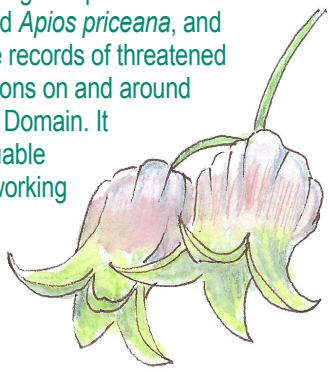
The Sewanee PLANT PRESS

Volume XXV, No. 4 Newsletter of the Friends of the Herbarium Fall 2021

End-of-Summer Report from Our Interns

When last you heard from the Herbarium interns, we shared our endeavors that took place at the beginning of our summer experience. Since then, we have seen some projects completed and even more started! One great example is the *Opuntia humifusa* cactus site behind Fulford Hall. The site looked pretty pitiful when we first started working on it, with the cacti practically buried under wisteria, privet, and other invasives. After two weeks of hard labor, the site is unrecognizable! The cacti are now visible and soaking in the raw daylight that they crave. If the population continues to recover, we might see them flower again in the next few years. With continuous maintenance of the site, we can soon imagine a pristine sandstone outcrop community right on central campus.

The next big phase of our summer work was with the Tennessee Plant Conservation Alliance. As volunteers we were able to help with a great variety of data collection. We assisted in population surveys of a gorgeous prairie restoration area at Arnold Air Force Base in nearby Tullahoma, looked for federally endangered plants like *Clematis morefieldii* and *Apios priceana*, and updated state records of threatened plant populations on and around the Sewanee Domain. It was an invaluable experience, working and learning alongside professional botanists, park officials, and state conservationists. The Plant Conservation Alliance has given us many amazing opportunities to explore the field of botany and fieldwork in conservation. We can only be grateful for such opportunities.



For one of our first outings, we met the state botanist, Todd Crabtree, along with Roger McCoy and Jason Miller, the director and program administrator of Tennessee's Division of Natural Areas, respectively, to search for species of concern near the proposed newest portion of the Mountain Goat Trail. Plans are to extend the trail, which currently traces the old railbed from Monteagle to St. Mary's-Sewanee, down the mountain toward Cowan. It will pass through one of Tennessee's most unusual plant communities — a limestone glade.

Botanist Henry Eggert—the person for whom the rare Eggert's sunflower is named—was in this vicinity on July 21, 1897, and may have collected a specimen of now-endangered *Clematis morefieldii.* We found many of the plants he described, including all seven that we were surveying for—and yes, even a new record of *Clematis morefieldii.* It seems likely that we were in or near the exact location that Henry Eggert explored over 120 years ago!

It's pretty special to make that historical connection and to reflect that humans have been botanizing for much, much longer than either us or Mr. Eggert. It was very cool to take a step back in time and walk in the footsteps of someone who loved plants (much like we do) and imagine what the area might have looked like when the railroad was newly constructed. It was also extremely fortunate to find those fragile populations persisting as they were so long ago, while elsewhere they have become more and more rare as they disappear due to habitat loss. I wonder if they will still be there for future botanists and plant lovers to find—perhaps even 120 years from now.

—Lilliam Fulgham, C'21
Oliver Hutchens C'23

Greenhouse Goodies

This is the first in a new series of reports from our Webb Greenhouse. —Ed.

Now that it's been a few years since the inheritance of the Vanderbilt collection, we can finally say the plants have adjusted. It took some learning and diligence, but as a result we see these specimens not only surviving but thriving! And what says "thriving" like flowers? Some highlights are:

Our Titan Arum (*Amorphophallus titanum*) flowered last summer, and the giant leaf that it put out this summer is a sight to behold. Our Queen of the Night (*Epiphyllum oxypetalum)* has bloomed several times as well. With each set lasting only one night, they are truly a sight to behold. Our *Bulbophyllum* "Daisy Chain" hybrid orchid has bloomed constantly, making it one of our show-stopper specimens. Just about every *Gesneriad* has flowered now as well. To put it simply: We have some happy plants! For more updates on what's blooming in the greenhouse, join us on instagram @sewanee_herbarium.

—Oliver Hutchens, C'23

Illustration: Epiphyllum *in bud*

Surveying a Rare Plant Population

In early August, Lillian Fulgham, C'21, and I, along with several other members of the Herbarium-sponsored nature journaling group, helped survey a local population of white fringeless orchid, *Platanthera integrilabia.* This plant, also known as monkey-face orchid, is federally endangered, under the protection of the U.S. Fish and Wildlife Service.

Roger McCoy, director of Tennessee's Division of Natural Areas, led the survey, which was initiated by Ranger Aaron Reid, assistant manager of South Cumberland State Park. Reid's domain is Savage Gulf, a 15,000-acre State Natural Area, one of Tennessee's most scenic wilderness areas. And that's where we headed.

The orchid population that we visited is the second or third largest in the world. It inhabits an area on top of the plateau that was once planted in loblolly pine. When it was discovered in the 1990s, the population numbered around 200 blooming plants. As the pines were thinned, the numbers hovered around about 100 or so. The land was purchased for addition to the State Natural Area in 2016, with the understanding that a lumber company could harvest the trees. The following year, immediately after the final logging, the number of blooming orchids plummeted to 39. But the population has recovered, and by 2020 close to 1,800 flowering plants were counted. This year we counted just over 2,200 flowering plants! A thunderstorm kept us from visiting a second smaller site, but Ranger Reid surveyed it later and found that population, too, had grown.

The plants are growing in a wet seepage area that looks like a fern- and wildflower-studded meadow with tree stumps scattered throughout. The technical term for this type of habitat is "Appalachian acidic seep community." It was easy to understand why we were to count only flowering plants, because the site was so crowded with herbaceous vegetation of all kinds that it was impossible to count non-flowering orchids with any accuracy. Besides our target plant and plenty of grasses and sedges, we were among cinnamon and royal ferns, cowbane, white-topped aster, cardinal flower, angelica, Joe-Pye-weed, blazing star, sunflowers, and the most beautiful yellow fringed orchids this author has ever seen—basically a botanist's paradise.

To avoid counting plants more than once, we surveyors spread out and formed a line, then all walked at once, slowly, through the population. We carried clickers in one hand for counting and walking sticks in the other for keeping up visually with where we were within the clumps of plants. McCoy and Reid estimated a 10 percent margin of error, which was acceptable, and preferable to other methods that would cause more disturbance.

Historically there were at least 90 known populations of white fringeless orchid, spread across the mountains of the Southeast. Today, 80 of those still exist, most of them on the Cumberland Plateau in Tennessee. For every species of plants, the "type specimen" is a single plant or plant population on which the description and name of the species are based. The site where the type specimen was collected is called the "type locality." The type specimen for this orchid was collected very near the entrance to Savage Gulf's Great Stone Door, putting the type locality a very few miles, as the crow flies, from the population that we visited.

White fringeless orchid's full scientific name, *Platanthera integrilabia* (Correll) Luer, includes the names of the authorities, the people who introduced the plant to the scientific community, as it were. Correll and Luer were both distinguished 20th-century botanists and conservationists.

Don Correll, who at one point considered a career in music, was first to describe the plant. He considered it to be a variety of the white fringed orchid, *P. blephoriglottis* var. *conspicua*. Botanically, orchids and other tropical plants were Correll's first love, but he also did work for the U.S. Department of Agriculture, exploring for and studying wild species of potato and seeking plant sources for the drug cortisone. Among his accomplishments were the publication of the *Manual of Vascular Plants of Texas* and, along with his wife, botanist Helen Elizabeth Butts, an illustrated *Flora of the Bahama Archipelago*; and the creation of Big Thicket National Park.

In the 1970s Carlyle Luer established white fringeless orchid as a species in its own right, distinct from its fringed cousin. He gave it the scientific name that we now use. Dr. Luer, a surgeon whose lifelong interest was the study—and illustration—of orchids, described and illustrated more than 3,000 new orchid species. He was instrumental in the establishment of the Marie Selby Botanical Gardens in Sarasota, Florida; founded the journal *Selbyana*; served as a senior curator at the Missouri Botanical Garden; and published extensively, including both *The Native Orchids of Florida* and *The Native Orchids of the United States and Canada, Excluding Florida*.

As with so many of our native plants, white fringeless orchid is threatened by habitat-altering activities, such as development, road construction, ATV traffic, poaching, and invasive species. Its listing as a federally endangered species, which entails regular monitoring of populations, should increase this rare mountain plant's chance of survival.

— Mary Priestley

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From the Director

I am very excited to announce the three new Block Undergraduate Fellows who will be associated with the Herbarium this year: Lucy Rudman, Oliver Hutchens, and Izzie Berthelot. They join George Burruss and Angus Pritchard, both of whom will be continuing as fellows in this, their senior year. I asked each to write a little bit about themselves. —*Jon Evans*

Lucy Rudman, C'22

I was a late bloomer when it came to the appreciation of plants. Though I grew up playing outside in my little neighborhood, it wasn't until quarantine that I began to appreciate what my community had to offer in terms of plants. Using the Seek app, I identified every plant in my yard that I could. That spring was also when I decided to major in biology with a track in ecology and biodiversity. Although I am new to the Herbarium Fellows Program, it is my goal to increase student body awareness of the plants in our immediate communities, especially the ones that might slip by in our day-to-days. I also work as a writing center tutor and as a writing fellow. And I'm a member of the Sewanee swim and dive team. I'm very excited for the upcoming year!

Oliver Hutchens, C'23

Living in Smyrna, Tennessee, my whole life, I have always had interest in the natural world that I found myself in. My parents love telling me that when I was a child, I used to say that I wanted to be a bug doctor, as I did not know what an entomologist was at the time. My biological interests were broad for the longest time, until I started a vegetable garden the summer of my sophomore year of high school as part of a school project. I had an amazingly successful yield of over 1,000 tomatoes. The awe I felt toward what these plants were able to do introduced my heart to botany. I am now majoring in ecology and biodiversity, utilizing everything Sewanee has to offer to build my understanding of biological systems and the place of plants in them. As a Herbarium Fellow, I am looking forward to connecting with the community through plants and taking part in research projects.

Izzie Berthelot, C'24

I grew up in Lafayette, Louisiana, a perfect blend of city life and rural traditions. My mother's side of the family was Cajun to the core and my father grew up in New Orleans. I chose to pursue my education at Sewanee because of the outdoor campus and biodiversity. When studying botany, I focus on ethnobotanical history and medicinal plants, largely influenced by the Louisiana cultures that I was submerged in. I am planning to double-major in environmental studies in the arts and humanities and biology. I am also an artist and Arts Fellow and incorporate this in my plant studies through botanical illustrations and art. I am planning to continue my ethnobotanical studies and documentations during my time at Sewanee, as well as participate in botanical illustration workshops and *Sewanee Plant Press* publications.

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HERBARIUM PUBLICATIONS

Fiery Gizzard: Voices from the Wilderness
What If Trees Could Walk?
Trail Guide to Shakerag Hollow
Sewanee Wildflowers in Watercolor

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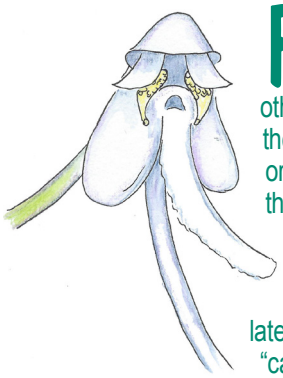
Platantheras integrilabia's Peculiar Perpetuation Plan



First let's look at this unusual flower: As with other monocots, the white fringeless orchid flower has three sepals and three petals. The sepals are the two reflexed lateral "flaps" plus the "cap" on top. Petals include the two short ones just underneath the cap, plus the lower lip. (The name "integrilabia" stems from the fact that this lip has no fringe around its edge.) In orchids, instead of bearing separate pollen-bearing anthers and receptive pistil, these structures are fused to form a column. The spur, which in our orchid is extremely long, contains nectar.

Members of the orchid and milkweed families, although unrelated, share an unusual pollination scheme: rather than producing loose grains of pollen with which to dust their pollinators (or to waft into the air), these plants bundle their pollen in packets called pollinia (singular: pollinium) that they attach to unwary nectar-sipping pollinators. White fringeless orchid's two pollinia are large and yellow and protrude from the sides of the flower's opening. ("Platanthera" refers to these particularly large anthers.) Butterflies, including eastern tiger swallowtails, spicebush swallowtails, and silver-spotted skippers, whose long tongues are adapted to reach down into the flower's extra-long spur for nectar, are among the known pollinators. These sweet-smelling white flowers may also be pollinated by long-tongued nocturnal moths.

To extend its tongue as far as possible into the spur, the pollinator must press its head into the flower's center, contacting one or both of the pollinia. The sticky pad at the end of the pollinium attaches to the insect's compound eye to be carried to the next flower. There, if all goes according to plan, pollen will be brushed onto the column in the center of the flower. Should we pity the poor pollinator, toting these packets of pollen from flower to flower, or just hope that it's too busy nectaring to notice the impediment?

Once pollinated, the flower fades, and a capsule containing thousands of dustlike seeds develops. The windborne seeds contain almost no life-sustaining nutrients. To survive, a seed must land on soil that contains a particular fungus. The relationship (mycorrhiza) with the fungus enables the seed to germinate, and in many cases is necessary to sustain the mature plant. Knowledgeable nature lovers know not to transplant orchids, as this relationship is difficult to maintain.

—Mary Priestley