

## Darwin and Flowers— Nature Abhors Close Fertilization

“... flowers are not only delightful for their beauty and fragrance, but display most wonderful adaptations for various purposes.”

—Charles Darwin, prefatory letter to A. J. Kerner's *Flowers and their Unbidden Guests*

“I do not think anything in my scientific life has given me so much satisfaction as making out the meaning of the structure of these plants.”

—Charles Darwin, *The Different Forms of Flowers on Plants of the Same Species*

This year, we celebrate the 200th anniversary of the birth of Charles Darwin, the English naturalist whose idea, the theory of evolution by natural selection, changed our whole concept of the world. On his birthday, February 12, Sewanee's Department of Biology held a garden party in Spencer Hall's new Darwin's Garden, complete with tea, cakes, songs, poetry, readings, and the dedication of a bronze statue of Darwin, executed by Sewanee alumna Jeanie Stephenson.

Darwin was a naturalist in the truest sense of the word, observing and writing about a wide range of subjects in nature—geology, paleontology, coral reefs, birds, earthworms, marine invertebrates, and more. At Cambridge, where his father sent him to study theology, his favorite occupation was collecting beetles:

“I will give proof of my zeal: one day, on tearing off some old bark, I saw two rare beetles, and seized one in each hand; then I saw a third and new kind, which I

could not bear to lose, so that I popped the one which I held in my right hand into my mouth. Alas! It ejected some intensely acrid fluid, which burnt my tongue so that I was forced to spit the beetle out, which was lost, as was the third one.”

One of Darwin's abiding passions was botany. Apparently, his interest in variation among plants began at an early age, as he explains in his *Autobiography*: “I told another little boy . . . that I could produce variously colored polyanthuses and primroses by watering them with certain colored fluids, which was of course a monstrous fable, and had never been tried by me.”

His early attraction to plants, reinforced by years of observation and experimentation, led to Darwin's spelling out the significance of the relationship between flowers and their insect pollinators in *The Origin of Species*.

Therein he concludes the discussion of insect pollination with these words: “Thus I can understand how a flower and a bee might slowly become, either

simultaneously or one after the other, modified and adapted to each other in the most perfect manner, by the continued preservation of all the individuals which presented slight deviations of structure mutually favourable to each other.”

Darwin's landmark opus, published in 1859, was followed by papers on a variety of natural history topics, several of them botanical, including orchid fertilization, climbing plants, insectivorous plants, and variations in domestic plants. One subject—heterostyly—particularly intrigued him, as he wrote in his *Autobiography*, “No little discovery of mine ever gave me so much pleasure as the making out the meaning of heterostyled flowers.”

For years, botanists had been aware of heterostyly in some plants: the existence of two forms of flowers in the same species. In heterostyly, all flowers have both male and female reproductive structures, which are arranged differently

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# Springtime Botanical Quests into Lost Cove

This year, the Sewanee Herbarium makes its final push to complete the Flora of the Domain. We are rapidly approaching 900 species of vascular plants and by the end of the year we expect to be close to 1000 species in the Flora. We have just added three new herbarium cabinets to our new space in Spencer Hall and so we now have adequate space to expand the collection.

With the addition of Lost Cove last year, Sewanee added a number of new habitat types to the Domain. Of particular botanical interest are the forests along the floodplain of Lost Cove Creek and the dry limestone, cedar glade-like areas on southwest facing slopes. The limited botanizing we conducted in both of these habitats this past summer yielded a whole suite of new species for the Domain. We expect the spring flora in Lost Cove to offer up some botanical surprises as well.

In March and April, the Herbarium will be teaming up with the Sewanee Natural



History Society to lead a series of botanical forays into Lost Cove to locate some of these botanical surprises. We are calling these day-long trips “quests,” and they are open to any intrepid

Sewanee student willing to join us off-trail in pursuit of botanical glory.

One particular spring wildflower we hope to find on these quests is the rare *Jeffersonia diphylla* (twinleaf) named in honor of our third president. George Ramseur and his classes found this plant downstream from Lost Cove near Sherwood back in the 1960s, but it has not been found on the Domain or in Lost Cove proper. The first student who finds *Jeffersonia* in Lost Cove will receive a special signed copy of the Tennessee Native Plant Society's book, *Wildflowers of Tennessee, the Ohio Valley, and the Southern Appalachians* from the Herbarium. The Herbarium staff has also planned a series of regular collecting trips into Lost Cove this spring and summer.

—Jon Evans

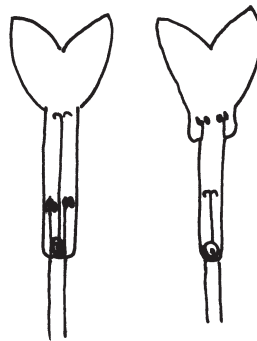
## Darwin, continued from page 1

in two or more forms, or morphs. The flowers of one morph can be successfully fertilized only by pollen from another morph.

In our flora, bluets are a good example. All of the flowers on any one plant are of the same morph, but if you turn the flowers of several plants over, you will see that in some, the flower tube has a bulge in it, whereas others have no bulge. Careful dissection reveals that in one morph the pollen-producing (male) stamens are longer than the female pistil and in the other the situation is reversed. Microscopic examination will even reveal differences in the sizes of the pollen grains produced by the two morphs.

Darwin determined, through work with primroses and cowslips, that the morphs

are adapted for pollination by different types of insects. He surmised that heterostyly is a clever strategy to avoid cross-pollination between plants that are very closely related. No kissing cousins among these plants!



As Asa Gray, the Harvard botanist to whom Darwin dedicated his paper on heterostyly, so aptly put it, “The

aphorism ‘Nature abhors a vacuum,’ is a characteristic specimen of the science of the middle ages. The aphorism, ‘Nature abhors close fertilization,’ and the demonstration of the principle, belong to our age and to Mr. Darwin. To have originated this, and also the principle of Natural Selection . . . and to have applied these principles to the system of nature, in such a manner as to make, within a dozen years, a deeper impression upon natural history than has been made since Linnaeus, is ample title for one man's fame.”

Hear, hear!

—Mary Priestley



## Celebrating Our Jubilee Year

**A**s you see from Jon Evans' article and the extensive list of events scheduled for the spring that Yolande Gottfried has compiled, we have introduced some special activities to celebrate the herbarium's 50 birthday. Take note:

We are joining forces with the student organization, the Sewanee Natural History Society, to sponsor a series of quests for students to discover the treasures of Lost Cove. The Society, only three or four years old, has been the force behind numerous expeditions and outdoor adventures for students.

In April we'll have a series of "Wednesday Walks at Noon" on and around campus, led by herbarium staffers. These walks will be short and easy, perfect for the lunch hour and for those with physical limitations who would still like to get out and see some spring wildflowers.

Looking ahead, we are taking a cue from the herbarium at the University of North Carolina at Chapel Hill to sponsor our first-ever Mega Mount-a-thon this summer. Are you curious about how plant specimens are mounted for permanent preservation in a herbarium? This will be your chance to learn! Look for details in our summer newsletter.

In the works, as well, are plans for the herbarium's birthday party (Jubilee Jamboree?). We are aiming for an autumn weekend to hike, socialize, and celebrate the 50th anniversary of this very much alive-and-kicking institution! Stay tuned!

—Mary Priestley

### THE SEWANEE PLANT PRESS

The Sewanee Herbarium  
Dr. Jon Evans, Director  
Biology Department  
Sewanee: The University of the South  
735 University Avenue  
Sewanee, TN 37383

#### WEB SITE

<http://lal.sewanee.edu/herbarium>

#### EDITOR

Mary Priestley  
marypriestley@bellsouth.net

#### CALENDAR

Yolande Gottfried  
ygottfri@sewanee.edu

#### CONTRIBUTORS

Jon Evans  
jevans@sewanee.edu  
Yolande Gottfried

#### COMPOSITOR

Tammy Elliott

*Drawings, by Mary Priestley, are of twinleaf, trillium, bluet, and a likeable lycopodium.*

## Membership Application/Renewal

The Friends of the Sewanee Herbarium support the work of the Herbarium: education, research, and conservation. A \$10.00 annual contribution would be very much appreciated. The date of your most recent contribution is printed on your address label.

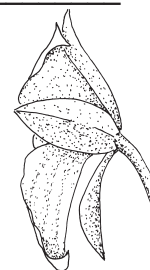
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# Spring Calendar of Events

## Bluebell Island—Sat., March 28, 10 AM

Join the South Cumberland Regional Land Trust for their annual Bluebell Island Ramble. Bluebell Island is located on the Elk River and was purchased by SCRLT in order to protect its unique natural features for posterity. The island is regionally famous for its plethora of wildflowers, especially Virginia Bluebells. Meet at 10:00 am at the gated entrance to the Tyson Foods parking lot on TN-50/US 64 W, just south of exit 127 off I-24 near the bridge over the Elk River, about two miles west of I-24. Easy except for crossing the Elk River on a log, but ropes or something else will be set up to make it accessible.

## Bird Walks—Sat., April 18, and Sat., May 2, 8 AM David Haskell

Dr. Haskell, ornithologist and Sewanee biology professor, will be looking for spring migrants and year-round residents. Meet at the main entrance to Spencer Hall across from the duPont Library. Walks will last about one hour. Cancelled in case of rain or high winds.

## Weekend Walks in Shakerag Hollow

Sun., April 5, 1:30 PM — Jon Evans

Sat., April 11, 1:30 PM — George Ramseur

Sat. & Sun, April 18 & 19 — Trails & Trilliums  
(<http://trails.sasweb.org>)

Sat., April 25, 1:30 PM — Mary Priestley

This is Sewanee's "Mecca" for wildflower lovers and these leaders are the experts. "A Trail Guide to Shakerag Hollow," published in spring 2007 by the Herbarium, will be available for purchase for \$5. Meet at Green's View parking lot (past the golf course). 2 miles, moderate to strenuous, with one fairly challenging incline.

## Wednesday Walks at Noon: a Herbarium Jubilee Series

- **April 1 (April Fool's Day)**—Meet at Morgan Steep. Unless the weather "fools" us, we'll look for trailing arbutus and other signs of spring.
- **April 8 (Passover/Holy Week)**—Meet at the University Cemetery. What better time to look for signs of "new life" and learn some history of the cemetery.
- **April 15 ("Tax Day")**—Meet at the gates to Abbo's Alley just past the Fowler Center. The walk will not be "taxing" and the Ravine Garden should be in full bloom.
- **April 22 (Earth Day/Administrative Professionals' Day)**—Meet in front of All Saints' Chapel to get out of the office and honor the earth with a tour of some of our campus trees.
- **April 29 (Classes end)**—Meet at the "end" of Tennessee Avenue at the Cross to look for pennywort and other late spring wildflowers and to admire the greening of the plateau.

**April 22-April 26 is the week of the Spring Wildflower Pilgrimage in the Great Smoky Mountains National Park.** Members of the Herbarium staff will be participating as walk leaders. For more information and registration visit the website at [www.springwildflowerpilgrimage.org](http://www.springwildflowerpilgrimage.org).

## Collins West—Sun., April 26, 10:00 AM Mary Priestley

This section of the South Cumberland State Recreation Area is the only other local spot on the plateau that rivals Shakerag Hollow for number and diversity of spring wildflowers. Meet at the Collins West trailhead, just beyond the Swiss-

Memorial School in Gruetti-Laager. Bring lunch and extra water. 5 miles, strenuous.

## Tom Pack Falls—Sat., May 2, 1:30 PM Yolande Gottfried

This trail in the Franklin-Marion State Forest is one of the few spots in this area where Catesby's trillium can be found. The abundant wild azalea may also be in bloom. Meet at the Forest Ranger's headquarters building on TN Highway 156 (South Pittsburgh Highway). 2 miles, moderate.

All times are CDT.

Wear appropriate shoes on all of these walks. Risks involved in hiking include physical exertion, rough terrain, forces of nature, and other hazards not present in everyday life. Picking flowers and digging plants are prohibited in all of the above-mentioned natural areas.

For more information on these events contact Yolande Gottfried at the Herbarium (931.598.3346) during regular business hours or by e-mail at [ygottfri@sewanee.edu](mailto:ygottfri@sewanee.edu). For directions to Collins Gulf contact the South Cumberland State Park Visitors' Center (931.924.2980).

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**SEWANEE**  
THE UNIVERSITY OF THE SOUTH

Herbarium, Biology Department  
735 University Avenue  
Sewanee, TN 37383-1000

ADDRESS SERVICE REQUESTED

