

# SEASONS

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**Morris Arboretum**  
UNIVERSITY of PENNSYLVANIA

*Official arboretum of the Commonwealth of Pennsylvania*



# SEASONS

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Photo: Paul Meyer



Photo: Christine Pape

## A Note from the Executive Director

**BILL CULLINA**, *The F. Otto Haas Executive Director*

There is a natural rhythm at work in a public garden. After a long winter, spring brings a welcome, frenetic energy as life awakens. It is my favorite time of year, not just for the magnolias, cherries, and woodland wildflowers, but also for the throngs of smiling visitors that return to marvel at nature's vernal spectacle.

It is hard to describe the quiet emptiness, wandering through the Arboretum this glorious spring. It was as if a troupe of venerable actors were giving a heartfelt performance to an empty house. It reaffirmed to me in an unprecedented and visceral way that a public garden is nothing without its people.

It took a few weeks for the shock of closing to settle in and the routine of zoom meetings, videos, and phone calls to seem almost normal, but I am very proud of our staff and how everyone has adjusted to digital operations. The horticulture and facilities staff have continued to work a staggered and appropriately distanced schedule, while the rest of us have been online, planning eagerly for your eventual return. We have instituted a few changes for the safety of staff and visitors during what will likely be a stepped return to normal. To limit crowding, we are requiring advance tickets for all guests. Though we realize that this is an inconvenience, we hope the value of an uncrowded experience will far outweigh it. We will not be able to open all buildings and features of the Arboretum at first, but will do so as soon as we feel we can do so safely. While you have been away, the Rose Garden renovations have been completed, the Fernery is getting its much needed heating replaced, and work on the complete restoration of the incredible Step Fountain is about to begin.

I know I speak for all the staff when I say—"We can't wait to see you again soon!" In the meantime, I sincerely hope you and yours are safe.



# We Hope to Welcome You Back Soon!

Morris Arboretum is preparing to open! Staff are working diligently to provide a safe, fun, and relaxing experience for all visitors in conformance with State, CDC, and University of Pennsylvania guidelines. Keep an eye out in your email for an announcement of when we will re-open. During this first phase of re-opening these new measures will be in place:



## **Advance Tickets Required**

Members visit free but must reserve a time



**Face Coverings Required for All Visitors Age 2 and older**



**The Visitor Center, The Shop, & Café are Closed at This Time**



**Bring Your Own Water & Snacks**



**Limited Number of Visitors in the Garden at One Time**



**One-Way Circulation to Aid in Social Distancing**



**Temporarily Closed: Garden Railway  
*Out on a Limb*  
Log Cabin  
Fernery**



**Restrooms Cleaned Regularly and Hand Sanitizing Stations in the Garden**



# Caring for the Garden During Closure

The Morris Arboretum was required to shut its gates to the public on March 14th just as the garden was bursting into spring. *The Gayle E. Maloney Director of Horticulture and Curator* Anthony Aiello responded to questions about taking care of the garden during the closure and making sure it would be ready to re-open to visitors eager to see what they had missed.

## What was your biggest challenge during the garden closure?

Obviously the biggest challenge was keeping up with caring for the garden. For the heart of spring we had been at reduced staffing levels, and all this time the turf grass and weeds kept growing. So we’ve been playing a lot of catch up since late April.

Likewise, all of the plants in the greenhouse have kept growing and seeds that were sown in the fall and winter have been germinating all spring. We’ve been working to keep all of these plants healthy. Behind the scenes, our plant records allow us to keep track of everything coming or going into the living collection. We have been short-handed staffing this role, so I’ve been trying to stay on top of the records during closure.

I really cannot thank the Horticulture staff enough for their efforts during this time. It’s been extraordinary to see their dedication and commitment to the Arboretum. As we all know, it’s been a stressful time and hard to keep a sense of normalcy, so it’s been heartwarming and reassuring to see everyone hard at work in the garden.



We have been without our volunteers, whom we really miss, not just for all their hard work but as much for the social interactions that they bring. For the past few weeks we’ve had our own (socially distant) departmental team days, and staff has been happy to be able to work (if not shoulder to shoulder) in six-foot proximity of their co-workers.

## What measures were taken to keep staff safe?

At first we were only working in shifts, two or three days each week, so it was easy to stay apart. We have since ramped up progressively, going from three, then four, and now five days each week. We have taken many steps to keep everyone safe: staggered arrival times, making sure that we don’t congregate, giving each of the horticulture staff a single assigned vehicle, wiping down the handles of all commonly used equipment, and requiring everyone to wear masks.

## Did the shutdown limit any plant or equipment deliveries or delay any scheduled contract work?

At first it did, but we were able to get many of the plants that we had ordered. Because we were working with reduced staffing, we decided to focus our planting efforts on areas with the greatest impact, such as the Rose Garden and Pennock Garden.

We also were able to oversee the deer fence project which is now in its final stages. This new fence has been installed all along the Arboretum perimeter, through Penn’s Woods, around the wetland, and along Paper Mill Run. The contractor is finishing the details such as adding gates inside of the Arboretum, and modifying the pedestrian and



vehicle gates along the perimeter. This new fence will allow us to grow a much wider range of plants and not have to worry about the deer browsing on them. It will also alleviate the need to individually protect our newly planted trees and shrubs, which will save the horticulture staff a huge amount of time.

## How did it feel not to have visitors to enjoy the hard work of your staff?

It felt odd to be so alone in the garden, especially during the first weeks when we were working with a skeleton crew and we had no mowers or contractors here. It was eerily quiet, but beautiful in its own way.

It was an especially good year for flowering cherries, a collection that we have worked on developing for the last ten years, so it was disappointing that there was no one there to enjoy them. It was also a great year for magnolias and crabapples, and again, unfortunate to not be able to share their beauty with visitors.

On my desk, I keep a description of the *Curatorship of the Arboretum*, which was written in 1941 when the Arboretum hired its first curator, Henry Skinner. One of the roles described is “fostering the enjoyment and educational benefits derived by the public from the collections.” I often thought of this while out in the Arboretum by myself, with no one else around to share this fabulous spring.

On a positive note, it was fascinating to see how the birds and other wildlife re-inhabited the Arboretum. For example, in early April I saw a committee of four turkey vultures on the roof of the studio (the small building located on the Holly Slope), something I have never seen in my 21 years at the Arboretum. Throughout the spring, there was a paddling of wood ducks in the Swan Pond, and the pileated woodpeckers were much more present than normal.

We’ve been working hard to make the garden look its best for when we are able to re-open. We have implemented some garden design changes, such as trying different mowing regimes to reduce the amount of mowing in certain less-trafficked areas as a way of conserving resources. We will attempt to interpret this so that visitors can see what we are trying and make it clear that this is intentional.

## Did you encourage the Horticulture staff to share the garden virtually through social media?

Yes! The horticulture staff has been engaged with this and are very aware that our visitors really wanted to know what was happening behind the gates while we were closed. It reminds me of the first opening of the Arboretum to the public in 1933. Very few people had seen “Compton” while John and Lydia lived here, so there was a huge rush of people when the public was first admitted. I can sense that pent up demand when I talk to friends and neighbors, and want everyone to know that we are looking forward to having everyone back—although not all at once and at a socially responsible distance.



Photos: Eloise Gayer and Anthony Aiello



# Keeping Things Up and Running

Tom Wilson, *The Moses Feldman Family Director of Physical Facilities* talks about some of the issues he managed while the garden was closed.

## What was your biggest challenge during the garden closure?

The biggest challenge during the closure was keeping essential staff safe while maintaining our facilities 24/7. The grounds and buildings had to be constantly monitored as there wasn't a major staff presence on site to alert us of any issues. Our buildings range in age from 10 to 260-years-old, so extra diligence is required.

## What measures did you take to keep staff safe?

From the beginning of the closure, we staggered staff workdays and shift times in order to limit unnecessary contact and interaction. Most importantly, we closely followed CDC and the University of Pennsylvania's Environmental Health and Radiation Service (EHRS) guidelines.

## Did the shutdown limit necessary deliveries or contract work? If so, how did you work around that?

At the time of the closure, we had several projects that were due to begin. For instance, the outdated and deteriorated cast iron heating system in the Fernery was slated to be replaced with a high efficiency unit (see photo at right). That work was initially put on hold while we waited for the materials, but we now have everything needed to complete this important restoration.



Photos: Tom Wilson



The renovation of the Step Fountain is another critical project that was due to be completed during this time. Work is currently on hold for this project as the vendor who is fabricating the bluestone for the area around the fountain remains closed due to the pandemic. Once they resume production, onsite work will begin to dismantle the fountain and upgrade the plumbing system. We are hopeful that this project will be completed by late summer.

Finally, while the Arboretum was closed to the public, we replaced the netting on the *Out on a Limb* exhibit thanks to funding from the Korman Family Foundation (see photo at left). We also installed a new tent behind the Widener Visitor Center. The upgraded tent will provide an enhanced experience for guests of the Café and particularly for wedding rentals. While we are disappointed that our visitors will not be able to utilize these features upon our reopening (access to these areas

is temporarily suspended in order to comply with social distancing guidelines), we look forward to the time when our guests will once again be able to enjoy these amenities.

## How did you prepare for safety measures once the garden re-opens?

As we prepare to welcome back our visitors, we will continue to implement the safety measures we are currently following. We will continue to adhere to CDC, state, local, and University policies to ensure a safe environment for both our guests and our staff. We will also be increasing the frequency with which we disinfect our restrooms, adding hand sanitizing stations throughout the garden, and installing supplemental refuse containers in the garden. We look forward to welcoming our members and friends back to the garden. Keeping everyone safe is our top priority.

# In Case You Missed It!

When the Morris Arboretum was forced to close the garden just as spring was bursting forth, Arboretum staff responded to the call to keep fans connected and engaged. In addition to working in the garden as spring demanded, the staff took time to create videos and blog posts for the Arboretum's website and YouTube channel. These were shared on social media, resulting in increases in fans across all platforms. From spring tours of the beautiful garden to informational videos including pruning shrubs, plants for pollinators, dividing perennials, identifying weeds, and more, fans of the Arboretum were treated to a virtual experience with its horticultural experts. Here are a few in case you missed them—click on the links below to learn more:



[Video: Rock Wall Crevice Planting](#)



[Blog Post: Plant Names Tell Their Stories: \*Magnolia sieboldii\* Honors the Swashbuckling Siebold](#)



[Video: Dividing Perennials](#)



[Video: How to Remove Spotted Lanternfly Eggs](#)



[Video: Creating a Garden Bed, Composts, and Mulches](#)



[Blog Post: What to Plant for the Bees](#)



# Morris Arboretum Interns Making a Difference

Each June, the Arboretum welcomes a new class of interns for a year-long program of hands-on learning. Working in various departments, they will gain valuable experience while observing the day-to day operations of a world class institution. Their year culminates with the completion of a project, some of which have resulted in the renovation of garden areas or in a new area of focus in education or research. This year, an exceptional array of projects were presented. Three of these projects, those by Alex Gunstensen, Eloise Gayer, and Alessandra Rella, are highlighted on the following pages. Below are the remaining projects from this year’s interns. Congratulations to each of them on a very successful year!

Emily Conn, *The Martha J. Wallace Endowed Plant Propagation Intern* –“A Gap Analysis of the Morris Arboretum’s *Hydrangea* Collection” **Click here to watch Emily’s project presentation.**

Dominique Groffman, *The Eli Kirk Price Endowed Flora of Pennsylvania Intern* –“Floral Development of *Ripariosida hermaphrodita* (L.) Weakley and D.B. Poindexter in Response to Recent Taxonomic Change” **Click here to watch Dominique’s project presentation.**

Luke Hearon, *The John J. Willaman & Martha Haas Valentine Endowed Plant Protection Intern* –“What’s the Catch? Collateral Mortality of Spotted Lanternfly Trapping” **Click here to watch Luke’s project presentation.**

Eliza Nobles, *The Martha S. Miller & Rusty Miller Endowed Urban Forestry Intern* – “Analyzing Soil Health and Wood Reuse at the University of Pennsylvania.” **Click here to watch Eliza’s project presentation.**

Caitlyn Rodriguez, *The Alice & J. Liddon Pennock Jr. Endowed Horticulture Intern* –“Evaluation and Recommendations for the Widener Wooded Path”

Nathaniel Flicker, *The Hay Honey Farm Natural Areas Intern* – “Enhancing Invertebrate Habitat on the Intensive Green Roof”



Intern Emily Conn assessed the Arboretum’s hydrangea collection with a focus on the “fuzzy leaf” varieties that fall under two classifications: Section Asperae and Section Chinenses. Within these groupings, the project included an analysis of the collection at the species and cultivar levels and outlined hydrangeas that are missing from or underrepresented in the collection, as well as recommendations for suitable additions. These recommendations favor wild-collected species and species available from the collections at regional arboreta. The project also entailed seed propagation of target species growing at the Arboretum, and cutting propagation of desired species from local institutions to diversify this growing collection.

Pictured at left are seedlings of *Hydrangea aspera* ssp. *sargentiana* (smaller plants on the upper left), and *Hydrangea bretschnideri*.



## Protecting Tree Roots

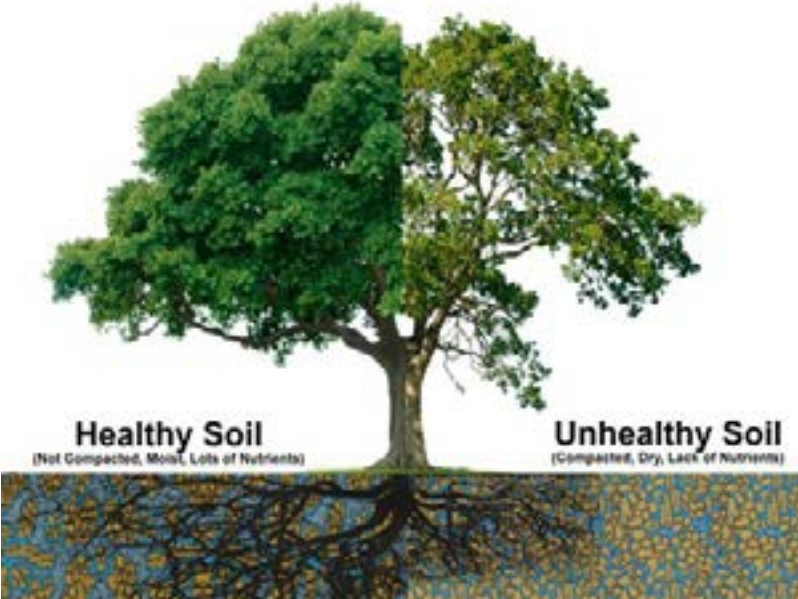
ALEX GUNSTENSEN, *The Walter W. Root Endowed Arborist Intern*

Trees need their roots to survive. The roots take in water and nutrients from the soil in the area and give it to the tree so it can grow into a beautiful feature in the landscape. A common belief about tree roots is that they grow as far as their branches reach out, but they can actually grow more than four times as wide as the crown of the tree. The roots of a tree do not extend down into the soil very far; most of them are found in the top three feet of the soil. There are two main types of tree roots: structural roots which primarily anchor the tree in, and feeder roots which take in the water and nutrients from the soil. Roots grow very close to the soil surface, and are easily damaged by soil compaction and erosion, both of which are problems that are easy to avoid.

Prevention is the best management method when it comes to soil-related issues and should be kept in mind in order to keep roots safe. Compaction occurs when soil particles are forced together, ruining soil structure by eliminating open voids called pores. Pores are crucial components of the soil, containing oxygen and water which are both required by trees and are taken in by the roots. Compacted soil keeps the water on the surface, making it take longer for plants to imbibe the water and causing water to linger, thus oversaturating the soil (note the compaction in the Dawn Redwood grove caused by repeated pedestrian traffic in the photo above).

Avoiding activities that compact soil such as driving or parking on soil, constantly using the same route when walking over turf, or working soil when it is wet will help prevent compaction from occurring in the first place. If it cannot be prevented, compaction can be undone by hiring an arborist to perform air tool work, using a gardening fork to punch holes in the affected soil, or digging up compacted areas and backfilling the area with a mixture of topsoil and organic matter.

Preventing or undoing soil compaction is a great way to not only reduce the number of problems caused directly by compaction, but will also lessen the amount of erosion that occurs. Erosion can expose tree roots to the surface leaving them vulnerable to many different sources of damage such as lawn mowers scalping the roots, or people walking over the roots and crushing them. Properly managing soil problems, whether through preventative measures or through actively addressing the problems, will ensure that trees and shrubs will thrive for years to come.





# Design and Installation of Two Rose Garden Beds

ELOISE GAYER, *The Charles S. Holman Endowed Rose and Flower Garden Intern*

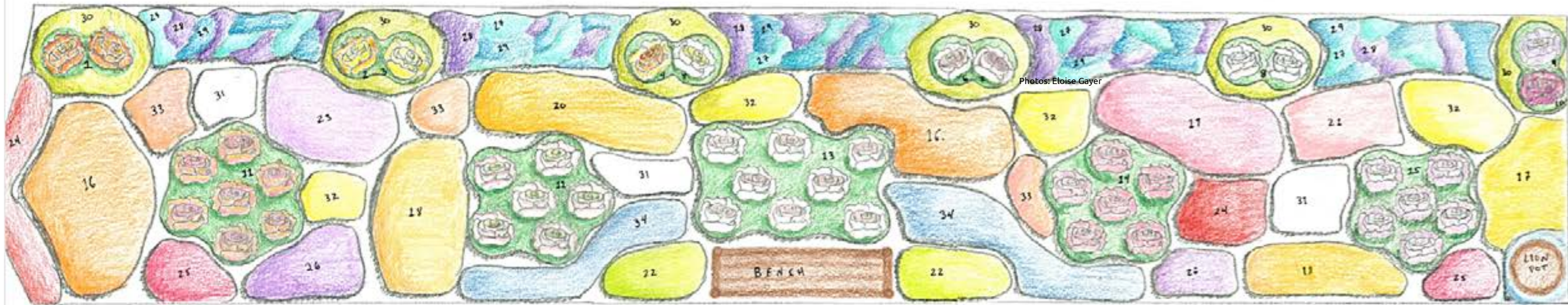
As one of the most highly trafficked and historically significant gardens at the Morris Arboretum, the Rose Garden is the subject of many improvement projects to encourage and accommodate its visitorship. Since the fall of 2019, the Rose Garden has been undergoing construction on the lower perimeter, removing a steep downward slope towards the central entryway, improving the hardscape by installing a seated retaining wall, new staircases and slate plazas at all three egresses, and redesigning the two planting beds that would be removed during the construction. Each intern (somehow) finds time to research, plan, and execute a project at the Arboretum during the year, and my project was the design and installation of the two beds at the bottom of the Rose Garden.

When I began, I had very little design experience. My academic background is in English and Cognitive Science, though I always had a passion for drawing and sculpture. Luckily for me, no design at the Arboretum is created without input from many people. Members of the Horticulture Committee, the Design Committee, the Horticulture Staff, and the senior staff at the Arboretum all contribute to planning, drafting and executing any new design.

To begin the design process, I explored the history of the area in the Morris Arboretum’s archives and by interviewing previous Rosarians. I chronicled the site’s planting designs starting with the 1909 Atlas, which features original

plantings and hardscape from the time of John and Lydia Morris, plans from the initial introduction of perennials into the Rose Garden in the 1990s, the All American Rose Selection display garden in the 2010s, to the present-day climbing roses surrounded by simple turf. From these discoveries, I was inspired to include historic roses in these beds that would have been contemporaries of John and Lydia Morris to preserve the historic nature of the garden.

Next I began to research the roses that would be included in the beds with several criteria in mind. To quote Vince Marrocco, the Arboretum’s Chief Horticulturist and current Rosarian: “I want visitors to smell the Rose Garden before they see it.” In my research, I focused primarily on roses that were fragrant, hardy in Philadelphia’s climate, and pest and disease resistant. I visited local rose growers and attended Philadelphia Rose Society meetings to get



Photos: Eloise Gayer

## ROSES:

- |                          |                       |
|--------------------------|-----------------------|
| 1. WESTERLAND            | 11. GOLD BLUSH        |
| 2. LADY BANKS YELLOW     | 12. MRS. DUDLEY CROSS |
| 3. MOONLIGHT             | 13. EARTH ANGEL       |
| 4. APRICOT IMPRESSIONIST | 14. SAVANNAH          |
| 5. CITY OF YORK          | 15. LE PETIT PRINCE   |
| 6. JASMINA               |                       |
| 7. BLOOMFIELD ABUNDANCE  |                       |
| 8. HONEYMOON             |                       |
| 9. QUICKSILVER           |                       |
| 10. STORMY WEATHER       |                       |

- |  |
|--|
| 16. AGASTACHE APRICOT SPRITE                   |
| 17. AGASTACHE KUDO MANDARIN                    |
| 18. AGASTACHE SUMMER GLOW                      |
| 19. CHRYSANTHEMUM 'GLOBAL WARMING PINK DAWN'   |
| 20. CHRYSANTHEMUM 'GLOBAL WARMING RUSTIC GLOW' |
| 21. CHRYSANTHEMUM 'CLARA CURTIS'               |
| 22. CHRYSANTHEMUM PACIFICUM                    |
| 23. CHRYSANTHEMUM 'MYSTERY MUM'                |
| 24. EUPHORBIA 'FENS RUBY'                      |
| 25. EUPHORBIA 'RED VELVET'                     |
| 26. GERANIUM PRATENSE 'DARK REITER'            |

- |  |
|--|
| 27. SALVIA OFFICINALIS 'BERGGARTEN'        |
| 28. LAVANDULA SSP.                         |
| 29. ROSMARINUS SSP.                        |
| 30. THYMUS SSP.                            |
| 31. VERBASCUM CHAMYU 'ALBA'                |
| 32. VERBASCUM BOMBYCIFERUM 'ARCTIC SUMMER' |
| 33. VERBASCUM 'SOUTHERN CHARM'             |
| 34. TEUCRIUM CHAMAEDRIS                    |

## Summerhouse Bed Planting Design





*Rosa 'Lavender Lassie'*



*Geum 'Wet Kiss'*



*Rosa 'WEKsmopur' EBB TIDE*

advice and support on which varieties to include. A total of 20 climbing rose varieties have been installed, plus a total of 12 shrub roses. Some roses were moved from other spaces in the garden, but most were entirely new accessions.

After much research, I was finally ready to begin the design. I worked with the Design Committee to draft a document outlining the goals, themes and practical details of the project, including a timeline of tasks to complete throughout the season and a sample plant list to compliment the roses. The overall theme of the design is transition. Since the beds flank a central exit/entry point in the Rose Garden, the design creates a sense of transition by echoing the color, textures, and plant selections of the nearby garden areas. To transition inwards toward the Rose Garden, we selected perennial plants and roses that matched the color schemes of the adjacent Rose Garden beds. To transition outwards towards the Herb Garden, we selected a palette of fragrant herbs along the edge of the new retaining wall to provide a sweet smell to visitors who stop there.

Once plants were selected, I began the drafting process with messy bubbles and lines that transformed, draft by draft, into a to-scale design plan, illustrated to reflect the bloom color of the plants (pictured previous pages). I also met with the Design Committee, the Horticulture Committee and the Arboretum's Executive Director, Bill Cullina, to ensure that everybody's input was fairly reflected in the final product. I learned how to create a design from scratch, and how to become an arbiter of the many suggestions and opinions that contributed to the project. Thanks to the collaborative and supportive nature of the Morris Arboretum's design process, I was able to successfully create a design that pleased everyone involved, and learn from a whole host of different people with different backgrounds, design styles, and experiences.

Using these completed plans, I sourced plants from nurseries and wholesalers that the Arboretum trusts. While waiting for the plants to arrive, I decompacted the soil in the area and amended it with fresh compost. The roses were planted first, having been ordered early in the season, and once the perennial and annual plants arrived, I was very lucky to have the whole Horticulture staff on my team for a massive (though socially distant) planting effort.

Now, the beds are full and growing in, the construction project is nearing completion, and the area will be splendid when the Arboretum opens again. Even though my time at Morris Arboretum is close to its end, I am so excited to visit the area in future, and I hope you will be able to visit the Rose Garden soon and enjoy it too!



Photos at left: Eloise Gayer, at right: Bill Cullina



# Engaging with the Arboretum’s Japanese Gardens

ALESSANDRA RELLA, *The McLean Contributionship Endowed Education Intern*

One late-summer day, I was tasked with examining the condition of signs present in the Arboretum’s Japanese gardens. What I found were faded, sun-blotched, barely legible panels. After muttering a quick “yikes!” to myself, I took pictures of the signs and brought them back to my office to decipher their content. I became particularly intrigued by the content of the Hill and Water Garden sign. I wanted to know more about the elements present in this garden and those that, according to the sign, make up all Japanese gardens. I reported back to the Morris Arboretum Interpretation Committee with a proposal to re-do the one sign in the Hill and Water garden, and to create three additional signs to interpret the Japanese elements present in the garden. Drawing on my own love for mindfulness and meditation, I proposed that the Japanese elements signs also offer short mindfulness practices to encourage visitors to engage with the garden through their senses. This became the major portion of my intern project.

The story of the Morris’ interest in the Japanese style can likely be traced back to 1876, the year of the Philadelphia Centennial Exposition. Like other countries invited to participate in this World Fair, Japan sent artwork, architecture, garden exhibits, machinery, and more, with the hopes of impressing those attending the Exposition. Japan was successful in doing so, and people were so captivated by the Japanese exhibit that there were reverberations of the Japanese style in Western culture for years to come.

In 1891, John and Lydia visited Japan as part of their “around the world tour.” It was here they purchased a Japanese tea house, which was to be the first garden feature back home at Compton, constructed on the property in 1898. From then until 1912, John and Lydia added four other garden features to the property, all of which were Japanese influenced: The Rock Garden in the Fernery, the Hill and Water Garden, the Overlook Garden, and the Rock Pond behind the katsura tree.

Japanese-style gardens are unique because they are created to be appreciated from a distance and viewed like a painting. Additionally, Japanese gardens are often created to be miniature replicas of a larger, more expansive landscape, either real or mythical. That means that garden elements, such as stones or water, act as metaphors for features found in the natural world, such as mountains or rivers. While there are many elements used in Japanese-style gardens, the three most basic ones are stones, water, and plants.

In creating new signs for the Arboretum’s Hill and Water Garden, there were two important stories I wanted to tell: the history of the Morris’ and the garden, and the story of Japanese gardens themselves. After going through a preliminary research phase to find information on these two topics, the next challenge was to take all the information I had and condense it to a limited number of words. The 100-200 words I fabricated per sign then went to the Interpretation Committee. Together, we meticulously looked over the text, analyzed every word, and made what felt like hundreds of edits. A professor once told me, “to write is to re-write.” That surely held true for the writing of these signs.

Choosing the images to be portrayed alongside the text was another effortful process. For the Hill and Water garden sign, I wanted to include a Japanese painting of a landscape to reiterate the point that a Japanese garden is meant to be looked at like a painting, and that the garden is a representation of a larger, more expansive landscape. I also wanted to have the Japanese characters for “hill and water garden” present on the sign, which were written out for me by Midori Asaoka Mizukami, a past Education Intern.

Once we had the perfect text and images, the signs were designed and printed. The last step was to determine the placement of each sign. To do this, myself, Lucy Dinsmore, and dedicated volunteer Hiram Munger went out to the Hill and Water garden and placed mock signs around the garden to see where each would look best. While doing so, we had to keep in mind: 1) Was the feature the sign referenced easily visible from the location? 2) Were the signs in an appropriate location for the mindfulness activities? 3) Were the signs located where visitors could stop and read them (i.e. not in a tight space or area that gets too muddy)? 4) Were the signs in a place that would not obscure, hurt, or damage plants? 5) Were the signs far enough apart that the small garden would feel too cluttered?

All the signs have now arrived at the Arboretum and are awaiting installment. We hope to have them installed by the time the garden re-opens this summer. Below is a sneak peek to what you will find in the Hill and Water Garden. You can also virtually tour the Japanese features present throughout the Arboretum on the website. **Click here to learn more.**

## Hill and Water Garden

Mr. Y. Muto, a highly sought-after Japanese landscape designer, built this peaceful, hidden garden in the Japanese hill garden style, *tsukiyama niwa*, for John Morris in 1905. In this garden, you will find traditional Japanese garden elements: hills, stones, water, plants, paths, a bridge, a shrine, and stone lanterns. Each element plays a symbolic role within the landscape. The earthen mounds here were created using the soil dug out to build the Swan Pond.

A traditional Japanese garden is meant to be looked at like a painting and serve as a miniature replica of a larger, more expansive landscape. In this way, all elements of the natural world are represented within the garden. Stones, water, and plants are the three basic elements that make up a traditional Japanese garden. Look for these three elements throughout the landscape.



### Green Peaks

1826, Noro Kaiseki  
(1747-1828),  
The Metropolitan  
Museum of Art

築山庭  
*tsukiyama niwa*





# A Palm Grows at the Arboretum

BILL CULLINA, *The F. Otto Haas Executive Director*

Tucked away among azaleas and oaks in a quiet part of the Arboretum is a most unusual specimen. If you venture off the side paths that follow the brook past the dawn redwood grove, you may stumble upon a five-foot-high clumping palm that has been thriving here for nearly 25 years. Needle palm (*Rhapidophyllum hystrix*) is native the Southeastern US from Florida north, to southeastern South Carolina, then west across central Georgia and Alabama to Mississippi. It is considered by palm experts to be the most cold-hardy palm in the world, surviving temperatures of 10 below zero or even more, for short periods of time. Needle palm is a relic genus with no close relatives in the Americas. In fact, its closest living relatives are the windmill palms of southern China, though fossilized needle palm fronds from the Eocene have been found as far north as Western Canada.

Fifty million years ago during what is termed the Early Eocene Climatic Optimum, worldwide temperatures were an average of 20 degrees Fahrenheit warmer than today. There was no ice at the poles, and even parts of Canada experienced a subtropical climate similar to modern day Florida. This warming is thought to have been caused by intense volcanic activity and subsequent release of greenhouse gases. If current trends continue, is it projected that we may reach this level of CO<sub>2</sub> concentration again in the 22<sup>nd</sup> century. In the past 25 years, our winter low temperatures in Philadelphia have gone up by five degrees, and since 1970, the growing season has increased by a full month! Summers are also getting warmer and wetter. It is not surprising then, that our needle palm is doing so well.

Needle palms get their name from the six-inch spines that clothe the short stem. These are not troublesome unless you must move or divide the plant! Old plants do form a small trunk, though this is usually masked by the many side shoots that spring up from the base. It is a rare species throughout its range, and many wild populations consist of but a handful of individuals. Its rarity is a bit of a mystery, as it sets ample fruit and seems hardly troubled by pests and diseases. One theory is that the needles—designed to repel now extinct herbivores from eating the fronds—now also prevent small mammals such as squirrels from gathering and dispersing the seeds.

Needle palm is available from several mail order nurseries. If you want to give one a try, site it in a lightly shaded place that is sheltered from winter winds with soils that are moist to wet and fertile. It is slow-growing, so nursery plants will likely be small. I would recommend that you protect your seeding with a heavy mulch of pine needles or straw for the first few years until its roots are well established. Alternatively, you can keep it in a pot for a few years that is overwintered indoors near a sunny window.

If you would like to bring a bit of the tropics to your own back yard, I would encourage you to give this fascinating 60-million-year-old species a try!

# Big Data on Plant Evolution

DR. CYNTHIA SKEMA, *Botanical Scientist*

By now almost everyone has heard of 23andMe or AncestryDNA. Similar to how this direct-to-consumer genetic testing for humans can tell us fascinating information about our ancestry and reveal important information about our health and traits, a recent scientific study has told us more about how plants are related and how they evolved.

With the publication last fall of the October issue of the leading science journal *Nature*, a large-scale collaborative project in the plant sciences came to fruition. The One Thousand Plant Transcriptomes Initiative (1kP Initiative) was a push to sequence over 1,000 plant transcriptomes to better understand the evolution and evolutionary relationships of green plants. The 1kP Initiative was led by Dr. James Leebens-Mack of the University of Georgia and Dr. Gane Ka-Shu Wong of the University of Alberta and was a collaboration of roughly 195 scientists from around the world. I was fortunate to be involved by contributing plant samples and taxonomic expertise on The Cotton Family (Malvaceae). The sampling for this study included an astounding 1,124 species of flowering plants, conifers, ferns, mosses, and algae. With such broad sampling, the data from this study will be the foundation for many future transformational studies in the plant sciences.



While direct-to-consumer genetic tests typically use little snippets of DNA to study genetic relationships between extended family members within a species (humans, of course), the 1kP Initiative used RNA to study evolutionary relationships between species across all green plants. Of particular interest, the 1kP Initiative study found that large expansions of gene families preceded the origins of the early-diverging major lineages of plants (green plants, land plants, and vascular plants), whereas whole-genome duplications are seen to have occurred repeatedly throughout the evolution of some more recent groups (ferns, flowering plants). Thus, the take-home message is that once some genes are freed from the constraint of necessary functions—or the more “play” there is in the genetics of an organism—the more chance there is to evolve novel traits and functions, some of which may prove adaptive!

## Breaking it Down

**DNA** is the self-replicating, hereditary material of nearly all living organisms. Deoxyribonucleic acids (or DNA) are the building blocks that form genes and chromosomes, which hold the information necessary to build, maintain and reproduce organisms. This information gets passed down from generation to generation. A **genome** is the entire collection of DNA in a living organism.

Ribonucleic acids (or **RNA**) are the molecules that carry out gene expression in living organisms. Different types of RNA complete various tasks to form the proteins that carry out the biochemical functions encoded in DNA, the functions that actually make organisms do what they do. (A few types of RNA even fulfill those biochemical functions themselves.) A **transcriptome** is the entire collection of messenger RNA in a living organism. Messenger RNA is formed through the reading and copying of DNA (called translation)—the first step in the process of creating proteins from DNA.

**Gene families** are groups of genes that share a common ancestral gene. Expansions of gene families arise from duplications of single genes (or sometimes blocks of genes).

A **whole-genome duplication** is the duplication of an entire genome of an organism. Most often, whole genome duplication originally stems from unreduced gametes (an egg or sperm cell that has two copies of the genome, rather than the typical single copy) coming together in fertilization.



# Go Wild for Native Bees

MICHELLE CONNERS, Visitor Experience Events and Volunteer Manager

Did you know there are approximately 400 species of native bees in Pennsylvania? While the European honey bee (*Apis mellifera*) is the bee we see most often in gardens and the one that produces most of the honey we enjoy, many other bee species are out there spring through fall doing the necessary work of pollination.

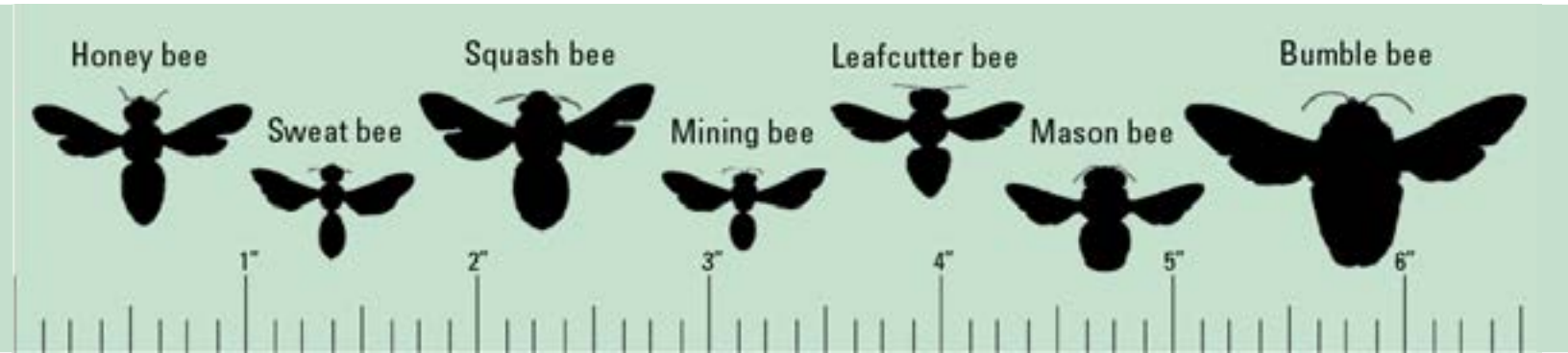
Bumblebees (*Bombus* spp.) are large and hairy, and appear to be clumsy fliers. In reality, they are highly efficient workers who can collect pollen twice as fast as honey bees. Like the honey bee, they are social creatures who live in cooperative hives.

Most other native bees are solitary. They live alone and build individual nests either by tunneling into the ground, into wood, or using existing cavities. This group includes the leafcutter bees (*Megachile* spp.) who cut and collect leaves to line the tube-shaped ground nests where they lay their eggs. If you have been to the farm side of the Arboretum, you may have noticed the nesting boxes on the garage walls. These were built by Equipment Supervisor Keith Snyder for another native species, the mason bee (*Osmia* spp.). Mason bees are generalists, meaning they are not picky about the plants from which they collect. They are easy, gentle bees and important pollinators of early blooming native plants.



they yellow jackets, hornets, or some other variety, wasps are carnivorous predators attracted to sweet ingredients. They are aggressive, and can and will sting. There is a reason for the saying “as busy as a bee.” Bees have too much work to do collecting pollen and nectar to feed themselves and their offspring to bother with much else. Bees are non-aggressive. Unless they feel threatened or mistakenly get caught in your clothing, they are not going to sting you.

So keep those native busy bees. When planning to add new trees, shrubs or perennials to your garden, check websites such as Xerces.org which provide regional planting lists of the most beneficial plants for native bee pollinators.



## Brighter Future Award

Lisa Bailey, a member of the Education Department and Lorraine Buckie, a Volunteer Guide, have won an award on behalf of the Morris Arboretum for their work with adults on the autism spectrum. Lisa and Lorraine received a My City, My Place Brighter Future award. Nominated by the staff at SPIN, Inc., Morris Arboretum was chosen as the winner of the Environmental Innovation Team Award by Philadelphia Intellectual disAbility Services (IDS). Eight small groups of adults who are on the autism spectrum were welcomed to the Morris Arboretum to pilot a new tour last fall. The tour was the culmination of many hours of work with several outside sources to create an experience for people with special needs. According to Wendy Williams, Public Awareness and ChildFind Coordinator at IDS, this award “...celebrates the accomplishments of those who have committed their lives to supporting people with an intellectual disability. You are a model of excellence, compassion, commitment, growth, and achievement.”



# A Special Thank You

At a time when there is so much need in so many places, the Arboretum is overwhelmed with gratitude for the outpouring of support during the mandated closure due to Covid-19. Below is a list of donors who have made gifts to the annual fund, purchased memberships, submitted pledge payments, supported special projects, and converted their 2020 *Moonlight & Roses* ticket purchases and sponsorships into outright contributions. Each of these gifts represents a vote of confidence in the Arboretum’s everlasting value, and helps to support our efforts to make the operational upgrades we will need in order to ensure the safety of our visitors, volunteers, and staff as soon as we are permitted to open once again to the public. To all who have been able to support these efforts, we thank you. This list includes gifts made between March 15, 2020 and May 15, 2020.

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Photo: Ken Tapp

# Thinking of Making a Contribution to the Arboretum?

The Coronavirus Aid, Relief, and Economic Security (CARES) Act includes provisions that may have an impact on your charitable plans for 2020.

If you take the standard deduction on your income tax return, you can take a charitable deduction for gifts up to \$300 even if you don't itemize your deductions on your 2020 income tax return.

If you are planning to itemize your deductions in the 2020 tax year, you can take an income tax deduction for charitable gifts of cash to public charities, now with a limit of up to 100% of your adjusted gross income (AGI). Note that this special incentive is not available for gifts of securities or other assets—and it's not available for gifts to donor advised funds.

If you have an IRA or other Qualified Retirement Plan and you are 70½ or older, you can still use your IRA to make a charitable gift if it makes financial sense for you to do so. The IRA Rollover (also known as a Qualified Charitable Distribution or QCD) can be a great strategy if you plan to make charitable gifts and you don't itemize your deductions.

For more information or if you have questions about any of these options, please contact Mira Zergani, Director of Development, at [mzergani@upenn.edu](mailto:mzergani@upenn.edu).





# Tributes & Memorial Gifts

Photo: Rachel Bachurski

The Morris Arboretum is grateful to the following donors who made tribute and memorial gifts between December 1, 2019 and May 15, 2020.

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Pamela & James Hill

## Remembering Sally Gendler

The Morris Arboretum mourns the recent passing of Sally Jane Gendler, pictured here with her loving husband, Steve. Sally was a longtime Arboretum member and volunteer, a member of both the Director's Guild and the *Moonlight & Roses* Committee, and was co-chair of the 2019 *Moonlight & Roses* Gala. She was a friend to many in the Arboretum community and an effervescent presence in every setting. She will be greatly missed.

**Click here to learn more about Sally's life and legacy.**

Photo: Mark Stehle

