# Sewanee PLANT PRESS

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Autumn 2020

n the fall of my freshman year at Sewanee, I walked into Dr. Jonathan Evans's office to ask about research opportunities on the Domain. A couple of weeks later I found myself in the field counting overcup oak (*Quercus lyrata* Walter) seedlings in a 5.5-acre plot of

forest in the Sinking Pond Natural Area on the Arnold Air Force Base. Fast forward to my junior year, and I find myself writing an honors thesis about the same data, examining how the pond has changed over the 17-year period since Dr. Evans set up the long-term study plot.

Sinking Pond is a seasonally flooded forest in a karst depression with an efficient internal drain. That is to say, it's a big shallow pond connected to a cave system via a sinkhole in the middle. When the water level in the cave system rises each winter to the level of the sinkhole, the rain falling on the pond can no longer drain out, and the pond begins to fill. When full, the water covers about 85 acres of bottomland forest. which is primarily made up of overcup oak, a river-floodplain species that is adapted to handle the seasonal inundation. There are several other bottomland tree species present: willow oak and sweetgum are both common in the pond, followed by river birch, red maple, and black gum. The presence of river birch is significant because Sinking Pond is the only documented place in the world where you can find overcup oak, resurrection fern, and river birch growing side-by-side.

A visitor to Sinking Pond will first notice one striking feature: All of the trees have a black stain rising to a level height because of an overflow that lets the water run off once it reaches a certain height. The second thing a visitor might notice is that there are *no small trees in the deep parts of the pond!* This is because the annual

# Sinking Pond Research

flooding drowns any seedlings that sprout in the brief July–November growing season. The question is then, "How did the huge, old (~200 years in some trees) oaks manage to get there in the first place?"

The answer lies in another question: What has changed about the conditions in the pond since those trees grew? Dr. Evans started by determining that the youngest trees in the deep part of the pond are around 70 years old, which means that seedlings haven't been able to get above the flooding level since around the time of World War II. So what changed in the 1940s and 1950s?

By the early 2000s, the United States Geological Society (USGS) had enough information to make a model of how the pond



filled and drained based on rainfall. Remember, this isn't a pond on a creek; it's like a big saucer that only can fill because of rain falling in the basin, then draining out of the sinkhole in the summer when the water table in the cave system drops again. Conveniently, USGS researchers were able to use rainfall data (which we have going to the 1850s for this area) to chart precisely when the pond was full and when it was empty, *going back to the 1850s!* By combining the USGS data with Dr. Evans's coresample ages of trees, they cracked the mystery: The model showed that the pond used to have breaks where it didn't fill up for two to three consecutive years, and the ages of the cored trees matched up exactly with these breaks in the flooding cycle. This meant that the trees used to have opportunities to grow during these dry breaks, then were able to survive the next years of flooding. But, this is no longer the case; because of increased rainfall the pond has been filling every year and drowning any seedlings, which is why no new trees have grown in the deep part of the pond for so long.

It's no secret that rainfall has been increasing in the southeastern United States (any Sewanee student can attest to how important rain jackets and umbrellas are here), but I personally was surprised to learn that this trend in climate change for our region has been so prevalent for so long, and even more surprised to see that it's had such a profound effect on an ecosystem already. Mystery solved ... almost.

Currently, my work with Sinking Pond started with collecting data in 2018, entering that data into the computer database (no insignificant amount of work: we collected data for 5,700 2x2m square plots, mapping more than 1,000 adult trees and more than 200,000 seedlings. saplings, and transitioning adults throughout the entire pond) and this past summer during a remote internship with Dr. Evans, analyzing and presenting the data in an easy-to-digest way. Through working on this project I've gained invaluable data management and analysis experience as well as more field-based knowledge, like how to use a clicker-counter and how many peanut butter sandwiches I can eat while counting trees. I'm very fortunate to have been given the opportunity, as a Block Herbarium Fellow, to explore a research project like this as an undergraduate. The continued efforts of biology faculty to include undergraduates in research is something that makes Sewanee a truly special place, and I'm very glad to be a part of this ongoing legacy.

—Angus Pritchard, C'22

The Sewanee Herbarium: Education — Research — Conservation

### **Nature Notes**

(Ed. note: Herbarium curator Yolande Gottfried reflects on her experience writing the Nature Notes column in Sewanee's newspaper the Sewanee Mountain Messenger. The Messenger is available each week, online and in print.)



he weekly Nature Notes column in the Sewanee Mountain Messenger dates back to the very beginning of the publication as the Sewanee Siren, a weekly newspaper for the Sewanee community. Phoebe Bates was the original news editor in 1967 and continued in that role for the 17-year history of the Siren. At that time, Nature Notes was a place for community members to report local happenings in the natural world, from the first crocus to the last hummingbird. In 1985, the paper became the Sewanee Messenger, with Geraldine Hewitt Piccard as editor, and Harry and Jean Yeatman were the major contributors to Nature Notes. Their combined extensive knowledge and experience of the birds, plants, insects, reptiles, and much more, of the Sewanee area made them a vital resource for the community in the area of natural history. In June 2011, under editor Laura Willis, the Nature Notes column started appearing with a photo of them and a byline. Harry Yeatman died in November 2013 and Jean Yeatman faithfully continued with Nature Notes both during his illness and even immediately after his passing. In August 2014, her own illness led her to ask me to fill in, on a temporary basis, as we both thought.





But her death a year later resulted in my continuing to contribute to Nature Notes on a weekly basis.

I first must make it clear that I cannot fill the Yeatmans' shoes. And yet, since I took up the banner of Nature Notes, people seem to assume that I can answer the kinds of questions that the Yeatmans could answer. They were serious birders, often going on field trips to birding sites like Woods Reservoir and then reporting in Nature Notes. I always believed that they could write on subjects such as copperheads or spiders off the top of their heads. Little do the readers realize that what I write is the result of much research most weeks, and I am learning as much as the readers are. When I write about a bird, I pull down my five birding field guides for information. One of the joys of writing Nature Notes is learning so much about so many different topics, from belted kingfisher nest-building techniques to cloudless sulfur butterfly migration.

Since I have to educate myself on the topics I write about, I sometimes think that, of course, folks could just look these things up for themselves. I do try to avoid looking things up online, especially Wikipedia, for that reason, though sometimes that is the only way to find out what I need to know. But I go to the field guides and other books first. I do believe, however, that people like to have such tidbits of information presented for easy consumption. I myself have a number of clippings from the Notes of the past to which I still refer to remind myself, for example, what kinds of spiders build their webs on porches in the fall.





Now that I have been contributing to the column for six years, the cyclical, seasonal nature of the subjects to cover is more and more evident. This is true, of course, for the *Messenger* as a whole. I was going through back issues in the online archives to trace the history of Nature Notes and I saw the round of the seasons and the academic year repeated over and over-new faculty, sports awards, theater productions, and so on. In Nature Notes, the topic of fall color comes around at the same time each year, and the same is true, of course, of the first spring wildflowers and migrating birds. I have to confess that I sometimes recycle columns that are pertinent to the season, as I believe the Yeatmans also did. I do try to cover in a timely manner what is currently of interest in any given week, which means I often wait until the last minute to write the column, hoping for inspiration from some hike I might take or observation I or someone else might make.

#### —Yolande Gottfried

Speaking of observations, the column has always been a place for community members to report on wildflowers or meteor showers or insects or anything in the natural world. Photographs are always welcome, too. I am always pleased if a report comes in and I don't have to think of a topic for that week, or, even better, someone contributes a whole column!



## Friends of the Sewanee Herbarium

The Friends of the Sewanee Herbarium support the work of the Herbarium: education, research, and conservation. A \$10 annual contribution would be very much appreciated. The date of your most recent contribution is printed on your address label.

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# Take an App Out for a Walk

Did you miss those spring and summer wildflower walks with herbarium staffers? It's fun strolling along with a knowledgeable leader, someone who has done their homework and is eager to identify the plants that you see along the way.

We miss those walks, too, and are disappointed not to have a calendar of events to offer for the fall. Maybe by next spring, we will again be able to get out together to enjoy the plants. Until then, a knowledgeable companion that you might consider bringing along is a free plant identification app from iNaturalist. Photos that you take using iNaturalist contribute to science, because they are shared with scientific databases that are accessed by scientists.

Last spring, unable to gather for the annual Spring Wildflower Pilgrimage in the Smokies, scientists and "pilgrims" were invited, instead, to use iNaturalist to engage in a one-week "bio blitz," contributing photos from wherever

#### Arums, continued from page 4

the botanically auspicious event even while sheltering in place—minus the smell of rotting meat, of course. Even as I was slightly envious of the social media posts of faculty members and my international friends who were forced to spend the summer on campus, I was grateful that at least a few people were able to experience the arum in person. I also deeply appreciated the connection they were. Hundreds of participants on four continents made thousands of observations of plants, fungi, and wildlife over the course of one week.

Maybe we can organize something like that for the spring. I know just the student to lead the way!

SEEK is another fun app, also free and from iNaturalist. (Also, SEEK is recommended for kids under the age of 13, who legally cannot have their own account with iNaturalist without specific parental approval.) With SEEK, you never take a picture, just point your cell phone at the plant in question, and the program will make its best guess as to what you've found. In my experience, it's amazingly accurate, even with these fall composites, which look an awful lot alike. Try it out this fall. You'll find that it's a wiz at identifying trees and shrubs from their leaves.

-Mary Priestley

to the Mountain and that, even with everything going on in the world, we were all brought together through our fascination with one very special plant. I can honestly say that tuning in, along with so many others across the country, to virtually watch the blooming of a big, stinky flower on that rainy July 4 was the highlight of my summer in guarantine.

Lillian Fulgham C'21

#### THE SEWANEE PLANT PRESS

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Drawings by Mary Priestley.

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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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#### ADDRESS SERVICE REQUESTED



Any years ago, while walking through the woods on my family's property, I came across a very unusual plant I had never noticed before. Different from the usual radially symmetric trilliums and mayapples, the inflorescence was cylindrical, green, and strangely hooded, with a hidden spadix within (although I had no idea of the correct terminology at the time). Upon running back to the house and asking my dad if he knew the name of the curious plant, I discovered that it was not a rare or new species as I had hoped (as I am sure many young naturalists do), but a fairly common perennial known colloquially as Jack-in-the-Pulpit.

Many years later, while taking Plant Systematics with Dr. Evans during my junior year at Sewanee, I learned that the charismatic little Jack was a part of a much larger and well-known family—Araceae—that includes not only the beloved philodendrons, pothos, and monsteras of the houseplant trade, but one of the largest flowers in the world—Amorphophallus titanum, the enigmatic "corpse flower."

Coincidentally, during the same semester, the Herbarium was fortunate enough to inherit the

## Arums I Have Known



majority of an impressive rare plant collection. Previously housed at Vanderbilt University and cared for by Sewanee alum Jonathan Ertelt, C'78, the 250 plants were moved into the small greenhouse next to the Biology Department. Among the orchids, cacti, rainforest trees, and ferns was a large bucket of dirt that-I was excited to learn—held the dormant tuber of a titan arum, the corpse flower. As one of the senior Block Herbarium Fellows and with having some prior experience with horticulture, it was my duty to keep up a watering schedule, help give tours, delegate chores among the other fellows, oversee propagation, and administer treatments for pests and diseases. As any proper botany nerd would be, I was absolutely elated. In preparation for spring break, I watered the collection extra thoroughly and made a mental note to repot some of the more rootbound plants when we returned—little did I know that it would be the last time I would set foot in the greenhouse for several months.

As fate would have it, the corpse flower's decade-long blooming cycle just happened to coincide with the summer of a devastating pandemic. Even though students were not allowed to visit, fortunately we had the technology to livestream the unfolding of the seven-foot flower so that anyone with internet access could witness

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