The Sewanee PLANT PRESS

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Global Climate Change Comes to the Domain in an Unexpected Way

Recent climate models now predict that the impact of global warming on the southeastern United States will be more complicated and more varied than previously thought. As one study put it, we are entering a "no analog world" where future patterns of precipitation and temperature will become increasingly unpredictable and unprecedented. There is already good evidence for increased annual temperatures across eastern North America and it has been predicted that associated changes in growing season length will result in long-term latitudinal and elevational shifts in species distributions. Increased hurricane activity and intensity are already having major ecological effects on coastal plain forests. However, it may be the more immediate effect of punctuated climate events that will prove to have the greatest impact on species composition and abundance in the Southeastern U.S.

This spring, across many southern states, we experienced an unusual climate event that may be another harbinger of what we can expect in this "no analog world" of global climate change. In mid-March, we had two weeks of unprecedented continuous warm weather. Both daytime and nighttime temperatures stayed well above normal, causing early budburst, leaf/ flower formation, and premature shoot extension. Ring-porous, frost sensitive species such as the oaks and hickories reached their cumulative thermal sum for bud break a good three to four weeks early. They then proceeded to produce shoot growth without the benefit of the hardening-off process that is typically associated with cold spring nights.

On April 3, a sudden cold front brought record low temperatures to the region. Over the course of the subsequent three days there was massive frost damage. In most woody species there was a complete loss of all new growth initiated up until that point. Species such as the shagbark hickory that were already maturing their third leaf looked like they had been sprayed with herbicide. Only a few woody species such as black cherry, red maple, and sugar maple seemed to have made it through the frost without major damage.

This strange combination of early warming followed by frost has been a phenomenon that climate modelers over the last 20 years have been predicting as a consequence of global warming. While

this frost was not unusually late (it occurred before the average last frost date), it was the combination of continuous warm weather followed by record cold that caught the flora by surprise. Given the pervasive meristemic failure, species were forced to mobilize dormant buds in order to re-initiate growth.

This has been a slow process, and as of the end of May, many species (including tulip-poplars, chestnut oaks, and walnuts) still had not yet fully leafed out in the canopy. Among some species (hickories and persimmon in particular) there is already evidence of high levels of sapling mortality. Flower failure among the oaks, hickories, and understory blueberries will result in a widespread lack of hard and soft mast this year. These and other ecological impacts will be felt over the course of the next two years.

One interesting pattern that we documented, however, was the mitigation of this climate event within sandstone rockhouse communities. Sandstone rockhouses, or wet bluff fronts, are semicircular recesses found beneath the bluff edge on the Cumberland Plateau. They provide sheltered habitats that buffer temperature; in comparison to the surrounding environment, they are cooler in the summer and warmer in the winter. We found in our studies that plant species in sandstone rockhouse habitats showed little or no frost damage, but the same species in the cove forest directly adjacent to these rockhouses were significantly damaged by the frost.

It appears as though sandstone rockhouses provide stabilized microclimates that allow species to flourish despite ongoing oscillations in temperature extremes. Just as narrow ravines and gorges of the southeastern U.S. have provided post-Pleistocene refugia for cold-adapted species that have long since migrated north, so now these same habitats may provide a buffer of a different kind for plant species in our current "no analog world."

— Jonathan Evans and Jordan Casey

Jordan Casey is a rising junior Ecology and Biodiversity major and a member of the celebrated Sewanee women's tennis team whose third place NCAA tournament finish made Sewanee sports history this spring. Jordan will be following in Darwin's footsteps and studying in the Galapagos Islands this coming fall.

From the Editor

The springtime rush of wildflower walks was tempered this year by the unusual cold spell in early April (see article p. 1). Standing in a snowstorm at a trailhead on April 15, hoping no one would arrive for a wildflower walk on one of my favorite trails, was a first for me! Amazingly, much of the frozen plant tissue disappeared with the rain and snow, and many of the wildflowers recovered enough to make for lovely and enjoyable walks a mere five days later.

We appreciate our spring flora all the more after this strange turn in the weather. As I write this, we seem to be headed into a second summer of drought. This of course puts pressure on our already-stressed plants and animals, as well as the wells and reservoirs that we depend on for our water. With the growing population here, there is increased demand for water. I have agreed to serve on our utility district's new water conservation working group. We have been charged to propose a much-needed policy designed to save our valuable water resource and protect the environment.

For the past several years, Herbarium staffers have enjoyed being with a group of women who have gathered in Sewanee every spring since 2001. They call themselves the "Women on the Mountain," and we often take them hiking. This past May, Herbarium Associate Curator Yolande Gottfried and longtime Friend of the Herbarium Jean Yeatman took the group on a walk around the University's Lake Dimmick, which serves as the community's emergency water supply. The group donated $400 to thank Jean and Yolande for the hike and thank all the herbarium staff for our "ongoing efforts to lead hikes, identify wildflowers and generally educate us year after year on the flora of the plateau," as spokesperson Carole Sergent wrote. Thank you, ladies, for this generous gift!

— Mary Priestley

Jim Wheeler, Combining Botany and Art

Sculptor Jim Wheeler spent two years as an undergraduate at Sewanee before earning a BA in Studio Art at the University of North Carolina, Greensboro. During his years at Sewanee, he took botany from Dr. George Ramseur and remembers feeling extremely lucky to have been shown a spectacular colony of pink lady's-slippers, which unfortunately has since been plundered.

Following a two-year sculpture apprenticeship at the Johnson Atelier in Princeton, New Jersey, Jim emigrated to Auckland, New Zealand, in 1981 to help set up the Art Works Studio, a sculpture foundry. He left there in 1989 to work fulltime on his own projects.

Jim recently sent us this drawing of one of his botanical sculptures: a 4-foot bronze titled "Northern Rata on Kauri" that is hung like a picture on a wall. It is the low relief surface of a tree trunk that has a long vine-like branch/trunk hanging across and in front (detached but encircling). The large flat trunk is *Agathis australis,* known locally as Kauri (Maori name), and the vine/trunk is *Metrosideros robust,* known as Northern Rata.

Northern Rata is a tree that begins life as an epiphyte in the crown of another forest tree, sending down aerial roots that eventually reach the ground. At the same time, horizontal side roots grow around the host's trunk (see the top of the drawing near the base of the leafy stem) until, in time, the host's trunk is completely enclosed in that of the Rata.

The *Agathis* has a defense mechanism against this in which its bark falls off in large flakes, detaching the clinging roots from its trunk. (See the bark flakes on the drawing as well as a juvenile, spreading Northern Rata vine.) George Ramseur has a sample of a Kauri bark flake collected in the field on sabbatical in New Zealand.

Jim explains, "In general my sculpture commemorates New Zealand's ancient forest which separated from the southern super continent Gondwanaland during the reign of the dinosaurs. My newer sculpture like 'Northern Rata on Kauri' is displaying the interaction between different plant species to slip a little forest ecology into the general public's consciousness. This is a sly plan that doesn't seem to put them off (knock on wood) from buying.

"I really enjoy getting *The Plant Press* as I sit and see in my mind's eye all the different species discussed and especially love to read about the various guided walks advertised. I dream of being there all year, but my favorite fantasy is seeing the ephemeral wildflowers in the spring!"

Jim lives in Auckland with his wife and two children.

— Mary Priestley

Calendar of Events

Stephen Puckette's Sewanee Trees
Wed., June 27, 4 PM, Yolande Gottfried

Using the second edition of *Comparative Description of the Native Trees of the Sewanee Area* by Stephen E. Puckette, with Mary P. Priestley, Karen Kuers, and Thomas O. Hay, we will stroll around the Sewanee campus and locate some of the example specimen trees given in the book for such species as pale hickory, baldcypress, American elm, and post oak. Meet in front of All Saints' Chapel for this easy one-hour walk. The book is available at the University Bookstore but is not required for the walk.

Sewanee Natural Bridge State Natural Area
Wed., July 11, 4 PM, George Ramseur

Join botany professor *emeritus* Dr. Ramseur in an exploration of the vegetation around this 27-foot-high natural sandstone bridge. It is a short drive from Sewanee down the Sherwood Road (TN Highway 56) to the area, formerly part of the University Domain but deeded to the state in 1974. Meet at the Sewanee Market parking lot to carpool or caravan to the Natural Bridge for this short, moderate walk.

Late Summer Wildflowers
Sat., August 25, 8:30 AM, Mary Priestley

The Meadow Trail at the Visitors' Center at South Cumberland State Park is unique: it winds through a former golf course that has been converted to a flower-studded grassy meadow. Come see what's blooming; learn some names, ecological information, and tidbits of lore about these plants. The Visitors' Center is located on Hwy 56 between Monteagle and Tracy City. Phone 931.924.2980.

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.

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Drawing by Jim Wheeler is of his sculpture, "Northern Rata on Kauri."

Drawings by Mary Priestley are of tickseed, hickory twig re-leafing after the freeze, beech, and trumpet vine.

For more information on these events call Yolande Gottfried at the Herbarium (931.598.3346) and leave a message or e-mail at ygottfri@sewanee.edu.

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.

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

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Please make check payable to The University of the South. Gifts are fully tax deductible. Send to:

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

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Botanical Blessing

I never tired of hearing Uncle Jack tell this story, whether in a college classroom or on the trail during a wildflower pilgrimage. When introducing binomial nomenclature in general biology lectures, I often included it. — M. E. E.

Dr. Jack Sharp, longtime botany professor at the University of Tennessee, collected plants in every county in Tennessee, every state in the U.S., and a number of foreign countries including Mexico, Japan, Taiwan, Russia, Tanzania, and Finland. Many of us called him "Uncle Jack."

Collecting in a remote area (possibly the tropical cloud forest in Mexico), he was riding on a burro along a narrow path surrounded by tropical vegetation. Out of nowhere, it seemed, a little Indian woman appeared on the path in front him. He stopped. She said something and offered him the small child she was holding in her arms. He didn't understand. She didn't speak Spanish. Uncle Jack did not speak the local Indian language.

Unable to communicate, they went their separate ways. Nevertheless, Uncle Jack could tell that she was disappointed that he'd failed to understand her. As he continued collecting plants in the area, the same routine recurred a number of times with different women and their babies. He couldn't figure out why a young mother would do such a thing.

Eventually it dawned on him. His khaki-colored field clothes were similar to those worn by a missionary order of Roman Catholic priests in that region. A customary practice of the priests was to bless infants. "But I wasn't a priest, not even a Catholic," he thought to himself.

Still, he continued to be mistaken for a Catholic priest. The mothers were disappointed when he failed to bless their infants. Uncle Jack felt bad about the ill will he was generating for the priests. These dedicated men had always been kind and helpful to him in his work. He, too, had started college to become a minister, but he ended up a botanist.

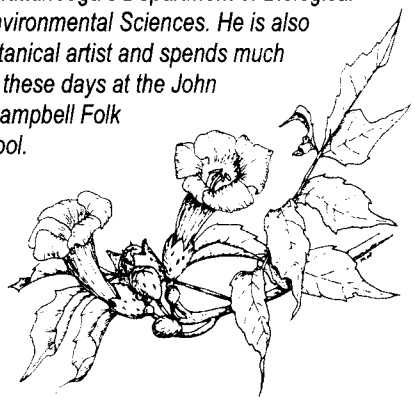
So he came up with a solution, as far as he was concerned. "Not only was I not a priest, I didn't know any liturgical Latin,... but then I realized neither did the Indian women." So when the next infant was offered to him, he bent over, took the child in his hands, cradled it in one arm, placed his other hand on its head, looked toward the sky, shut his eyes, and started chanting, "*Lir-i-o-den-dron tul-i-pi-fer-a, Li-quid-am-bar sty-ra-ci-flu-a, Tril-li-um grand-i-flor-um, Hem-er-o-cal-lis ful-va, As-clep-i-as tu-ber-o-sa*. Amen." Then he handed the child back to the mother. She smiled broadly, bowed deeply, crossed herself multiple times, and disappeared back into the forest.

Before his collecting had finished, he'd blessed over a dozen babies, all with botanical names.

To me, this story illustrates that botanists can be both colorful and philosophical. We don't have to be dry and brittle, like herbarium specimens. After all, isn't our terminal degree in philosophy?

— Maurice E. Edwards

A Friend of the Herbarium, Maurice has recently earned the title Professor emeritus, *following 33 years teaching in the University of Tennessee at Chattanooga's Department of Biological & Environmental Sciences. He is also a botanical artist and spends much time these days at the John C. Campbell Folk School.*



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