The Sewanee PLANT PRESS

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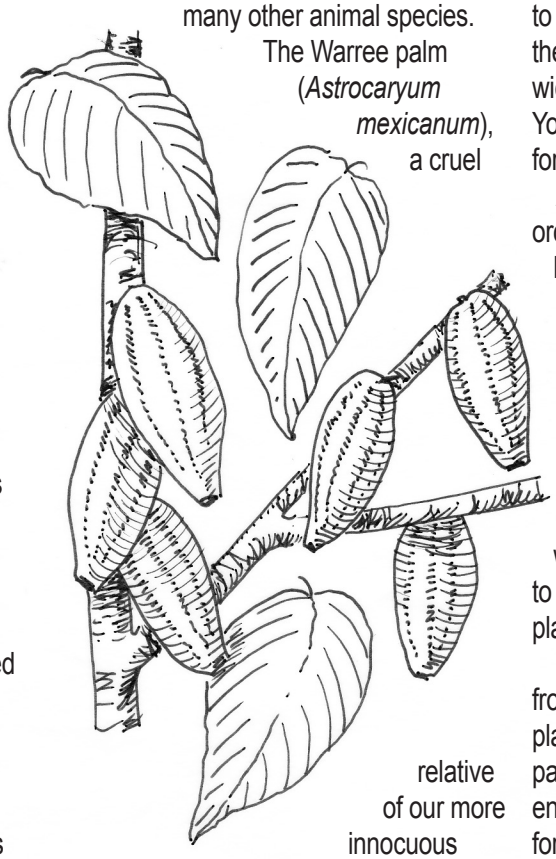
Field Study in Belize

Have you ever gone to a family reunion and had the uneasy feeling of not entirely knowing all the people there? This is exactly what happened to a novice botanist in the jungles of Belize this summer. A trip led by Jonathan Evans for ten days into the rainforests and coral reefs of Belize, which is next to Mexico on the Yucatan Peninsula, investigated the local flora and fauna of an exotic ecosystem surprisingly similar to our own Tennessee forests, as part of a new course offered by the Sewanee Environmental Institute.

Our objective was simply to observe a vastly different ecosystem and community. We looked at the interactions between animals, plants, and the land itself. The goal was to widen our experience beyond the Eastern Tennessee forests. We saw vines that seem to grow feet in a day, trees whose width reminded us of Shapard Tower, ants that can defoliate an entire canopy, and spiders the size of my hand. True to our liberal arts education, we also looked at local methods of agriculture, saw Mayan ruins from the ninth century, and conversed with indigenous people about life in the forest and what the forest itself meant to them.

Belize has more than 4,000 flowering plant species, including some 250 species of orchids, and 700 or so different trees, all of which are strewn across an area about the size of Vermont. Most of the plants are tucked back in the steamy depths of the forest.

Of the hundreds of plants that I had the good fortune to observe let me tell you about a select few. The cacao tree (*Theobroma cacao*) is an understory tree you may have heard of. It gives us chocolate today, but it was used as money by the Maya. It was one of the first plants to be brought back by Columbus to Spain in 1492. The plant itself is about four meters high and is quite unassuming. The green pods hanging off of it in odd places are objects of desire for humans, as well as many other animal species.



The Warree palm (*Astrocaryum mexicanum*), a cruel relative of our more innocuous palm trees, likes the low-lying areas near water. This extremely common plant is literally covered in spines. The spines, which are on the leaves, stem, and petioles, inject a painful toxin when they stab you. I had one of my thumbs turn purple and swell up when I brushed by a stem during a study one day.

The strangler fig (*Ficus* sp.) starts growing high in the canopy and later grows down and envelops entire trees, creating haunting trunk forms around the dying trees it covers. The philodendron plants (*Philodendron* spp.) are everywhere in the lowland wet forests. These plants seek out the large tree trunks near them and climb to the canopy from the ground. Several of these species, like the strangler fig, are widely cultivated in house plant varieties. You have probably brushed by the rain forest without even knowing it!

And finally we saw some amazing orchids. These beautiful flowers are very hard to find in the forest because more than half of the orchid species are epiphytes. Like the strangler fig and the many other plants in the forest, they grow high in the overstory of the forest on large tree limbs. Unlike the fig, though, the orchids are rarely big enough to be seen from the ground. So when you get down to Belize make sure to bring binoculars for the birds and the plants.

I would like to leave you with an excerpt from a journal of my travels in Belize. “This place rewards the observant, prepared and patient. It seems to equalize everyone that enters it and forces them to the will of the forest. The multitude and intensity of life here is at a fever pitch. But even with so much life the system is still so fragile and it takes so little for the whole ecosystem to topple down. That seems to be the irony of the rain forest: there is so much here, but it requires so little to bring it all down.”

Will Overton, C’12

Fire Ecology on the Domain

Fire is a forest management tool that has come full circle in North America. For thousands of years, Indians burned the woodlands to promote grasses, attract game, and provide better access into the forest. As a result, landscapes dominated by fire-adapted and fire-dependent species developed.

Many of us grew up in a culture in which fire was always considered harmful to nature. For those who might have missed Smokey the Bear's admonishments, Bambi and his mom certainly brought home the message that forest fires are a bad thing. But in recent years, it has become increasingly obvious that a whole array of forest ecosystems require intermittent fires for the establishment of desired species.

For the Domain, shortleaf pine, *Pinus echinata*, may be one of those fire-dependent species, as well as several oak and hickory species. The suppression of fires here is allowing some of our oak-hickory forests to succeed to species like maples and beeches. Ecologists call this "mesophication," a positive feedback cycle in which conditions improve for shade-tolerant species and deteriorate for fire-adapted, less tolerant ones. For example, Piney Point is currently the only area on the Domain where there is a mixed oak and shortleaf pine forest. Scientists surmise that this combination was more widespread in the past when the forests burned periodically.

Forestry professor Ken Smith is interested in using fire as a management tool to re-establish open woodlands on the Domain, including those dominated by shortleaf pine, oak, and hickory. He is organizing prescribed burns in several tracts, which will serve as long-term research sites for classes.

This fall I accompanied him and Domain Manager Nate Wilson to visit one of these areas. The 35-acre section of Compartment 46, near the southwest-facing escarpment at Armfield Bluff, had been partly cleared and planted in loblolly pine, *Pinus taeda*, in the 1960s. Subsequently white pine, *Pinus strobus*, had been planted along the adjacent firelanes. Both of those exotic pine species were removed, and the area was burned in April and May of 2010. Invasive tree-of-Heaven, *Ailanthus altissima*, was killed, and five species of native warm season grasses were seeded over three acres.

A year and a half later, the area may be on its way to becoming an open woodland. Most of the oaks and hickories survived the fire, whereas a good number of red maple (*Acer rubrum*), yellow-poplar (*Liriodendron tulipifera*), and sourwood (*Oxydendrum arboreum*) did not. The grasses have become established, and other herbaceous plants have appeared, including, most prominently, the American burnweed, *Erechtites hieracifolia*, an annual that often comes in right after a fire. But numerous loblolly pines and yellow-poplars have sprouted from buried seed, and maples have sprouted from the roots. In general, woody shrubs were not deterred by the fire. Invasive Nepal grass, *Microstegium vimineum*, has gained a foothold in one of the open areas.

Smith plans to burn the area again, possibly in two- or three-year intervals, to plant shortleaf pine near the bluff, and to continue fighting the invasive plants. "We need to see the effect of two or three burns. By then we'll know if it's worth the effort to try to establish an open woodland here."

This new management tool also opens up the opportunity for research by forestry and biology students. Before the burn, 20 permanent plots were set up. To date, plants on those plots have been inventoried four times: once before the fire and three times afterwards. Preliminary research shows a doubling of the number of oak seedlings. However, last year, 30% of all tree seedlings had been browsed by deer, an indication that herbivory is playing a significant role in the development of this plant community.

Plant ecology students under the direction of biologist Jon Evans have looked at changes in the make-up of the community and determined how various species reacted to the disturbance created by the fire. Several woody species were greatly suppressed or even extirpated from sample plots; others increased because of sprouting from underground rhizomes or buried seed; and still others, particularly herbaceous species, increased as a result of dispersal of seed from outside the site.

Environmental Science Post-doctoral Fellow Devan McGranahan, who has done research in the Midwest on native grass restoration, is interested in seeing this increase in open habitats on the Domain. "Birds are a good indicator of biodiversity. A grassy woodland would attract charismatic flora and fauna — interesting herbaceous plants as well as bluebirds, red-headed woodpeckers, and scarlet tanagers — that are never found in a closed-canopy forest." New research possibilities may well emerge along with the prospect of increased biodiversity as we see continued use of fire as a management tool on the Domain.

Mary Priestley

Autumn Calendar of Events

Mountain Goat Trail, Sat., Sept. 24, 10 a.m., Yolande Gottfried
Start the autumn season with a wildflower walk! The paved Mountain Goat RR Biking/Walking Trail is a good spot to see a variety of asters, goldenrods, thoroughworts, and other fall-bloomers. Meet in the parking area of the Sewanee Market (at the intersection of University Ave. and Hwy. 41-A) for this easy 2-hour walk.

Abbo's Alley, Sat., Oct. 1, 7:45 – 9 a.m., George Ramseur
The Abbott Martin Ravine Garden is a lovely mix of native and cultivated plants, and the ravine is steeped in Sewanee history. Botany Professor *Emeritus* George Ramseur has spent countless hours working in the garden and knows it well. Meet on the campus Quadrangle (beside All Saints' Chapel) at 7:45 a.m. for this easy one-hour walk, a Sewanee Family Weekend event but also open to the public.

Caldwell Rim Trail (Lost Cove), Sat., Oct. 15, 10 a.m., Mary Priestley
This trail, named for Hugh Caldwell, philosophy professor and founder of the Sewanee Outing Club, was established in the summer of 2010 by Sewanee Outing Program Director John Benson and his summer interns. The trail is located largely along the rim of Lost Cove with glimpses into the University's recently-acquired property. Meet at the Sewanee Market for this easy 2-mile hike.

Botanical Watercolor Workshop, Sat., Nov. 12, 9:30 a.m. – Noon, Margaret Patten Smith
This workshop led by Chattanooga watercolorist Margaret Patten Smith gives people of all ability levels an opportunity to try their hand at capturing some of autumn's beauty in watercolors. Participants are invited to bring in botanical or other natural objects to paint, or choose from a variety provided. Bring your own painting materials and meet in room 173 on the first floor of Spencer Hall (first on the left after entering through the main doors across from duPont Library). The workshop is free, but space is limited, so reservations are necessary (see below).

Nature Journaling Opportunity, 9–11 a.m. Thursdays, Mary Priestley
The nature journaling group that has been meeting throughout the summer will continue into the fall. Experienced in but not an "authority" on nature journaling, Mary has been practicing

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The Sewanee Herbarium
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Drawings, by Mary Priestley, are of a tropical orchid, cacao tree, oak leaves, fireweed, and passion flower.

Friends of the Sewanee Herbarium

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.

Name and Address (if different from that on the mailing label on the back):

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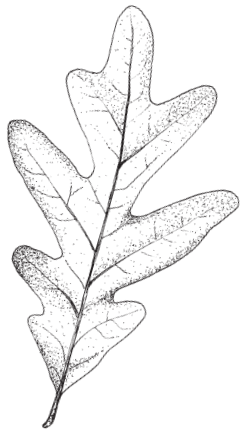

Others who might like to receive *The Sewanee Plant Press*: _____

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Opening the Book of Nature

Sewanee's new Center for Religion and Environment has instituted an "Opening the Book of Nature" program to help people recover an ability to discern spiritual lessons and experience God in creation. The program helps people of all religious persuasions to connect to the early tradition of learning spiritual lessons from nature. These explorations use periods of private prayer and reflection alternating with discussion to produce a blend of low-key instruction, personal experience and group sharing. For information about this and other programs that the Center is offering see www.sewanee.edu/cre or contact Joyce Wilding, program director, at joycewilding@comcast.net.

Autumn Calendar, cont'd from page 3

it for close to ten years. This is not a workshop. Rather, it is an invitation to set aside any or all Thursday mornings for nature journaling. The group will meet at Stirling's Coffeehouse (rather than the gazebo in Abbo's Alley), for a couple of hours or so. Outings to easily-accessible places such as the "H" tree, Piney Point, or the SAS Res are also planned, with time to sketch. Contact Mary Priestley concerning planned outings at marypriestley@bellsouth.net. Bring a notebook (preferably small and unlined) and a pen or pencil. For outings you may wish to bring something to sit on.

All times are CST or 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 or to reserve a spot in the watercolor workshop, call the Herbarium at 931-598-3346. Directions are available at the Herbarium website, http://lal.sewanee.edu/herbarium/ under the calendar of events.

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