



Wellesley College Friends of Horticulture

Fall 2010 News

Re-Energizing a 1920's Landscape

by Mary D. Coyne, Ph.D. (Wellesley MA '61)
Professor Emerita, Department of Biological Sciences

Dr. Coyne retired in 2002 after 32 years of teaching at Wellesley College. In her tenure as department chair, Dr. Coyne served as the interim director of the Botanic Gardens and initiated the reglazing of the greenhouses in the 1970's. Dr. Coyne was also one of the co-founders of the Wellesley College Friends of Horticulture, and she was instrumental in the development of our Certificate in Botanical Art and Illustration. In 2005, she entered the Certificate Program in Landscape Design of the Arnold Arboretum at Harvard University and graduated in May, 2010. "Master Plan for the Wellesley College Botanic Gardens" was her year-long independent project for the certificate. This is a short extract of her presentation.

The ghostly light stretched up the tall tree trunk and the rustling leaves cast haunting shadows on the ground below. Students hesitatingly moved through the darkness toward a small figure standing below the tree canopy. As they crept closer the faintly lit figure told an ancient tale about the tree – how its leaves were used for medicine and its bark for poultices – how youngsters danced around its trunk and wished for health and happiness. The visitors were offered a tea made from its leaves and a cookie to accompany the drink. And so another Mystical Tree Tour unfolded in the Wellesley College Botanic Gardens.

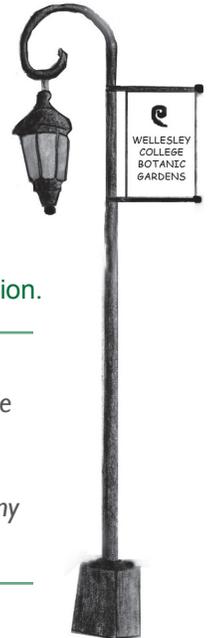
The Botanic Gardens are alive again. There are student-generated happenings, student-faculty research projects, botany-related student clubs, phenology studies, art classes, tours, children's weekend and vacation programs, and local daily walkers and strollers. Visitors can be found at any time in the Botanic Gardens, as well as students relaxing on the grass, studying in a sunny spot or creating a site-specific art installation. Here is a resource whose time has come, and our time has come to reassess its function, accessibility, and opportunities for education and

relaxation in this 20-acre portion of the campus that has not had a master plan for its landscape since the original design in 1924.

In 1920, Dr. Margaret Ferguson, Chair of Botany, requested that over 20 acres of campus land be set aside for the exclusive use of the Botany Department to accompany seven new greenhouses already planned. She was given open land abutting Route 135 which had formerly been a student golf course. At that time, the Whittin Observatory sat on a promontory in the land and an axial path led from the inner campus to the 'Vil' (the Town of Wellesley's village square next to the campus). Mrs. Cordenio Severance donated the initial funds to construct a 'botanic garden' in memory of her deceased child, Alexandra. A 'beaux arts' style garden designed by noted Boston architect, Arthur Shurtleff was rejected by Ferguson as not fitting their educational plans, and Helen Davis, a faculty member in Botany and a trained landscape designer, drew up the existing landscape plan for the Botanic Gardens. In her final plan, Davis designed a more naturalistic style with a waterfall spilling into a concrete-lined stream – the 'Silver Thread' – that wanders westward expanding intermittently into small pools and ending in a larger pond. As described in a document from the Archives about the Botanic Gardens, the "principle aim of the Botany Department... is to maintain the natural beauty and to bring back into them [the spaces] the



BOTANIC GARDENS TOPOGRAPHY — Contour map (2 foot contours) of Wellesley College Botanic Gardens (inside the dashed line) showing the geological formations.



Notes from the Director

Fall 2010 – Hello from Wellesley!

We had quite an exciting spring and summer in the Botanic Gardens, starting with some crazy weather. Spring came early, with many plants blooming two to three weeks earlier than they did last year. March brought two very heavy rainstorms in close succession, with major flooding as a result: the little pool at the low point in the Arboretum grew to more than ten times its normal size, and Paramecium Pond joined with the Maple Swamp across the path and began to cross the main college road until the water was diverted by a giant pump. It took a month for the high water to recede to normal spring levels, and I am amazed at the resilience of most of the plants affected. We lost the giant-leaved Japanese butterbur (*Petasites japonicus*), which never emerged from its inundated area, but that's the only notable casualty to date. After such a wet beginning, the growing season became increasingly dry, with very little rainfall through the heat of the summer, quite the opposite of last year! A much better year for tomatoes...

Our "plants as food" theme has really taken off in some exciting directions. An unanticipated one originated when Jacki Musacchio, Associate Professor of Art, approached me about providing some plants for the fall course she was planning, "Dining with Michelangelo: Art and Food in Renaissance Italy" (ARTH 330). Our summer Botanic Gardens interns, Caitlin McGlynn '11 and Julie Vining '12, under the direction of Senior Gardens Horticulturist Tricia Diggins, took this idea and ran with it, creating a Renaissance Food Garden in the patch cleared by Friends of Horticulture and student farm volunteers behind the greenhouses. Working with a plant list provided by Professor Musacchio, the students researched Renaissance-era growing techniques and applied them to such novelties as Italian Climbing Squash, which needed a lot of trellising as it threatened to take over the garden. As the harvest started coming in, Caitlin and Julie experimented with 15th-century recipes and provided wonderful additions to our end-of-summer barbecue. The art history class will meet in the garden and in the Greenhouse Visitor Center a few times this fall, and students in the course will research the various food plants. It has been so energizing for our interns to have such a unique and useful summer project. In June I attended the annual meeting of the American Public Gardens Association in Atlanta, and found that food is THE big thing in botanic gardens these days. Gardens large and small are putting in beautiful food gardens and outdoor kitchens, but nobody



Early harvest from the Renaissance Food Garden that Botanic Gardens interns Julie Vining and Caitlin McGlynn are growing for Jacki Musacchio's fall art history course "Dining with Michelangelo." Check out that Italian Climbing Squash!

Wellesley College Friends of Horticulture
106 Central Street
Wellesley, MA 02481-8203

781-283-3094 horticulture@wellesley.edu
www.wellesley.edu/WCFH

Editorial Committee:

Kristina Niovi Jones Gail Kahn Vivi Leavy '62
Carole Ely '79 Eileen Sprague Ray Pace, layout

As the harvest started coming in, Caitlin and Julie experimented with 15th-century recipes and provided wonderful additions to our end-of-summer barbecue. The art history class will meet in the garden and in the Greenhouse Visitor Center a few times this fall, and students in the course will research the various food plants. It has been so energizing for our interns to have such a unique and useful summer project. In June I attended the annual meeting of the American Public Gardens Association in Atlanta, and found that food is THE big thing in botanic gardens these days. Gardens large and small are putting in beautiful food gardens and outdoor kitchens, but nobody

Continued on page 11

Expanded Benefits for Friends of Horticulture Members

Exciting news for garden lovers: we have just joined the American Horticultural Society's Reciprocal Admissions Program (RAP). By presenting your new **Wellesley College Botanic Gardens membership card**, donors to Friends of Horticulture at the Contributor (\$50) level and above now have access to a wide array of botanical gardens, arboreta, and conservatories throughout North America - more than 200 organizations in 44 states, plus Canada and the U.S. Virgin Islands - offering free or discounted admission privileges and many other benefits.

Friends of Horticulture hopes this new benefit encourages our members to visit public gardens while traveling throughout North America. Some of the most well-known public gardens

in the U.S. offer reciprocal admissions through the AHS program. Depending on the institution, you may receive free or discounted admission, free or discounted parking, gift shop discounts, or discounts on tours or educational programs.

Your membership card will be mailed to you when we receive your 2010-2011 member gift. For those who renewed their membership near the end of the 2009-2010 year, we will issue you a membership card upon request. Please contact us at 781-283-3094 or email horticulture@wellesley.edu.

Sorry, this benefit is not available to our organizational members (your membership card must be in the name of a person, not an organization or company).

The most up-to-date list of participating gardens as well as details on how to enjoy the benefits of the Reciprocal Admissions Program can be found in the AHS online directory at http://www.ahs.org/events/reciprocal_events_online_directory.htm.

Please note that gardens within 90 miles of Wellesley, MA are excluded from this program.

Bananas: A Threatened Future?

by Katie Griffith, Ph.D., Visiting Scholar, Wellesley College

Bananas are one of the most mainstream foods. They are cheap, nutritious, and hailed as the perfect baby food. In America, we eat more bananas than apples or oranges combined. You may have heard about a widespread disease that is destroying bananas worldwide. Is this rumor true? And, if so, what is being done about it? In order to answer these questions, we'll need to start at the very beginning of the story.

Bananas are a member of the Musaceae family, in the same order as ginger. Botanically speaking, they are not actually trees, just very large herbs. The "trunk" of these monocots is called the pseudostem and contains no actual wood, but very strong fibers that allow the plant to grow up to 20 feet. Separate male and female flowers are grouped into a large, drooping inflorescence. The female flowers will develop into the actual bananas we eat, and the male flowers are hidden under large purple bracts at the very tip of the inflorescence.

In the approximately 1,000 species of wild banana, flowers are strongly scented to attract bird and bat pollinators. The seeds are teeth-shattering hard, and the actual fruit leaves something to be desired. They are also much smaller and rounder than the Cavendish bananas we slice up in our cereal. But the most important difference between wild and commercial bananas revolves around sexual reproduction.

Our commercial Cavendish banana, along with its delicious fruit, has sterile flowers and no seeds. This means that it cannot sexually reproduce. Despite this seemingly large issue, bananas have been farmed for over 7,000 years, making them one of the earliest crops. Today they are the largest fruit crop. How is it even possible to grow this sexless fruit on such a large scale? The secrets to mass cultivation lie in their vegetative propagation.

Bananas reproduce vegetatively by making root-like corms at the base of the stem. Plantations are maintained by constantly dividing up corms and replanting them elsewhere. It takes around nine months to harvest the fruit from the time the corm is planted. By the end of life, a banana plant usually produces dozens of daughter plants that are still thriving. If you consider that a single banana plant can yield around 1,000 fruits during its lifetime, this is pretty productive.

The bananas we eat in the US come from Central and South America, where hundreds of thousands of hectares have been transformed from rainforest to banana plantations. Because banana plants don't tolerate very wet soil, extensive irrigation ditches and

drainage canals have greatly manipulated the natural hydrology of the system and lead to excessive runoff to the Caribbean. Massive fish kills and algae blooms have been directly linked to fertilizer and pesticide use on banana plantations. Most striking is the partial blame these plantations have taken for the destruction of 90% of the coral reefs along the Caribbean coast of Costa Rica.

There is an alternative to these conventional practices, however. Organic bananas are starting to become a common sight in supermarkets, where your purchase can support much more sustainable farming practices. For example, organic bananas are grown with limited to no pesticides, all fertilizers are organic, weed control is done with machetes rather than herbicides, and growing techniques are improved for both workers and the surrounding environs.

But let's return to one of the most striking features of banana plantations, organic or not, which is the simple fact that each and every Cavendish plant is an identical clone. There is *no* genetic diversity whatsoever: the Cavendish banana you



© 2007
Carol Govan

Bananas are responsible for starting the Caribbean Cruise industry.

Banana companies (mainly United Fruit which is now Chiquita) built enormous, refrigerated, white ships (The Great White Fleet) to transport bananas from Central and South America up to North America and Europe. They would be filled with bananas going north and empty on the return down south, so the company cut costs by taking tourists down to tour Central and South America (in air conditioned luxury!)

Banana Republic does not just refer to a clothing store.

The term was coined in a 1935 Esquire magazine article detailing American industry in Central and South America. It refers to a country that is politically unstable, dependent on limited agriculture (bananas), and propped up by overseas corporations. These banana companies, mainly United Fruit, not only owned a majority of land for plantations, but laid down all infrastructure (railroads, harbors for banana transport), built entire cities, and even ran postal services. In a giant country club in Honduras built for United Fruit executives, one of them was quoted saying, "governments were made and broken between rounds of golf."

Further Reading

The book, *Banana*, by Dan Koepfel, is an incredible resource for learning more about the history of bananas.

are eating in Wellesley is a genetic twin of a Cavendish banana someone is eating in the Philippines. For the most part, this is not a problem, but rather a key to the success of cultivated bananas – it standardizes agricultural methods, shipping protocol (based on ripening time), and consumers know exactly what they're getting when they buy a banana.

Continued on page 4

Bananas: A Threatened Future? *Continued from page 3*

However, there is one very significant downside to the lack of genetic diversity within a crop. If a disease appears that the crop is susceptible to, there is little ability to stop it from spreading across plantations worldwide, nor any chance for resistant varieties. This happened before to commercial bananas, and it's happening again today. From the late 1800s through the 1950s, the commercial banana was not the Cavendish at all, but the Gros Michel (Big Mike). On all accounts, this was a much better banana: it was larger, with a thicker skin (less bruising in transit), had a creamier texture, and a much fruitier taste. But in 1910, a fungal root infection called Panama Disease spread through soil and water to wipe out each and every plantation (also comprised of a single clone of Gros Michel plants).

By 1960, the Gros Michel was extinct and plantations were successfully growing its successor: the Cavendish. The Cavendish was primarily chosen because it was resistant to Panama Disease. But relatively soon afterwards, as Cavendish plantations spread from Central and South America to Malaysia and beyond, it became susceptible to a *different* strain of Panama Disease found there. Today the disease has devastated plantations in the Philippines, Pakistan, Indonesia, and Africa. It hasn't arrived in the Western Hemisphere yet, but it is expected to do so within the next 5 to 10 years. And when that inevitably happens, the US source for Cavendish bananas will dry up.

The reason our Cavendish (and the Gros Michel before it) is so devastated by this disease isn't necessarily because Panama disease is so virulent, it's because these bananas have no resistance and no genetic diversity to rely on. Talk about putting all your eggs in one basket. This is an enormous problem not just for the companies that grow bananas, but for much of the world's population that relies on this fruit as a main source of nutrition.

How are people responding to this crisis? Currently, the race is underway to find a replacement for the Cavendish. Scientists are using genetic engineering, and attempting to cross a wild banana that is resistant to Panama disease with the Cavendish to hopefully acquire a fruit that still has much of the Cavendish's popular qualities with added resistance to the fungus. This is no small feat, and to be on such a tight time budget makes it even harder. Moreover, if scientists do succeed in creating a genetically modified banana that tastes the same and resists the disease, will people even buy it? Chances are pretty low in Europe, according to local surveys. A warmer reception is possible in the US.

In the meantime, enjoy your bananas while you've got them! And remember that while Panama Disease is indeed wiping out our commercial banana, there are close to 1,000 other species of wild banana that are doing just fine. They may not be as fit for consumption as the Cavendish, but we can take heart in the fact that bananas will still exist regardless of what happens in our supermarkets. 🌱

Alaska Update

Our volunteers and frequent visitors to the WCBG may remember intern Becky Hewitt, who worked with Director Kristina Jones and the horticultural staff on several projects during the 2007-2008 academic year, including the organization and replanting of the Desert House. After her internship at WCBG (funded by WCFH's Memorial Fund), Becky went on to her doctoral work at the University of Alaska in Fairbanks. In addition to her research described below, Becky notes that she is mid-PhD and things are going very well. She enjoys living in her little cabin and is adopting a sled dog.

The expansive Alaskan boreal forest and the vast extent of the Alaskan arctic are two systems experiencing unprecedented change due to the direct and indirect effects of warming. Fire is the primary landscape-scale disturbance in the boreal forest. Shifts in fire severity and frequency, an indirect effect of climate warming, may overshadow the direct effects of climate change on species distribution and migration. As climate changes at high latitudes, boreal and tundra fires have become more frequent which could dramatically shift the current treeline. In Alaska and across the treeline ecotone, a shift in treeline position would alter climate feedbacks (carbon storage, energy exchange) and other ecosystem services such as wildlife habitat, impacting subsistence users.

Here in Alaska I have been investigating how fire might act as a potential mechanism for treeline advance or retreat by altering the symbiosis between tree seedlings and soil fungi—mycorrhizal fungi are integral to nutrient uptake and water acquisition for plants while plants reciprocate with a carbon food source for the

fungi. Fire alters the community dynamics (who is present and in what

abundance) of soil microbes and potential fungal symbionts of trees. If tree seedling establishment is limited by the availability of fungal partners or the availability of *good* fungal partners, then fire may be able to influence where trees can establish at and beyond their current range limit. I have been investigating these topics for my dissertation research at University of Alaska Fairbanks. My research sites are located from interior Alaska to north of the Brooks Range in a series of experiments altering the provision of soil microbes to tree seedlings and observing how patterns of revegetation after treeline and tundra fires may affect the availability of fungal symbionts for trees. My internship at Wellesley College was a springboard for pursuing graduate work in plant sciences and ecology. Thanks! Becky Hewitt 🌱



Ruhlman Presentations 2010

Soil Inoculation: Investigating Measures to Improve Drought Resistance in Crops

by Amisha Ahuja '12, English & Biological Sciences

Among the many new burdens associated with climate change, droughts are increasing in many places around the world. Placed in light of our planet's exponentially increasing population, scarcity of water has left farmers and legislators at a loss for how to feed unmatched numbers. More than ever, there is an urgent need to find ways to produce larger yields of vital cereal crops. My project investigates the effectiveness of inoculating soil with mycorrhizal fungi to increase drought tolerance of spring wheat, also taking salinity stress from irrigation into account. Wheat plants were grown from seed under greenhouse conditions; after applying water and salt stress on the plants, I observed their overall health and specifically measured photosynthetic rate, height, and root biomass. It is my goal that this experiment will be useful in addressing the critical agricultural concerns of developing nations.

Switchgrass and Climate Change

by Jennifer Yang '12, Biological Science

Panicum virgatum, or switchgrass, is a biofuel crop candidate for North America. Although switchgrass tolerates a wide range of environmental conditions, a recent study found that switchgrass yields vary with flooding and drought events. Drought events are becoming more frequent, according to regional climate models, and my research builds on this study to evaluate the factor of drought timing on switchgrass yields and growth. I conducted a greenhouse experiment to simulate the effect of early, mid- and late season drought periods on a common switchgrass cultivar 'Cave-in-Rock' manipulating soil water potential to maintain drought-like conditions. I tracked various growth and development measurements from seedling and subsequent stages, and my results include final biomass yields, root:shoot ratio, and phenological data. Understanding how switchgrass, known for its hardiness and high yields, responds to the factor of drought timing, is particularly relevant for climate change and biofuel efforts.

Native Bee Emergence and Climate Change

by Dominique Hazzard '12, Environmental Studies

Bee populations worldwide are in crisis, most likely due to pesticide use, introduced diseases and parasites, loss of habitat, and climate change. While the decline of the commercially valuable *Apis mellifera*, or Western honey bee, has been the subject of much research, little is known about the health of most native bee populations. Native bees are an integral part of New England ecosystems: they increase the yield of commercial crops such as blueberries, and they are superior pollinators of native plants. By tracking the arrival of native bee species to the Wellesley College campus and analyzing the emergence cues, overwintering habits, and generalist or specialist nature of those species, this research investigates the impacts of climate change, particularly the early arrival of spring, on the emergence of native bees.

ON THE ROAD

CHINA

Secrets of Sichuan ...
A Journey to Jiuzhaigou
May 14-29, 2011

Come explore the flora, fauna and culture of Sichuan, China. Wild mountain nature reserves will be the focus of our journey, with visits to Tangjiahe



Photo by Rebecca Saunders '61

and Wanglang Nature Reserves, both home to spectacular wildflowers and wild panda. A major highlight of our trip is a two-day visit to Jiuzhaigou National Park, a UNESCO World Heritage Site of incomparable beauty.

To view a downloadable brochure with a detailed itinerary, see the Friends of Horticulture's website www.wellesley.edu/WCFH

For information by mail, call the Friends office 781-283-3094 or email horticulture@wellesley.edu.

Designing an Edible Ecosystem Garden

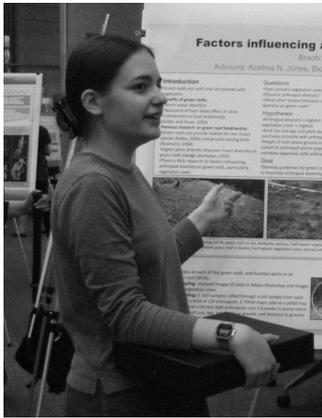
by Laura Chilson '11, Anthropology; CarolAnn Ferris '10, Biological Chemistry; Carly Gayle '13; Alexandra French '11, Classical Civilization; Melanie Kazenel '10, Environmental Studies and Spanish; Hoi-Fei Mok '10, Biological Chemistry; Hannah Rainey '10, Cinema and Media Studies; Bracha Schindler '11, Environmental Studies; and Carolyn Whitlock '12 Environmental Studies

We are collaborating with Dave Jacke, landscape designer and author, to design a new garden on campus, with a goal of growing edible plants in the most ecologically sound manner possible for our local environment. Trees and shrubs that bear the tastiest fruit are often difficult to grow, requiring lots of water, fertilizer, and other inputs for pest and disease control. We are researching appealing fruits with minimal needs, soil preparation and landscaping methods that increase availability of existing water and nutrients, and supporting plant species that enhance soil fertility and help minimize pest and disease outbreaks. Together, our selected plants should form a self-sustaining long-term ecological community in which the major maintenance requirements are mowing the paths and harvesting the fruit! Our guide in this endeavor, Dave Jacke's book, *Edible Forest Gardens*, is a comprehensive presentation of the vision, theory, design and practice of edible ecosystems.

Summer 2010 Research Projects

A Bug's Life: Factors Influencing Arthropod Diversity on Green Roofs

by Brachi Schindler '11



Green roofs are known to provide a variety of benefits to the urban environment (Getter and Rowe, 2006). Some benefits of green roofs have been well studied, such as their ability to retain storm water and to reduce the heat island effect in cities by reflecting heat. However, there have been few studies of green roofs' contributions to local biodiversity. Previous studies of biodiversity on green roofs have demonstrated that they can support rare insect species (Kadas, 2006) and ground nesting birds (Baumann, 2006). Other studies that compared green roofs to overgrown abandoned industrial sites concluded that increased plant diversity would improve insect diversity on the roofs (Gedge and Kadas, 2005).

In my experiment, I sought to determine if the level of vegetation cover on green roofs also influences arthropod diversity. I specifically tested the hypothesis that arthropod diversity is highest where vegetation cover is highest. To test this hypothesis, I measured arthropod diversity in plots with varying cover of vegetation on six green roofs in the greater Boston area, based on the observation or collection of over 800 arthropods. In addition, on one roof I measured arthropod diversity, based on over 2700 collected or observed arthropods, in plots with high vegetation cover, low vegetation cover, and low cover plots with vegetation added. I also collected data on the cover of vegetation and number of plant species in each plot and the size, age, and level of isolation of each roof from existing arthropod habitat.

My preliminary results suggest that the diversity of soil arthropods positively correlates with vegetation cover across roofs. In contrast, data collection is ongoing on the roof where cover of vegetation was manipulated, but current data suggests there was no correlation between vegetation cover and overall arthropod diversity, though vegetation cover strongly correlated with the total number of arthropods. These results suggest that the level of vegetation cover on green roofs may have a stronger influence on the number of arthropods than the diversity of arthropods on the roof, although factors such as roof size may be important. The findings of this study may inform the design of green roofs that provide better habitat for arthropods.

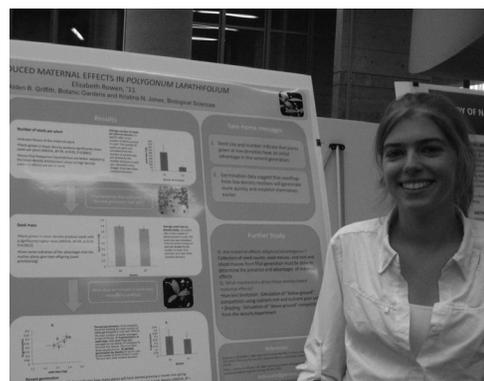
Advisors: Kristina N. Jones, Biological Sciences and Alden B. Griffith, Botanic Gardens
Funded by Frost Endowed Environmental Science/Studies Fund (Dean of the College)

References: Baumann, N. 2006. Ground-Nesting Birds on Green Roofs in Switzerland: Preliminary Observations. *Urban Habitats*, 4(1): 37-50.
Gedge, D. and Kadas, G., 2005. Green roofs and biodiversity. *Biologist*, 52(3): 161-169.
Getter, K. L., D. B. Rowe, 2006. The Role of Extensive Green Roofs in Sustainable Development. *Hortscience* 41(5): 1276-1285.
Kadas, G., 2006. Rare Invertebrates Colonizing Green Roofs in London. *Urban Habitats*, 4(1): 66-86.

A Stressful Pregnancy: Density-Induced Maternal Effects in *Polygonum lapathifolium* by Elizabeth Rowen '11

Mendel had a lucky break when studying pea plants. What if flower color in *Pisum sativum* was not determined by genetics, but by environmental conditions experienced by the mother plant? Would Mendel have been able to infer the existence of genetic particles? Environmental maternal effects can offer a somewhat counter-intuitive contrast to what is considered "normal" natural selection.

Maternal effects affect the phenotypes of offspring based on the environment of the mother, without altering the genotype of this next generation. In angiosperms, maternal effects manifest themselves primarily through seed provisioning, dispersal, germination patterns, and/or epigenetic effects. A mother plant may provision her offspring differently based on the degree and kind of stress that she is experiencing. Sultan et al (2009), for example, found that in certain species of *Polygonum*, drought stress in the mother plant produced a change in root morphology of the filial plants, even when not drought stressed. Like drought, stress due to density (i.e. competition), can be fairly predictable from generation to generation, and thus a good candidate for studying maternal effects.



In order to better understand maternal effects, and to determine whether or not this ability is adaptive, we are conducting a two generational experiment on *Polygonum lapathifolium*. Plants from three populations were grown at high (7 plants per pot) and low (1 plant per pot) densities. Seed, shoot, and root masses were measured, as well as the seed number for each treatment. These second-generation seeds were then germinated, and again grown at high and low densities to determine how the offspring performed in coping with similar or different densities from their mother. Similar measures of seed number and mass, as well as root and shoot masses will give indications of overall fitness.

Analysis of the first generation showed that the average seed mass was significantly higher ($p=0.0012$) in the plants grown at low density than those grown in high. The vegetative-reproductive mass ratios indicated that the plants in both density treatments were exerting similar efforts in their reproductive tissues. Should we discover indications that *Polygonum lapathifolium* does exhibit density dependent maternal effects, this adaptive plasticity may be one mechanism through which this weed is able to easily adapt to many different environments. While the traits due to density may not seem to follow strict Mendelian genetics, the adaptive plasticity that makes this possible is inheritable, and shows how flexible plants can be to survive.

Advisors: Alden B. Griffith, Botanic Gardens and Kristina N. Jones, Biological Sciences

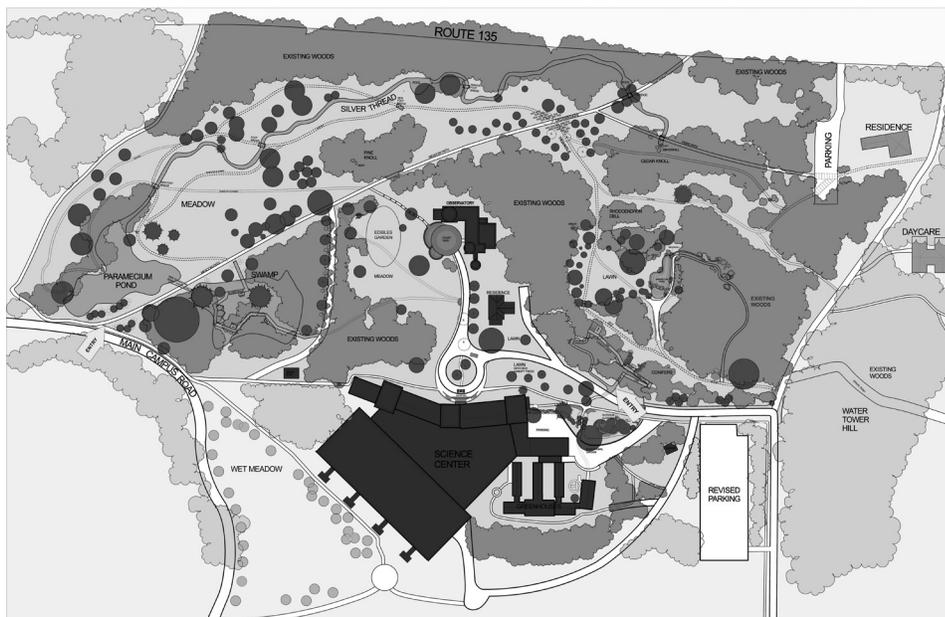
Funded by the Frost Endowed Environmental Science/Studies Fund (Dean of the College)
References: Donohue, K. & Schmitt, J. 1998. Maternal Environmental Effects in Plants, Adaptive Plasticity?. Pp. 137- 158 in T. Moussaux & J. Fox (eds.) *Maternal Effects as adaptations*. Oxford University Press, Oxford.
Sultan, S. Barton, K., Wilczek, A.M. 2009. Contrasting patterns of transgenerational plasticity in ecologically distinct congeners. *Ecology*. 90:1831-1839.

Botanic Gardens *Continued from page 1*

native wildflowers and shrubs, as well as to introduce into settings naturally adapted to them the most attractive and interesting plants which will survive our climate.” This same memo listed the way in which the plants were to be distributed throughout the botanic gardens and specifically mentions several special areas – wildflower garden, rock garden, scree, azalea hill, lower pool (Paramecium Pond), pool in the hollow (Arboretum Pond), and a woodland garden.

An assessment of today’s existing landscape reveals a varied topography consisting of an elevated plateau, a glacial kettlehole, several knolls and a lowlands with a swamp, a pond and a wet and dry meadow. This topography has the advantage of providing several different natural habitats but the disadvantage of difficult access to some of these areas. While the contours of the land provide numerous possible views along corridors: across the tree canopy; closed, short views in the arboretum hollow; or expansive, open views across the meadows, finding one’s way in and out of these habitats can be challenging. The topography dissects the gardens into several microclimates, which can be used by visitors, depending on their needs at the moment: a quiet, shady, warm hollow; an open sunny, breezy slope; a quiet open expanse by a pond; or a private nook with running water. While these diverse areas provide the visitor with choices of environments, the same variety of climate has to be considered in placing plants and siting seats and pathways. The undulations of the landscape can provide many diverse places to plant interesting specimens and for students and visitors to expand their knowledge, or to enjoy the outdoors, but some of the original areas are missing – the wildflower garden, rock garden, scree, and woodland garden.

There is much to love about the Botanic Gardens but several issues need to be addressed for a fuller enjoyment of the land and for its use as an educational resource—circulation, signage, accessibility, development of habitats, enhancing the views, and additional seating. For example, the current pathway system does not bring visitors into some of the areas of teaching value, leaving habitats underused—the maple swamp, the grotto, the



Design Suggestions for Wellesley College Botanic Gardens, 2010, Mary D. Coyne

waterfall, the woodlands, and gardens around the greenhouses. In addition, there are some infrastructural problems to be considered, including adding trees as buffer along Route 135, stormwater management, decreasing the use of potable water for the stream, and ongoing battles with invasive plants.

A reevaluation of the landscape of the Botanic Gardens presents many opportunities to enhance its visual and educational features. In taking advantage of these opportunities, three main goals directed my design development:

1. to enhance the educational value of the Botanic Gardens;
2. to develop the environment into a pleasing and interesting landscape to serve the passive recreational needs of the community;
3. in doing so, to respect the historical design of the gardens.

My master plan project is an outgrowth of many years’ of enjoyment and engagement with the Botanic Gardens, beginning with the simple quest to find a nice spot to sit and eat my lunch. It is my hope that my personal vision (see list below) will inspire others to think in new ways about this unique resource, and the research I have done will be beneficial to the College when it considers ways to solve infrastructural problems and reinvigorate the landscape.



It is not possible in this short essay to describe all the modifications in the Botanic Gardens proposed by Dr. Coyne’s master plan project but her design suggestions include:

- Remove parking from ‘Plateau’
- Add seating courtyards outside Sage Hall and Observatory
- Enhance habitats (Maple Swamp, Arboretum Pond, Woodlands)
- Improve circulation and wayfinding
- Improve accessibility to habitats (Swamp Boardwalk, Woodland Walk)
- Introduce an outdoor teaching area
- Increase seating and scenic view opportunities
- Improve stormwater management
- Improve presentation of specimen plantings
- Augment use of native plantings
- Maintain natural feel of the landscape
- Respect the historical design of the botanic gardens

Programs

- All classes are held in the WCBG Visitor Center unless otherwise noted.
- For classes over the lunch hour: Bring your own lunch or walk to local shops.
- Materials Lists may be found on our website on the Courses page.
- Parking on campus is restricted. Use of the Davis Parking Garage or car pooling from off campus is encouraged.

To register for classes, use the form on page 11 or visit www.wellesley.edu/WCFH and print a registration form.

WOW—Botany is Exciting!

Love plants and want to understand them better? Enjoy the WCBG Greenhouses as **Carol Govan** introduces botany to you using basic terminology, direct observations and journaling to explore plant morphology (seeds, roots, shoots, flowers and fruit).

Sunday, Oct. 24 BAC 11 020A

Saturday, Jan. 22 BAC 11 020B

Class are 9:30 a.m. – 2:30 p.m.

Each 1-day session:

Members \$50 / Non-Members \$65

Conifers for Gardens

Conifer enthusiast **Dr. Richard L. Bitner** helps the beginning or avid gardener, landscape designer, nursery tradesperson or horticulture student make better plant choices—for small gardens, larger landscapes, and difficult sites.. His illustrated talk promotes integrating conifers in the landscape with other woody and herbaceous plants rather than isolating them.

NOTE LOCATION: Hunnewell Building,

Arnold Arboretum, Jamaica Plain

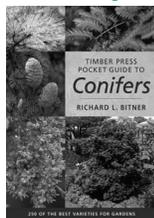
Thursday, Oct. 28 HOR 11 020

7:00 p.m. – 9:00 p.m.

Members \$25 / Non-Members \$30

Conifer ID

Do you know the differences between pines, firs, and spruces? How about arborvitae, junipers, cedars, and false-cedars? **Dr. Richard L. Bitner** gives you a clearer understanding of conifers. Dress in layers so that you are comfortable both in the classroom as well as outdoors among the Arboretum's outstanding conifer collection. The class fee includes a copy of *Timber Press Pocket Guide to Conifers*.



NOTE LOCATION: Hunnewell Building,
Arnold Arboretum, Jamaica Plain

Saturday, Oct. 30 HOR 11 021

9:00 a.m. – 2:00 p.m.

Members \$70 / Non-Members \$80

Ink Brush Painting

Explore ink brush painting with **Nan Rumpf**. Capture the essence of different plants and flowers using expressive gesture strokes based on Asian ink brush painting traditions. Work with black ink and color and also explore rice paper washes using gouache tea and color. No previous experience is required.

Oct. 30; Nov. 13, 20; Dec. 4 WCC 11 111

4 Saturdays: 1:00 – 4:00 p.m.

Members \$125 / Non-Members \$160

The Secret Lives of Honey Bees

Heather Mattila

studies the social organization of honey bees at Wellesley College, where her hives lend a lively presence to the arboretum. Heather will unravel the secret life of honey bees, including the different kinds of bees that are found in hives and the jobs that they do, as well as the means by which honey bees communicate to ensure that the end result of their interactions is a healthy and productive colony.



Monday, Jan. 10 HOR 11 030

2:00 p.m. tea, 2:30 p.m. lecture

Members \$10 / Non-Members \$15

Art as a Way of Seeing and Knowing

A journey of discovery for serious artists at all levels. Be inspired and renewed by the awesome diversity of natural plant forms. Or use your drawings, memory and imagination to develop ideas in the studio classroom. Draw or paint using materials that suit your expressive intentions. In a warm and supportive atmosphere, award winning artist/educator **Susan Swinand** will offer weekly critiques and suggest projects that will spark your creativity.

WCC 11 202

Jan. 26; Feb. 2, 9, 16; Mar. 2, 9, 16

7 Wednesdays: 1:00 – 4:00 p.m.

Members \$200 / Non-Members \$250

It's a Small World— Macro-Digital Photography

Zoom in and discover Macro Photography with **David Kahn**. Check with WCFH office for complete list of course requirements. Please bring your lunch as David plans a special presentation over lunch hour.

Friday, Feb. 11 DIG 11 101A

(Snow date: Friday, Feb. 18)

Sunday, May 1 DIG 11 101B

Classes are 10:00 a.m. – 4:00 p.m.

Each 1-day session:

Members \$75 / Non-Members \$95

New York Garden Spaces

Explore the green side of the Big Apple in this illustrated lecture with garden designer and WCFH docent **Maureen Bovet DS '92**. Maureen was born and raised in New York City and her passion for gardening began there. She will be your guide to the traditional and modern places where New Yorkers and visitors enjoy the great outdoors.



Monday, Feb. 14 HOR 11 040

2:00 p.m. tea, 2:30 p.m. lecture

Members \$10 / Non-Members \$15

Gardening for the Birds

Stephen Kress, author of *The Audubon Society Guide to Attracting Birds*, will present desirable gardening practices... from a bird's viewpoint. He will explain bird-plant interactions, landscaping options for creating enticing and safe habitats, solutions for reducing bird encounters with windows and cats, as well as some tactics for preventing the spread of avian diseases. He will also share tips for learning to recognize common backyard birds by sight and song. His book will be available for purchase and signing.

NOTE LOCATION: Hunnewell Building,
Arnold Arboretum, Jamaica Plain

Saturday, March 19 HOR 11 050

9:30 a.m. – 12:30 p.m.

Members \$40 / Non-Members \$45

For more information on the programs and courses, visit www.wellesley.edu/WCFH or contact WCFH at 781-283-3094 to be sent the 2010-2011 Program Brochure.

The Thorndike Intern: A Dream Realized

Thanks to the donations of WCFH members, including generous gifts from many of Dorothy Thorndike's family and friends, the Dorothy Thorndike Botanic Gardens Internship is now endowed. The internship was established in fond memory of Dorothy Dudley Thorndike DS '75 to celebrate her life and work with plants and to continue her legacy of connecting people to plants, nature and the environment using the botanical resources of the College. The endowment ensures that the internship stipend will be available in perpetuity to support a Wellesley College student in informing and inspiring students and visitors with a passion and understanding of plants and nature.

At the first annual Thorndike Tea, a special celebration held at the Visitor Center on April 30, 2010 that was attended by many of Dorothy's friends and family, John Thorndike spoke movingly about Dorothy and her love of sharing her learning with greenhouse visitors. Jizhou Wang '10, the first Thorndike Intern, presented highlights of her year of enthusiastic advocacy for the Wellesley College Botanic Gardens. Jizhou had enticed people attending last fall's Mystical Tree Tour to try hemlock tea, a delicious beverage made from the needles of the hemlock tree; assumed the role of a shaman at the Greenhouse Light Show, explaining the uses of various medicinal plants; and created a spring botany walk inspired by the poetry of Robert Frost. She took a leadership role among her peers in stimulating interest and soliciting student volunteers for Botanic Gardens activities. "Bringing plants to the front scene is one of the over arching goals of my internship," Jizhou explained. "Plants often fade

into the background in the college as just scenery. And similarly, the beautiful botanic garden often fades into just scenery in the back of people's minds. And some people walk through the Botanic Gardens without realizing what they just passed by."

At the Thorndike Tea, Jizhou officially turned over her role to 2010-2011 Thorndike Intern Jennifer Yang '12. Jenn brings to her year of internship a knowledge of technology and an enthusiasm for science writing in addition to her interest in plants and the Botanic Gardens. We look forward to watching Jenn's growth as she forms a new link in the long chain of stewardship of Wellesley College's uniquely beautiful landscape. 



(L to R) Jennifer Yang '12, John Thorndike, Jizhou Wang '10 share the celebration at the first annual Thorndike Tea.

More classes of interest ... complete details online in our program brochure or contact WCFH office.

Foundations of Botanical Drawing and Painting

Classes are 9:30 a.m. – 12:30 p.m.

8 Tuesdays: Jan. 25; Feb. 1, 8, 15; March 1, 8, 15, 29

8 Wednesdays: Jan. 26; Feb. 2, 9, 16; March 2, 9, 16, 30

Techniques of Botanical Drawing and Painting

9:30 a.m. – 2:00 p.m.

6 Thursdays: Jan. 27; Feb. 3, 10, 17; March 3, 10

Elements of Botanical Drawing: Getting It Right

5 Saturdays: Oct. 16, 23; Nov. 6, 13, 20

9:30 a.m. – 12:30 p.m.

Color Curriculum: Palettes That Work

3 Fridays: Nov. 5, 12, 19

9:30 a.m. – 3:30 p.m.

Applied Technology for Artists

3 Wednesdays, Jan. 5, 12, 19

9:30 a.m. – 3:30 p.m.

Tonal Drawing Applied: Leaves

3 days: Friday, Jan. 7 – Sunday, Jan. 9

9:30 a.m. – 3:30 p.m.

Elements of Botanical Drawing: Value and Form

5 Saturdays: Jan. 29; Feb. 5, 12, 26; Mar. 5

9:30 a.m. – 12:30 p.m.

From Flowers to Fruits: Botanical Textures in Gouache

4 days: Tuesdays, Jan. 4, 11

and Thursdays, Jan. 6, 13

9:30 a.m. – 3:30 p.m.

Watercolor for Beginners

Classes are 1:00 – 4:00 p.m.

4 Saturdays: Feb. 5, 12, 26; Mar. 5

A Year in the Life of a Tree with Wendy Hollender

3 days plus finishing class and critique in December 2011 – date TBA:

Tuesday, Mar. 22 – Thursday, Mar. 24

9:30 a.m. – 4:30 p.m.

Introduction to Botany through Drawing

4 Saturdays: March 26; April 9, 23; May 7

9:30 a.m. – 3:30 p.m.



© 2009 Kelly Radding

Water 101

When is Enough Not Enough?

Massachusetts is blessed with relatively abundant precipitation (an average of 45 inches/year) leading many residents to the erroneous belief that there's plenty of "surplus" water available for human consumption at any time and for any purpose. **Russ Cohen** of the Mass. Department of Ecological Restoration clues us in to why our water resources can at times be insufficient to support our aquatic ecosystem, how human activities – both historically and today – adversely affected our river and stream systems, and what potential solutions are available to mitigate these impacts.

*Co-sponsored with
Arnold Arboretum of Harvard University,
Garden Club of Back Bay,
Boston Junior League Garden Club,
New England Wild Flower Society,
& Wellesley College Friends of Horticulture*

Monday, March 21 HOR 11 060
10:30 a.m. coffee, 11:00 a.m. lecture
Science Center, Wellesley College
Members \$10 / Non-Members \$15

WCFH's Certificate in Botanical Art: Its Foundations and Accomplishments

June 7, 2010 was a day of celebration for Friends of Horticulture, when we graduated the inaugural class in our Certificate in Botanical Art and Illustration (CBA) program. At the Friends' Annual Meeting, graduates Sandy Adams, Barbara DeGregorio, and Carrie Megan were presented with lovely hand-painted certificates before an audience of WCFH members, families, and fellow botanical artists in a ceremony led by WCBG Director Kristina Jones; Sarah Roche, CBA Education Director, and Carole Ely, WCFH Alumna Co-Chair and CBA Program Director. The three new graduates spoke eloquently about the varied interests and circumstances leading them to pursue a rigorous course of study in botanical art, starting even prior to the establishment of the CBA program. As the motivator for the creation of the program, Sandy shares memories of her personal journey in botanical art and the establishment of the CBA.

I was captivated by plants early on – a chance to share time in our garden with my dad. He owned a local nursery and brought his interest home. I knew many plant names, and enjoyed ridding the garden of nasty insects in my own private war to protect the glowing flowers.

Fast forward forty years after my cherished youth eradicating bugs ... I experimented with design and garden history classes and became enchanted with 18th c. garden design books and botanical art, collecting a few interesting titles and images, placing them where I could look at my trophies often. A chance encounter with Diane Boucher, founder of American Society of Botanical Art (ASBA), at a conference in '94, later afforded me a spot on the ASBA Board. I saw that ASBA members were enjoying fascinating courses at their annual conferences. It had not occurred to me to think about starting to paint until then. It now seems like a logical progression.

I took some courses offered at the following year's conference – and loved them. I began to dream about finding a place nearer home to take art lessons. Sarah Roche, a master teacher on the South Shore, had a burgeoning coterie of students turning out lovely work. I asked Sarah if she would consider teaching closer to my home. The Ferguson Greenhouses at my alma mater Wellesley College seemed like an ideal and special location for such an interesting pairing of interests. Luckily, the Friends of Horticulture were receptive and asked if classes could be started in January '03, just two short months away! I got my wish to take classes conveniently, and more people would be able to enjoy this fabulous historic art form.

Would-be artists eagerly signed up, the classes filled, and the budding artists were delighted. Sarah's classes and words of encouragement made it possible for all students to feel that

they could paint too. We followed instructions and saw that we could emulate – to some extent – the techniques we learned from live demonstrations clustering around Sarah. Sweet! Color mixing, sure brush strokes, pale colored washes, layered color – all looked so effortless, I forgot to be intimidated!

First effort, a radish. A line drawing on tracing paper. A contoured small red vegetable with a white root, and a lot of healthy green, veined leaves, exploding artfully from the tiny top of a cone shaped mass. I helped the arrangement of leaves for a more interesting composition, traced the outline on "posh" paper and painted it over the next week. It was pretty rudimentary, but it had the energy of the plucked vegetable. I did it! To me, it was a miracle.

I still have much the same feeling of mystery and hopefulness for a good outcome, as I start each new painting. There is great pleasure in the choosing what plant to paint; it has to speak to me. Searching the cherished Hunnewell Arboretum I walk with anticipation on or off the paths, to see what is new, the growth and progress of plants loved the previous year, the trajectory of their complex cycles of life, and the many changes appreciable if I revisit over a few days or weeks. The specimen has to have a rhythm of life that is recognizable and manageable. Unconsciously I seem to go for the art nouveau curves and flourishes seen, to some extent, in all four of my exhibited final project paintings. That is when I am the most happy making the specimen live on paper. It is a collaboration between artist and plant: both are changing rapidly as one captures an enduring image. Seize the opportunity to paint the plant in its fresh state. It doesn't wait for you.

Though my requirements for the certificate have been met, there is much yet to learn about plant lore, and certainly much more to learn about the art of painting.

Sandy Adams '59 June 7, 2010



Celebrating in the Visitor Center after being awarded the CBA, (left to right) Carrie Megan, Barbara DeGregorio, and Sandy Adams.

Established in 2006, Wellesley College Friends of Horticulture's Certificate in Botanical Art and Illustration is the first program of its kind in New England, bringing together fine art and scientific accuracy in an integrated course of study set in the Wellesley College Botanic Gardens. Using three sequential levels of study, the curriculum provides a solid background in both botanical art media and techniques, fosters a working knowledge of plant anatomy and development, and concludes with an in-depth independent study in a medium of choice.

For more information on our Certificate program, check Friends of Horticulture's website: www.wellesley.edu/WCFH, email horticulture@wellesley.edu, or phone the Friends office at 781-283-3094.

Notes from the Director *Continued from page 2*

else had a Renaissance Food Garden or an Edible Forest Garden – at Wellesley we love being ahead of the curve!

The Edible Forest Garden is evolving into an “Edible Ecosystem Garden,” as part of it will be an edible meadow (or “eddo” for short). Dave Jacke provided a final design plan in July, incorporating the research and recommendations of the students who worked with me in the spring on the central fruit tree area (see the abstract from their Ruhlman presentation on p. 5). Much of the area has been taken over by crown vetch (*Coronilla varia*), an aggressive weed, so we have mowed it down and will sheet mulch it for at least a year before planting. In the meantime we will source and grow the fruit and nut trees and shrubs and start many of the understory species from seed. This is truly a long-term project, and we are proceeding slowly and thoughtfully, with a lot of research ahead of time to maximize the opportunities to study all aspects of this garden as it develops.

There were also several other student projects in the Botanic Gardens this spring and summer, ranging from a study of what kinds of pollinators took advantage of the early spring bloom, to a greenhouse investigation of drought and salt tolerance in wheat, with and without microbial inoculation (see abstracts on p. 6). Botany Fellow Alden Griffith co-mentored these students and conducted his own research on pollinator responses to invasive plants and impacts on native plant species. He also has an ongoing collaboration with Elizabeth Rowen '11 examining non-genetic responses to crowding that are transmitted to offspring via “maternal effects,” in a genus of common plants, *Polygonum*. Alden continues to greatly expand opportunities for students to engage in plant science on campus, exactly what we hoped the Botany Fellow would provide. He has also dived into the science of climate change, provoked to examine climate skeptics’ claims for himself and to share his findings on a great blog: www.fool-me-once.com. And to top off a great year, he and Katie had their second child, a boy named Field, on Marathon Monday! Many thanks to all Friends of Horticulture members, as your support has enabled Alden to stay on for a third year as Botany Fellow.

Lots of students were involved in the student farm this spring, and two summer farm interns, Genevieve Goldleaf '12 and Nicole Uhrain '11, were sponsored by the Center for Work and Service and the Botanic Gardens. Jenny and Nicole not only organized, planted, weeded, watered, and harvested the farm plot on the “north 40,” they also ran a weekly farmer’s market at the Wang Campus Center and are providing produce to the student-run El Table café in Founders.

Last but not least, one student had a particularly strong involvement in the Botanic Gardens this past year: our first Dorothy Thorndike Intern, Jizhou Wang '09. Jizhou played major roles in all of our outreach events to students: the Mystical Tree Tour, Greenhouse Light Show, and Spring Smoothie Night,

NAME: _____

ADDRESS: _____

PHONE: Home: _____ **Work/Cell:** _____

EMAIL: _____

If applicable, Wellesley College Class _____ CBA student ? _____

_____ I would like information on volunteering at WCFH.

Mail this completed form and your payment to :

Wellesley College Friends of Horticulture

106 Central Street, Wellesley, MA 02481-8203

COURSE REGISTRATION

See programs and classes information and cancellation policy

Course ID#	Class title	Fee
_____	_____	_____
_____	_____	_____
_____	_____	_____

SEPARATE CHECK FOR PROGRAM FEES \$ _____

made payable to: Wellesley College Friends of Horticulture

WCFH cannot accept credit cards for course fees. Checks or cash only please.

MEMBERSHIP IN WCFH

(for the academic year July 2010-June 2011)

Membership Gift Payment Type (circle one):

Credit Card: MasterCard / Visa / AMEX

Account number: _____

Exp. date: Month : _____ Year : _____

or **SEPARATE CHECK FOR MEMBERSHIP GIFT**

made payable to *Wellesley College Friends of Horticulture*

My membership gift for the current academic year \$ _____

Membership Levels

Patron:	\$2500
Benefactor:	\$1000
Supporter:	\$500
Donor:	\$250
Sponsor:	\$100
Contributor:	\$50
Young Alum:	\$15

LOGO ITEMS FOR SALE

WCFH Tote Bags _____ at \$15 each tote bag = \$ _____

WCBG / WCFH Mugs _____ Pair(s) of mugs at \$15 = \$ _____

WCBG Recycled Fleece Vest

_____ Women’s Medium \$40 each = \$ _____

_____ Women’s Large \$40 each = \$ _____

_____ Men’s Large \$40 each = \$ _____

_____ Men’s Extra-Large \$40 each = \$ _____

Shipping / Handling at \$5 for each vest, tote, pair of mugs = \$ _____

SEPARATE CHECK FOR LOGO ITEMS. TOTAL = \$ _____

made payable to *Wellesley College Friends of Horticulture*

WCFH cannot accept credit cards for merchandise. Checks or cash only please.

as well as developing and implementing her own celebration of spring in the gardens for Earth Week. She handed off her notebooks and enthusiastic advice to the incoming Dorothy Thorndike Intern, Jennifer Yang '12, at a tea celebrating Dorothy and the internship. I am thrilled to report that thanks to John Thorndike, family and friends, the Dorothy Thorndike Botanic Gardens Internship is now fully endowed, so we will always have a dedicated student ambassador for the Botanic Gardens.

Looking forward to an exciting 2010-11 school year!

Enjoy the fall beauty, and I hope to see you at Wellesley soon.

Kristina

Kristina Niovi Jones, Director
Wellesley College Botanic Gardens
kjones@wellesley.edu 781-283-3027



WELLESLEY COLLEGE
Friends of Horticulture
Science Center
106 Central Street
Wellesley, MA 02481-8203

Non Profit Org
US Postage
PAID
Boston, MA
Permit No 12548

GREENHOUSE KIDS' TIME

1:00 - 4:00 p.m.

The Margaret C. Ferguson Greenhouses host special afternoons of fun family activities on winter vacation days. Crafts and scavenger hunts introduce kids of all ages to the amazing plant world through art and science. Drop in at any time between 1 & 4 p.m. to share the warmth and wonders of the greenhouses.

FREE. All children must be accompanied by an adult.

December 27-30 (Winter Vacation Week)
January 17 (Martin Luther King, Jr. Day)
February 21 (Presidents' Day)



SEE WHAT PLANTS ARE ... ALL ABOUT!

Sundays, 1:30 - 4:00 p.m. – FOR ALL AGES

All About! is a free series of family explorations combining science, close observation, and art. Each independent session has a focus designed to appeal to all ages from tots to grandparents. Join us for this interactive, informal way to become familiar with botanical concepts through many learning pathways.

All children must be accompanied by an adult. However, adults are encouraged to come even without a child and spend an engaging afternoon immersed in the natural world of the Botanic Gardens. Dress appropriately for going outdoors.

All About! is taught by Wellesley College Visiting Scholar Katie Griffith, a naturalist and environmental scientist with a strong interest in family education.

FREE, pre-registration by previous Friday at noon is required. Space is limited. Call 781-283-3094 or email horticulture@wellesley.edu.

All About! – Sunday, Oct. 17 – The Colors of Fall

Fall is a glorious time of year, characterized in New England by dramatic leaf changes and the autumnal ripening of fruits. We'll explore the reasons behind the beautiful colors of fall, then go outside to collect leaves and fruits.

All About! – Sunday, Nov. 14 – Harvest Time

Thanksgiving celebrates all the yummy fruits and vegetables we love to eat. We'll look at the difference between a fruit and a vegetable, both those familiar and exotic. And of course we'll have lots of samples to try!

Visit our website or call the office for future **All About!** programs.

ON THE ROAD with the Friends of Horticulture

Secrets of Sichuan — A Journey to Jiuzhaigou May 14-29, 2011

See page 5 for more information



printed with soy-based ink on recycled paper