. A core of committed volunteers will continue to track the seasonal changes of trees at the Arboretum for the benefit of scientists everywhere. Citizen science offers many avenues for nature enthusiasts like me (and you?) to get involved, to learn, and to contribute to solving problems through community effort. I look forward to seeing where part two of this adventure takes me, my fellow volunteers, and the plants we observe changing through the seasons. 🌿



Bringing the **ARNOLD** Home

by Christine Ventura, Living Collections Fellow

Arnold Selects program prepares new plant introductions



On the eve of its sesquicentennial, the Arnold Arboretum of Harvard University is renewing its commitment to advancing horticulture by providing and promoting exceptional plants to the nursery trade. This work dates back to the Arboretum's earliest days, envisioned in the founding documents drawn between the trustees of James Arnold's estate and Harvard College. We look forward to advancing this important legacy through a new program for evaluating, promoting, and distributing exceptional woody plants—Arnold Selects.

When the Arboretum was established in 1872, inaugural director Charles Sprague Sargent began at once to receive germplasm from his contacts in Europe and seeds from Asia. When Sargent directed the first national census of forests for the United States government in 1884, plants from all over the United States arrived at the Arboretum for study as part of this inventory. From the Arboretum's greenhouses, the offspring of these plants continued to flow to nurseries and enthusiasts who sought to display a diversity of plants on their estates. Plant collectors for the Arboretum, notably Ernest Henry Wilson, provided the Arboretum with plants and seeds from groundbreaking expeditions to temperate regions of Asia.

In the years that followed, the Arboretum established plant breeding and evaluation programs, with the dual goals of understanding the physiological and genetic basis for plant traits, and increasing the nation's horticultural palette through distribution. Under the direction of Karl Sax, Director of the Arboretum from 1946 to 1954 and Donald Wyman, Horticulturist at the Arboretum from 1935 to 1970, these programs flourished and established the Arnold as an authority on the use of woody plants in the landscape—for both professionals and popular enthusiasts.

During this period, many celebrated hybrids were bred by Sax and his colleagues at the Bussey Institute, then Harvard University's school of agriculture and applied biology. After 1970, this authority extended to the broader horticultural community of New England, with the Arboretum hosting annual plant sales in Weston and later member giveaway events in the landscape. That same year members saw the debut of an annual "plant dividend" (today known as the Arbor Day Seedling), another avenue for sharing superb plants. Horticultural contributions from this period are still celebrated and recognized, though the era's rapid pace of exchange may never be matched.

Under Director Robert Cook, then Director of Living Collections Peter Del Tredici focused on returning to the mission of acquiring and distributing all the woody plants fit to grow in the Arboretum's climate. The Plant Introduction, Promotion, and Distribution (PIPD) program was developed by Putnam Fellow Kim Tripp to serve these ends. Starting in 1993 and running through 2008, PIPD plants were selected by a team of Arboretum staff and distributed as a subscription service to nurseries, sister institutions, and enthusiasts. The Arboretum still fulfills requests from nurseries and researchers and provides plants to our community through programs such as the aforementioned Arbor Day Seedling.



Jon Hetman



William (Ned) Friedman

Plants offered to nurseries in 2021 as Arnold Selects are two superb re-introductions: *Abies koreana* 'Prostrate Beauty', a dwarf form of Korean fir with dense, dark green foliage and mauve immature cones, and *Acer rubrum* 'Schlesingeri', a red maple with the earliest fall color we have found. 'Prostrate Beauty' (913-67*B, above left and opposite page) is a superb specimen with well-retained features and is not well-known in the trade. 'Schlesingeri', though a popular red maple cultivar, has become confused in the trade, a problem which Arnold Selects aims to correct by distributing cuttings from our original 1888 lineage (3256*A, above right), collected by Charles Sprague Sargent from a neighbor's Brookline estate.

Times have changed since the days of Sargent and Wilson's contributions, Wyman's exhortations, and even the recommendations of PIPD. New pests and diseases have emerged. It has become evident that some previous introductions have not performed as intended or desired. In fact, some introductions were successful in ways that Sargent and Wyman could not have imagined, revealing noxious characteristics over time. Through careful planning, Arnold Selects will adapt evaluation and assessment programs to ensure that our introductions are thoroughly tested and proven to perform well and play well with others in the landscape.

In many cases, out of real necessity, introduction programs are driven by monetary returns. Trademark licensing agreements and patents provide assurance that growers invest in plants that consumers desire, and breeders can be assured of a return on their efforts. However, the Arboretum's goal for Arnold Selects is to increase accessibility to our living collections. Our model is to provide unique plant material to nurseries for propagation, along with rich cultural information and backstories, so that gardeners can keep their plants healthy and feel a personal connection to what they grow.

One hundred fifty years of expertise in cultivating these plants, rigorous curatorial work that accompanies our propagation trials, and robust documentation of our horticultural care provides authoritative information

to share with our nursery partners and the public. Our unique and longstanding relationship with these plants has transformed an appreciation for their horticultural merits to a real love and admiration for their enduring qualities—an understanding rooted in decades of stories about the origins, quirks, and charms of individual plants in our collections. Arnold Selects aims to deepen the relationship people have with the plants they grow through the stories only we can tell, illuminating the characteristics and history that make each plant special. In doing so, we aspire to also forge stronger connections between people and the Arboretum, as well as between people and our world. 🌿



ENJOY THE PERKS OF Membership

As a part of our mission to promote horticulture and the cultivation of exceptional woody plants, the Arnold Arboretum offers seedlings to members at the Sustaining (\$100) level and above through our **Arbor Day Seedling Program**. This year's plant selection is *Fothergilla × intermedia* 'Alice' **LEGEND OF THE FALL**®—a versatile, four-season shrub with beautiful autumn color (*pictured at right; inflorescences pictured above*).

Eligible members received postcard and email invitations for the 2021 Arbor Day Seedling distribution in February. Information on how to participate is on our website at arboretum.harvard.edu/seedling/. Offer available while supplies last and shipping request deadline applies.

To confirm or upgrade your Arboretum membership, please contact Wendy Krauss, Membership Manager by email at membership@arnarb.harvard.edu or call 617.384.5766.



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Suzanne Mrozak

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Posts from the DIRECTOR

Posts from the Collections highlight the myriad ephemera in the lives of the Arnold Arboretum's plants, captured by the eye and camera of Arboretum Director William (Ned) Friedman. Look for new posts on Instagram (@[nedfriedman](https://www.instagram.com/nedfriedman)) or sign up to receive Ned's posts at arboretum.harvard.edu/signup/

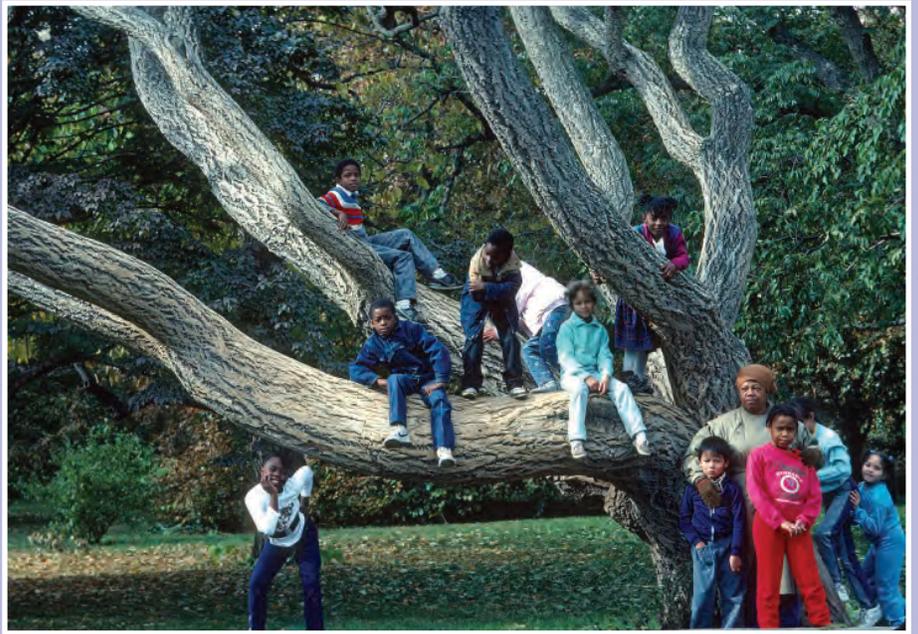


William (Ned) Friedman



AL & the ARNOLD

by Lisa E. Pearson, Head of Library and Archives



Albert Bussewitz, 1988. Photographic Archives of the Arnold Arboretum

In October 1988, Bussewitz photographed students from the Eliot School in Jamaica Plain posing with “Corky”, a beloved Amur cork tree that, until it succumbed in 1995, was the only tree Arboretum visitors were permitted to climb in.

The Arnold Arboretum has been fortunate over the years to rely upon the support of a dedicated group of volunteers, guides, and docents who are passionate about the institution and its mission. A prime example from the past half-century must surely be Albert “Al” Bussewitz. For decades he and his wife Flora gave the gift of their time to the Arboretum in the form of tours, lectures, and assistance on projects both large and small. Although it has been over 25 years since Al passed away, his generosity continues to inspire through the gift of his photographs to the Horticultural Library and Archives.

Al grew up on a farm in Wisconsin where he first developed his love of nature. After pursuing studies in the natural sciences at the University of Wisconsin, he migrated to Rochester, NY, where he worked for Bausch and Lomb. In this, the hometown of the Kodak camera, he developed his mastery of photography. His fascination with birds led him to found the Genesee Ornithological Society, now the Life Sciences division of the Rochester Academy of Science.

Al and his family moved to the Boston area in 1949 when he took a position with Mass Audubon as director of the Moose Hill Sanctuary in Sharon. When Norfolk’s Stony Brook Wildlife Sanctuary opened a few years later, he became director. In the mid 1960s, he continued his public education activities as a natural history lecturer for Mass Audubon. Soon after his retirement in 1976, Al and Flora moved to Bourne Street in Jamaica Plain to be near the Arboretum. They quickly threw themselves into numerous volunteer activities.

As a photographer of the natural world, Bussewitz was skilled and prolific, his oeuvre exploring all forms of plant and animal life. He even turned his lens to photograph New England’s historical

gravestones, like the markers in the Arboretum’s Walter Street Burying Ground. Over his life he took thousands of images, most of them output as slides. In the age before Powerpoint presentations, they were painstakingly arranged and loaded into carousels to illustrate his lectures.

Upon his death in 1995, a portion of his photograph collection concerning his activities with Mass Audubon and the Garden in the Woods were presented to the archives of those organizations. Last year, Al’s son Robert contacted me to see if the Arboretum might be able to provide a home for the remainder of his father’s collection. I enthusiastically accepted.

Numbering approximately 3000 slides, the collection reflects Al’s eclectic interest in all aspects of the natural world. There are images of plants, landscapes, and visitors at the Arboretum including many that appeared over the years in the pages of *Arnoldia*. In addition to these, numerous sub-collections of images explore topics from cemetery views to Vermont’s natural scenery, and include robust study collections of images that explore such things as fungi, birds, spiders, amphibians, and tree bark. Each slide is carefully labelled with the kinds of metadata we image catalogers crave, like titles, dates, and locations, all enormously helpful in cataloging the collection.

When our staff is able to return to the library at the end of the COVID-19 crisis, we look forward to digitizing this significant new acquisition with the help of interns from Bennington College and Simmons University. The Arboretum remains grateful to Al Bussewitz for his remarkable dedication to the Arboretum, and this gift from the Bussewitz Family offers intriguing glimpses into his work, interests, and continuing legacy. ↩

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Clockwise from top left: Just a Walk–Arnold Arboretum (2020), digital photocollage by Amy Ragus; Beech and White Pine (2020), ink on paper by Lizi Brown; Japanese Maple in Fall (2020), photograph by Joel Kershner.



ART IN THE ARBORETUM
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Look Again

Seeing Nature Through a Different Set of Eyes
Photographs by Joel Kershner
A Virtual Exhibition, March 20–June 20, 2021

A Walk in the Arboretum

Digital Photocollages by Amy Ragus
A Virtual Exhibition, April 29–July 18, 2021

Growth spurts, Knobs and Knuckles

An Environment of Trees by Lizi Brown
A Virtual Exhibition, July 23–July 10, 2021



The **ARNOLD**
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