Road Trip!

The road trip has been a staple of Hollywood movies for decades, often matching two battling characters on a common mission with comedic results. Kristina’s and my road trip “movie” to the Southeast USA would only appeal to botanists and gardeners as it was non-contentious (though we did have some laughs) and focused strictly around plants. We flew to Miami with a packed schedule and over the next nine days visited four outstanding botanic gardens and seven specialty nurseries, packing a Penske truck with botanical treasures for the long drive back to their new home, the Global Flora conservatory.

With a theme of plant form for Global Flora, it was obvious we were in the right area as the landscapes of Florida are strikingly diverse. We were greeted by an amazing variety of palms and other trees, bromeliads used as groundcovers, and flowering shrubs new to veteran botanists. We started at specialty nurseries that had been recommended by Dr. Chad Husby, the Chief Explorer at the Fairchild Tropical Botanical Garden of Miami.

Charles Alford is a legendary fern grower in Vero Beach and has supplied botanic gardens for decades with rarities. Here we obtained ant ferns (Lecanopteris) staghorn ferns (latycerium) and firmosses (Huperzia) which now grace the north wall of Global Flora. Marie Nock’s Ree Gardens in Miami was a jungle oasis of rarities and

Continued on page 10
Greetings from Wellesley! What a year we’re having here in the Botanic Gardens. It is truly a thrill to see students and classes using the Global Flora greenhouse and engaging with its amazing diversity of plants, one year after there was only a steel skeleton on the site. The plants and the building are striking examples of form AND function, beautiful and well-adapted. The collection of species continues to grow (just passed 1000 taxa accessioned), the sensors in the soil and air are sending data live, and the sailfin mollies in the mangrove tank are making baby fish so fast we may have a population explosion! Botanical Collections Manager Rob Nicholson, Senior Greenhouse Horticulturist Tony Antonucci, and Botany Fellow Jenn Yang ’12 worked especially hard to get Global Flora ready for the beginning of the school year, with spectacular results.

Outside too it’s been a good growing season, with plenty of spring and summer rains, and not as much gypsy moth damage as feared. At the same time, with major construction happening at the Science Center, we’re challenged with altered circulation patterns and stormwater management where construction zones meet the gardens. With seemingly more intense thunderstorms every year, I’m impressed with the performance of the seeded wildflower meadow in its first growing season on the steep slope below the Global Flora conservatory. A combination of nurse crop for quick establishment and native perennials gaining a good footing, this meadow will be interesting to follow as it develops over the next several years.

The Edible Ecosystem Teaching Garden also is thriving, under the skilled care of Botanic Gardens Fellow Katherine Brainard and Senior Gardens Horticulturist Tricia Diggins, and engaged a lot of students from summer interns to the Botanistas student group during the school year. Above and beyond the herbs, nuts, berries, jujubes, paw paws, currants, plums, persimmons and other perennial crops, the garden also grew Italian heirlooms for Professor Jacki Musacchio’s Art History course on food and art in Renaissance Italy, standing in for the Kitchen Garden (on hiatus until the Science Center renovations are complete), and including some enormous squashes in shapes I’d never seen before.

Students are playing increasingly important roles in the Botanic Gardens as we take on projects. As summer interns, work-study assistants, and researchers whose studies inform planning and management, students are learning by doing and making significant contributions. Abby Conte ’20, Amy Liu ’22, Annalise Michaelson ’21, Ashley Bismar ’22, Ava Mackay-Smith ’20, Emma Andrew ’23, Emma Conrad-Rooney ’20, Evelyn Vivar ’20, Kayli Hattley ’22, Maren Frye ’23, Mimi Diaz-Salgado ’23, Sophia Harrison ’21, Timia Kennerly ’22, Vianney Salas ’23, Wilson Haims ’23, and Yuxi Xia ’20 all are working this semester on everything from accessioning new plants into the database (and mapping, photographing, and labeling them), developing exhibits and displays, monitoring plant (and fish!)...
Paulson Water Challenge Explores Mirror Pond: A Little-studied Piece of the Paramecium Pond Water System

It’s a hot, humid July morning at Paramecium Pond. Turtles bask on lily pads and fallen logs. Six goslings, no longer diminutive puffs of downy yellow feathers watching students hurry to class in the Spring, are now barely discernible from their parents.

Upstream, the Silver Thread brook flows down from a small waterfall and meanders through the Botanic Gardens. Before reaching Paramecium Pond, the brook widens and forms a small pool filled with diverse life called Mirror Pond. The Botanic Gardens’ charismatic Japanese weeping cherry tree (Prunus yedoensis) bows dramatically over the pond’s edge, while blue dasher dragonflies (Pachydiplax longipennis) zip around, periodically resting on aquatic vegetation emerging from the water’s surface. Microscopic plankton, including tiny crustaceans called copepods and even smaller phytoplankton, form the basis of the food web that supports dozens of northern green frogs (Lithobates clamitans melanota).

Meanwhile, at the Whitin Observatory lab, Chansie Yang ’22 and Mia Kennerly ’22, both part of the Paulson Water Challenge (PWC) summer research team, set to work gathering field notebooks, waders, and water quality sensors, which can help reveal the complex dynamics of the little-studied Mirror Pond and how it plays a role in the entire Paramecium Pond system. Their work, along with that of eight other PWC students, will inform sustainable campus management as the College begins to consider alternative water sources for Paramecium Pond, which is currently fed with drinking water.

The summer air grows warmer and heavier as the sun rises. Lugging the sensors with their 100-foot cable to Mirror Pond is no small task, but deploying them is fairly simple and produces a host of data. In her waders, Mia slowly lowers the sensors vertically into the small, shallow pond. Every second, the sensors record the water’s temperature, pH, salinity, and the amount of oxygen in the water, known as “dissolved oxygen.” These sensors easily yield a multitude of data, but the researchers must untangle and interpret it.

Dissolved oxygen is a crucial component in aquatic environments that support a diversity of life. A lack of dissolved oxygen, or anoxia, leads to major die-offs and would devastate the Paramecium Pond system. Three factors—temperature, salinity, and atmospheric pressure—determine how much oxygen can dissolve in water, representing 100% saturation. Puzzlingly, Mia and Chansie find a dissolved oxygen up to 180% saturation in Mirror Pond, or 16.59 mg/L, indicating “over-saturated” conditions. So what could cause dissolved oxygen levels to reach above 100% saturation?

A little research yields an answer: plants. In daylight, plants and algae photosynthesize and produce oxygen. It isn’t uncommon for small, slow-moving, plant-filled water bodies to reach dissolved oxygen levels well over 100% saturation during the day due to high rates of photosynthesis. In fact, dissolved oxygen levels often undergo significant daily variation in water bodies like Mirror Pond because the rate of photosynthesis fluctuates.

Chansie and Mia decide to test the possibility that dissolved oxygen levels in Mirror Pond shift throughout the day. Sure enough, an early morning trip to Mirror Pond produces much different results: down to around 60% dissolved oxygen saturation, and no higher than around 90%. Plants and algae halt photosynthesis during the long period of nighttime darkness,
The Friends Support WCBG in Many Ways

The Friends of Wellesley College Botanic Gardens takes its supporting role seriously. Every year, our funds provide housing for summer interns. We regularly offer special botanical art classes for students and let them come to our horticultural lectures for free. This past year, students attended a one-day botanical workshop called “Roots and Shoots” with naturalist Louise Barteau, and botanical artist Ellen Duarte led our summer interns in three class sessions on the techniques of field sketching.

The Friends have made it possible for Botany Fellow Jenn Yang ’12 to attend “Introduction to Botany Through Drawing” this fall. While most of the botanical art students in the class are familiar with drawing and take the class to learn botany, Jenn already knows a lot of botany and is focusing on developing her drawing skills.

Recent bequests have provided the means for the Friends to contribute a couple of pieces of equipment to WCBG. A new color laser printer that takes larger sizes of paper will make it possible for the staff and students to print plant labels and interpretive signage for Global Flora and the gardens. And the hort staff received a new electric vehicle this past summer, courtesy of the Friends. It is much quieter and easier to drive than our old gasoline-powered Cushman, which makes it easier for students to use, and it has the capacity to carry tanks of water around the gardens for watering plants.

Our bequests have also enabled us to hire Botanic Gardens Fellow Katherine Brainard, a horticulturist who is in charge of the research and teaching gardens. Katherine has quickly become a valuable member of our team. See the article about her on page 5.

by Gail Kahn,
Assistant Director, WCBG
New Staff Member

CBG welcomed Katherine Brainard as the Botanic Gardens Post-Baccalaureate Fellow in March of this year. Through the spring and summer Katherine has been focusing on managing the Edible Ecosystem Teaching Garden (EETG) and Farm in a Box, working with students and interns, and assisting with Global Flora planting and maintenance in the botanic gardens. Katherine majored in Environmental Studies at the University of Vermont and has worked at several botanical gardens and arboreta in the Philadelphia and Boston areas, as well as in Hawaii. Katherine loves talking native plants, conservation and exploring natural areas near and far.

Over the spring and summer Katherine and Horticulture Interns Amy Liu ’22, Ronnie Alvarez-Alfani ’20, and McKenna Montminy ’21 made the amazing discovery that spraying grape-flavored Kool-Aid on the blueberry patch helped keep birds away, and made for the largest blueberry harvest the EETG has had to date. There have been a lot of weeding, pruning, and planting projects throughout the season, and being able to snack on different plants while working in the garden kept everyone refreshed in the summer heat. The variety of edible plants in the gardens also enabled the summer interns to create plant family potlucks—learning about Rosaceae, Brassicaceae and more while testing their culinary skill.

Species Spotlight: Monarda punctata

Planting is a big part of spring for most gardeners, whether it be annuals, perennials, or starting seeds. There was a focus on planting more native herbaceous species in the Edible Ecosystem Teaching Garden (EETG) this spring to increase the resiliency of naturalistic planting areas, including meadow, swale, and tree understory habitats. One of the most successful plantings was our Monarda punctata, or horsemint. Also known as spotted beebalm, this mint relative was quick to establish in the meadow and in bordering beds, and has attracted a huge diversity of pollinators while remaining in bloom throughout the latter half of the summer. With light green foliage and dusty pink and gold flowers, this Monarda is a unique addition to any sunny garden area. Native to meadows on the east coast, as well as plains and prairie in the upper and lower Midwest, this species can behave as an annual, perennial, or biennial depending on the conditions, and prefers sandy, well-drained soil. It was used by indigenous people as a treatment for cold symptoms and for pain relief. In addition, it has been commercially cultivated for extraction of thymol, an essential oil.

The Monarda was bought as plugs from a native plant nursery, and planted in April to May. Here’s hoping it gets through the winter without issue so the display can be even greater next year.

by Katherine Brainard, WCBG Post-Baccalaureate Fellow
The space under the ramp in Global Flora’s Wet Biome is planted with examples of some of the world’s oldest extant plant families. On the family tree of plant life, these species are found near the trunk. Land plants evolved from green algae to non-vascular plants like mosses and liverworts, to spore-producing vascular plants such as ferns, then to gymnosperms like cycads, ginkgos, and other coniferous trees. The seed-producing plants or angiosperms were the next evolutionary step, and it was a successful one, with 300,000 known species in 13,000 genera. The “Ancient Corner” of Global Flora contains examples of these major evolutionary branches. It is anchored by the 380 million year old fossil tree stump from Gilboa, NY that was given to Margaret Ferguson by the principal researcher of the Gilboa fossils, Winifred Goldring (Wellesley College class of 1909).

Several species of ferns and fern allies are planted in this shady corner. One is peacock selaginella (Selaginella willdenowii). Though not a true fern, it is fernlike in appearance and reproduces by spores. The most striking characteristic of this plant is the blue iridescence of its fronds, produced by a layer of cells in the upper cuticle of the leaf. This iridescence only develops in specimens that grow in extreme shade. Iridescence occurs in several unrelated plant species and obviously has an adaptive benefit, but it’s unclear exactly what that might be—perhaps for protection from sunlight, or a defense against herbivores who might not recognize a blue leaf as tasty. Mapania caudata, a member of the sedge family native to the Malaysian peninsula, also has iridescent blue-green leaves. In this case, light scattering off of silica nanoparticles in the leaves creates the metallic blue color.

The Wollemi pine (Wollemia nobilis), a plant from the original Ferguson Greenhouses, has taken its rightful place in the Ancient Corner. Despite its common name, it is not a pine but a member of the Araucariaceae family, an ancient family of coniferous trees. The Wollemi pine was known only in the fossil record until a small stand of these trees was discovered in Australia’s Wollemia National Park in 1924. In order to protect the population, the exact location has never been revealed. However, specimens have been made available to botanic gardens through nursery propagation.

Aroids are an ancient family of flowering plants and the titan arum (Amorphophallus titanum) is a spectacular example. If ours manages to flower, it could be 6-9 ft. high, as the titan arum...
produces the largest unbranched inflorescence in the world. The flower consists of a tall spadix containing the male and female flowers with a large, petal-like burgundy spathe wrapped around it, and it has the scent of rotten meat. Its other common name is the corpse flower.

A woody vine with leathery leaves, *Austrobaileya scandens* is a basal angiosperm, found near the base of the family tree of flowering plants. Its large, pale green flowers smell like rotting fish to attract flies, its preferred pollinator. But the most basal of living angiosperms, *Amborella trichopoda*, is the quiet star of the Ancient Corner. Many of the plants here, like the Wollemi pine, are members of a monotypic genus, the single surviving member of their genus. *Austrobaileya* is the single member of both its genus and family, while *Amborella* is the single member of its genus, family and order. The sole survivor of millions of years of climatic and geological change, it has no near relatives.

*Amborella* is endemic to New Caledonia, an island that is part of the mostly submerged continent of Zealand which separated from Australia 65 million years ago. Plant life on New Caledonia developed in near isolation and the island contains many unique genera and species. *Amborella* is a tropical understory shrub or small tree with evergreen leaves. Its vascular system contains primitive features not found in other angiosperms. The plant is dioecious, a trait more common among gymnosperms, meaning that the small, creamy white male and female flowers grow on separate plants. But *amborella* plants can switch genders, producing male flowers one time and female flowers the next.

The *Amborella Genome Project* provides key data in understanding the evolution of flowering plants. It was made possible because Ron Determann at the Atlanta Botanical Garden is an expert at cultivating these difficult to grow shrubs. Our *amborellas*, an example of Ron’s generosity to the Wellesley College Botanic Gardens, may be unprepossessing to look at, but they make a botanist’s head whirl.

by Gail Kahn,
Assistant Director, WCBG
Learn With Us

Due to construction projects taking place at the Science Center, WCBG Friends botanical art programs are being held at the Massachusetts Horticultural Society and the Wellesley College Club. Please pay attention to the location given in the course listing.

Massachusetts Horticultural Society
The Gardens at Elm Bank
900 Washington Street, Wellesley, MA 02482

Wellesley College Club
At the Route 16 Entrance to the College

* For classes over the lunch hour, bring your own lunch.
* Full course descriptions and materials lists may be found on our website.
* Pre-registration is required. Print a form online: www.wellesley.edu/wcbg/learn.

Crow-Quill Pen for Beginners
Explore the wonders of the unique medium of the Crow-Quill pen and sepia ink. This class with Carol Ann Morley will help give you the techniques and technical skills that you will need to proceed to representational ink drawings.

BAC 20 043
1 day: Mon., Jan. 13 (snow date: Jan. 17)
9:30 a.m. – 3:30 p.m.
Putnam classroom at Elm Bank
Members $110 | Non-Members $130

Foundations of Botanical Drawing and Painting
Let 2020 be the year that you jump into this creative pastime combining fine art and scientific accuracy. Sarah Roche guides your experience through structured exercises, projects and demonstrations, exposing you to the basic techniques and methods of botanical drawing and watercolor painting. All experience levels welcome.

BAC 20 102
6 Wed.: Feb. 5, 12, 19, 26; Mar. 4, 11
(snow date: Mar. 18)
9:30 a.m. - 1:30 p.m.
Putnam classroom at Elm Bank
Members $295 | Non-Members $345

Botany’s Beauties: Restoring Wellesley’s Flower Models
The collection of antique botanical models purchased for the college by Henry Durant is being restored and will be on display in the corridor linking the Visitor Center to Global Flora. WCBG Assistant Director Gail Kahn leads you on a journey through their history, their conservation, and the intriguing mysteries about their origins that are slowly being revealed.

HOR 20 104
Mon., March 2
1:00 - 2:00 p.m.
Wellesley College Club
Members Free | Non-Members $10
Pre-registration required

History of Botanical Art
Pam Harrington will review the significant roles and styles of botanical art, from early times to the present. The class will also visit the Special Collections in Wellesley College’s Margaret Clapp Library for a viewing of the college’s extraordinary collection of rare botanical books.

BAC 20 112
3 days: Mon., Jan 6 – Wed., Jan. 8 (snow date: Jan. 9)
9:30 a.m. - 12:30 p.m.
Wellesley College Club
Members $125 | Non-Members $150

Wellesley College Club
At the Route 16 Entrance to the College
**Life’s So Sweet With a Sugar Maple in Your Yard**

Trish Wesley Umbrell, Natick Community Farm’s Assistant Director will share tips on the identification and uses of sugar maples in the home landscape, explore the rich history and traditions of New England maple sugaring, and give a virtual tour of her favorite sugar shack, as well as tips for making your own maple syrup on your stove top.

**HOR 20 103**  
Mon., Feb. 10  
1:00 - 2:00 p.m.  
Wellesley College Club  
*Members Free | Non-Members $10*  
Pre-registration required

**Color Mixing for Artists**

Susan Fisher teaches you how to mix the colors you want, not the ones you end up with through trial and error. Learn an easy system for combining colors consistently to achieve the broadest possible spectrum for any “wet” medium including watercolor, gouache, oils, acrylics, etc.

**BAC 20 113**  
3 days: Thurs., Apr. 23 – Sat., Apr. 25  
9:30 a.m. - 3:30 p.m.  
Putnam classroom at Elm Bank  
*Members $350 | Non-Members $450*  
(price includes color mixing sheets)
extremely rare cycads. The palms we acquired here will form the main canopy of the wet biome in decades to come, and several diverse cycads now accompany the Giant Dooon that remains from Margaret Ferguson’s initial greenhouse collection. A visit with Vickie Murphy of the Montgomery Botanical Center forged new alliances and we left with more rare palms and cycads.

We left the Miami area in our big yellow truck and motored across the Everglades, that sea of grass that Marjory Douglas worked to protect. We started the next morning in Sarasota at the Selby Botanic Garden, hosted by Shawn McCourt, Angel Lara and Bruce Holst. We could have easily spent days here acquiring divisions and cuttings as it is one of the most diverse and interesting collections of tropical plants we have ever seen. We have recently been able to reciprocate some of their generosity by sending a collection of cuttings of a dozen different *Rhipsalis* cacti, harvested from the nascent Global Flora collection. Our final stop in Florida was ARC Ferns, a large commercial grower of tropical ferns. We purchased hundreds of tiny ferns in plug trays, destined for the understory of the wet biome.

Leaving Florida we began a series of grueling pushes to get our treasures back to Wellesley as soon as possible. This was complicated by the translucent roof of the cargo area of the truck which allowed heat to build up inside (The Moving Greenhouse Effect), such that we had to stop every 90 minutes or so to open up the truck to vent. Pots were stacked upon each other, sometimes three high, so watering this load amounted to “spray and pray” when we could find hose bibs.

There was one last big stop at Atlanta Botanic Garden, which was truly inspirational: superb plants and plantings, a production area chock full of rarities and a warm, funny, generous host in Ron Determann. We spent the day collecting cuttings, securing plants and making mental notes about how to do things right. We had plans to stop at the United States Botanic Garden in Washington, DC for additional plants but after loading in Atlanta, it was clear there was no more room. Ron had the joke of the trip when he said in his Georgia/Dutch accent, “well just get going 90 miles an hour on the highway, then slam on the brakes. You’ll make room.” When the truck pulled safely on to campus it was amazing to see all we had acquired and wonder how it all fit.

When we look out at the planted and growing Global Flora, we see not only a collection of marvelous plants but memories of the people and places that helped to build the collection. The generosity of our sister botanic gardens was an inspiring piece to our collections building. But we now have a collection worthy of distributing to others, a process we have already begun.

by Rob Nicholson
Botanical Collections Manager
health, and building up the sensor network in Global Flora, to weeding, mulching and pruning, to leading the Botanistas to connect even more students to plants and nature on campus. Collaborations with the fabulous Paulson Ecology of Place Initiative (www.wellesley.edu/paulson) are involving students in evaluating more sustainable sources of water for Paramecium Pond than the current potable water feed, making paper from invasive grasses in the Book Arts Lab, growing woad and extracting dyes to make beautiful textiles, and making music (and dance) in the landscape. The WCBG exists first and foremost for students, and it is great to see so many of them engaging in a diversity of ways.

Best wishes for a beautiful fall season.

Kristina Niovi Jones, Director
Wellesley College Botanic Gardens
kjones@wellesley.edu 781.283.3027

NOTES from the Director Continued from p 2

One of the Italian garden squashes on display at the campus center.

MEMBERSHIP IN WCBG FRIENDS
A membership level of $50 or above entitles you to discounts on WCBG Friends programs and discount admission to botanical gardens across the U.S. through the American Horticultural Society’s Reciprocal Admissions Program. For an up-to-date list of participating gardens and for details on how to enjoy benefits, see: www.ahs.org/gardening-programs/rap

Your membership is valid for a full calendar year.

My membership gift: $_____________

Membership Gift Payment Type (circle one):

CHECK or MasterCard / Visa / AMEX

Acct. # __________________________

Expiration date: Month: ______ Year: _________ CVV _______

Or SEPARATE CHECK FOR MEMBERSHIP GIFT
made payable to: Friends of Wellesley College Botanic Gardens
Or send your membership gift to the Friends online:
www.wellesley.edu/wcbg/wcbg_friends/give.

REGISTRATION FORM

NAME: __________________________________________________________

ADDRESS: _______________________________________________________

PHONE: Home __________________ Work/Cell _________________________

EMAIL: __________________________________________________________

If applicable, Wellesley College Class ________ CBA student? ______

Mail this completed form and your payment to: Friends of Wellesley College Botanic Gardens, 106 Central Street, Wellesley, MA 02481-8203

COURSE REGISTRATION
(See Programs and Classes Information and Cancellation Policy.)

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SEPARATE CHECK FOR PROGRAM FEES $ ______
made payable to: Friends of Wellesley College Botanic Gardens
Friends of WCBG cannot accept credit cards for course fees.
Checks or cash only please.
Thank You!

Many thanks to Luisa Hunnewell, Willard Hunnewell, and David Dusenbury for letting us use a greenhouse on the Hunnewell estate to store our plants while Global Flora was under construction. The Hunnewell family was very accepting of our staff’s daily visits to care for the plants, and Grounds Superintendent David Dusenbury helped us out with tasks like opening and closing vents. We are deeply appreciative of these wonderful neighbors.

Our giant dioon cycad has put out a crown of new leaves since returning from a 2-year sojourn with the Hunnewells.

Renew Your Membership

You have likely just received the “All Friends” mailer from Wellesley College. If your membership in WCBG Friends has lapsed, now would be a good time to respond. WCBG Friends considers your membership as current for a full year after your membership gift.

If you have a question about your membership, please call or email the Friends office. Thank you!