

The Plant Press



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Newsletter of the Friends of the Sewanee Herbarium

Spring, 1998

Unlocking the Secrets of Sinking Pond

Over the past two years, the Sewanee Herbarium has been involved in ecological research and plant inventoring at the Arnold Engineering Development Center (AEDC) near Tullahoma. We have established a large collection of plant specimens from AEDC as a result of our collaboration with their botanists. This U.S. Air Force base encompasses 40,000 acres of barrens habitats including a unique wetland system called Sinking Pond. Sinking Pond is a special karst depression that is filled with water from November through July but is dry during the remaining months of the year. It drains almost overnight as a function of a change in groundwater hydrology that is not well understood. In this pond there is a unique population of *Quercus lyrata* Walt. (overcup oak) which has been the focus of a research project initiated by a Biology major, Sarah McCarthy ('99), who began working with me this past summer. Overcup oak is typically associated with bottomland wetland forests primarily on southern river flood plains. At Sinking Pond overcup oak is disjunct from these riverine populations, but it has found an environment that is similar in many respects to a floodplain.

Sarah and I have been examining the patterns of distribution and abundance of seeds, seedlings, saplings and adults in relation to critical environmental variables so as to predict the fate of this population over time. Data collected in the fall of 1997 suggest that this population of overcup oak is experiencing a regeneration failure. One indicator of this is that there are no overcup oak individuals between 5 and 40 years old. It appears that individuals have not been able to grow beyond the sapling state within the last 40 years. *Continued page 3*

Shakerag in the Spring

What makes Shakerag Hollow such a rich site for spring wildflowers? In the eastern deciduous forest, the forest floor provides a moist environment, sheltered from wind and hot sun, with a thick layer of leaf litter and a richer, less acidic soil than in more open areas. In winter it is cold but well-lighted. In the days after the winter solstice, the sun's rays fall more directly on the heat-absorbing layer of brown leaves. The forest floor actually reaches its highest daily maximum temperature in the early spring. These early-blooming plants have adapted to take advantage of this combination of moisture, temperature, and light conditions before the canopy leaves out.

Nearly all these species are perennials with stored food in corms (narrow-leafed spring beauties—*Claytonia caroliniana*), bulbs (trout lilies—*Erythronium americanum*), rhizomes (bloodroot—*Sanguinaria canadensis*), or roots. Thus, as soon as the day length and mean temperature reach certain levels, they can quickly draw on this stored food to put out new leaves, bloom, set seed, and form next year's buds.

There are various patterns of photosynthesis to produce and store the food for next year's growth. Some, such as liverwort (*Hepatica acutiloba*) and, often, toothwort (*Cardamine diphylla*), have evergreen leaves and are thus prepared to take immediate advantage of favorable conditions for photosynthesis. Others, including violets (*Viola* spp) leaf out in the spring and remain green

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Botany at Sewanee - Part 4

The reorganization of the biology department in 1950 brought to campus H. Malcolm Owen (BA Hampton-Sydney; MA, PhD Virginia) professor and chairman, Harry C. Yeatman (BA, MS, PhD UNC) assistant professor, and John Oscar Batson (BA Vanderbilt, MF Yale) assistant professor of biology and forestry. Owen and Yeatman were both zoologists, and Yeatman was an able botanist. They established curriculum and departmental traditions which have been elaborated and carried on to the present. Owen helped establish the radioisotopes laboratory and introduced the use of radioisotopes well ahead of most other undergraduate programs. His students used computers in the classroom long before their use became widespread. As chairman of the building committee, Owen played a vital role in the completion of Woods Laboratories as an up-to-date science facility.

With the exception of A. G. Willey, who had taught for 19 years (1917-38), Owen and Yeatman were the first to remain in the department for an extended period of time and were the first to serve until retirement. Owen retired in 1978, Yeatman in 1980. Batson left after only one year and was replaced by Henry Wilds Smith (BA Dartmouth, DFor Yale). Smith remained for a long tenure in forestry, but taught botany for one year before being replaced by Edmund Berkeley (BA, MA Virginia; PhD UNC). Berkeley, the first botanist with a completed PhD, rounded out the "new" biology department until he left after six years. Ackland Jones (BA Sewanee) filled in for one year.

George Shuford Ramseur (AB Elon; MEd, PhD UNC) came to Sewanee in 1958. He taught general botany, plant ecology, plant taxonomy, plant physiology, and, on occasion, general biology. With the hiring of an animal physiologist, Charles W. Foreman (AB UNC; MA, PhD Duke), in 1964 the plant physiology course was dropped. Microbiology was introduced in 1972 when Henrietta Brown Croom (AB, PhD UNC) joined the faculty. As the enrollment increased, the botany offerings were expanded with the arrival of Larry Hudson Jones (BA Wofford; PhD UNC) in 1977. His courses included plant physiology, the biology of cryptogams (lower plants) and genetics. When Ramseur retired in 1993, Gordon A. Fox (BA UC Berkeley; PhD Arizona) served as a temporary replacement. A permanent replacement in 1994 was Jonathan P. Evans (BA Cornell; PhD Duke). Evans reorganized the herbarium with the help of instructor and laboratory coordinator Mary Patten Priestley (BS Sewanee, MS Middle TN) as curator. Yolande McCurdy Gottfried (BA Wilson College; MA UNC) served as associate curator.

This very abbreviated history of botany at Sewanee was begun with some curiosity, but little expectation of what I might find. As it was with most small colleges of that era, botany was subordinate to zoology in Sewanee's biology department. My PhD advisor suggested that I minor in zoology since at that time most of the graduates took positions in small departments where teaching some zoology courses might be necessary.

Most of the information in this series comes from the *Sewanee Catalogs* and the *Proceedings of the Board of Trustees*.

—George S. Ramseur
Director *Emeritus*

Spring Wildflower Walks

- March 29
1 PM **Bluebell Island**, with the Bluebell Island Land Trust. Meet at Tyson Foods parking lot in Alto. 1 mile/easy. Cross Elk River via fallen tree.
- April 4 & 5
TBA* **Shakerag Hollow**. Meet at Green's View. 2 miles/moderate. Co-sponsored with TN Aquarium. Small (\$4-\$6) charge.**
- April 11
2 PM **Bridal Veil Falls**. Meet at Morgan's Steep. Co-sponsored with Sewanee Outing Program. 2.5 miles roundtrip/moderate.
- April 18
2 PM **Shakerag Hollow**. Co-sponsored with Sewanee Outing Program. Meet at Green's View. 2 miles/moderate.
- April 19
10 AM **Collins Gulf**. Co-sponsored with South Cumberland State Recreation Area.*** Meet at Swiss Memorial School, Gruetli-Laager. Bring sack lunch and extra water. 5 miles roundtrip/strenuous.
- April 25
10 AM **Shakerag Hollow**. Meet at Green's View. 2 miles/moderate.

*To receive notification about herbarium outings via e-mail, write Mary Priestley at mpriestl@sewanee.edu

**For more information about this Wildflower Celebration, contact the Tennessee Aquarium, Chattanooga.

***For more information about hikes sponsored by SCSRA, telephone the Visitors Center at 931-924-2956.

Sinking Pond, *continued from page 1*

There is a positive significant ($p=.027$) relationship between sapling density and relatively high light areas associated with tree fall gaps in the population. The data suggest, however, that some other factor is necessary, in conjunction with the high light, to create the windows of opportunity necessary for a tree to become an adult. We have postulated that this factor (probably associated with the past hydrological regime) no longer exists and, therefore, these windows of opportunity no longer occur.

—Jon Evans
Herbarium Director

Shakerag, *continued from page 1* into the summer shade, able to photosynthesize under low light conditions and to continue growth, though slowly. Many, however, go through the whole growth cycle and wither early, examples being windflower (*Thalictrum thalictroides*) and Dutchman's breeches (*Dicentra cucullaria*). And, by their rush to take maximum advantage of this particular habitat, they provide a glorious show for our enjoyment.

—Yolande Gottfried
Associate Curator



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Please make check payable to The University of the South. Gifts are fully tax deductible. Send to Sewanee Herbarium c/o Mary Priestley, 735 University Avenue, Sewanee, TN 37383. Others who might like to receive *The Plant Press*: _____

The Hart's-Tongue in Tennessee

Sept. 13, 1897

My dear Madam,

The plant I want to know of is...hart's tongue fern.... This fern is found only here in Central N.Y.; two places in Canada; in Mexico somewhere; and "near South Pittsburg, TN." ... I attend Syracuse Univ., and this is my last year there. I am very anxious to get together a good deal of material on this fern, and shall anxiously await a reply from you....

Very sincerely yours, Will R. Maxon

The author of this letter, who would later become associate curator of the U.S. National Herbarium and president of the American Fern Society, was writing Mrs. Joseph Lodge of South Pittsburg about what might today be the rarest of Tennessee's plants. Our single known population of hart's-tongue fern (*Asplenium scolopendrium* var. *americanum* (Fern.) Kartesz & Gandhi) inhabits a sinkhole on the side of the Cumberland Plateau in Marion County.

First discovered in 1878 when the territory was being prospected for coal, the population decreased from approximately 200 plants to "only a few left" in 1925. In an effort to bolster the waning population, spores from plants originally growing in Ontario, Canada, were sprinkled into the sinkhole in 1929. About 20 new plants resulted. Eleanor McGilliard of the University of Chattanooga located six plants in 1947.

Hart's-tongue's spotty distribution, as noted in the letter, is the result of its particular environ-

mental requirements: constant low temperatures; plenty of shade and moisture; and rich, limestone-based soil. A boreal plant, it was forced southward during the ice ages, and for some reason our relict population has clung on.

A 1996 search of the moss- and liverwort-covered ledges and sticky clay soil of the sinkhole produced only one plant. Later, a group from the Tennessee Nature Conservancy found one additional plant. The Conservancy, which is responsible for the largest private system of natural sanctuaries in the world, now leases the land surrounding and including the sinkhole.

—Mary Priestley
Herbarium Curator

The hart's-tongue fern's habitat is extremely fragile. It should not be visited except for scientific purposes. Special thanks to Mrs. Pat Lodge for background information for this article.

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