



PLANT SCIENCE BULLETIN

SPRING 2022 VOLUME 68 NUMBER 1

A PUBLICATION OF THE BOTANICAL SOCIETY OF AMERICA



Make Your Plans to Attend—In Person or Virtually!

A promotional poster for the Botany 2022 conference. The background is a light blue sky with a few yellow stars. The word 'Botany' is written in large, purple, serif letters. To the right of 'Botany' is the year '2022' in a similar font, with a cluster of blue flowers and green leaves integrated into the '2's. Above 'Botany' is the text 'Plants at the Extreme!'. Below 'Botany' is 'Anchorage Alaska' and 'July 24 - 27'. At the bottom left is the website 'www.botanyconference.org'.

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IN MEMORIAM

LEONARD THIEN (1938–2021)



Students of floral evolution, plant ecology, karyology, and molecular systematics were much saddened by the loss of Professor Leonard B. Thien of Tulane University, Louisiana, on October 24, 2021 after a long illness. In 1991 Professor Thien became an elected Fellow of the American Association for the Advancement of Science for his studies in cytology and the pollination biology of what we now call basal or relictual angiosperms. While Len Thien maintained a lab at Tulane for almost 40 years his field studies took him from the American Midwest to the Hudson Bay region of Canada, Latin America, Madagascar, Australasia (New Caledonia, Australia and New Zealand) and China.

Len's origins were distinctly Midwestern as he was born in Breese, Illinois. He took his BS at Southern Illinois University. His Masters was completed at Washington University, St. Louis, and this allowed him to meet the staff and use the facilities at the Missouri Botanical Garden,

introducing him to the Neotropics. The NSF awarded him a Research Assistantship under then Curator Calaway Dodson (1928–2020). Len assisted Dodson on a field trip to Ecuador collecting orchids. It's obvious that Dodson appreciated Len's work because he named several new species after him, citing the young botanist as a "co-discoverer." This included *Stanophea xthienii*, now recognized as a naturally recurring hybrid. Len remained interested in orchids for the rest of his career, contributing to taxonomic revisions while he and his graduate students investigated novel insect-orchid interactions.

From Washington University Len went on to UCLA for his PhD, in the laboratory of Harlan Lewis (1919–2008). He graduated in 1968 and married his wife, Lorraine, in 1966. She was also a student at the university and survives him. He was hired quickly by the University of Wisconsin in Madison as an Assistant Professor of Botany. Len and Lorraine weren't keen on Madison. It was a place of student protests in the 1960s, leading to the arrival of the National Guard following the explosion of the Army Mat Research Lab so close to Len's office. However, during this period he completed his first piece of fieldwork, published in the *American Journal of Botany* (Thien, 1969). It remains a significant publication today (see below). Len discovered that the blunt-leaved orchid, *Platanthera (Habenaria) obtusata* was pollinated by female mosquitos in the genus *Aedes*. His field sites horrified Lorraine. Len worked alone in those deep Wisconsin bogs. You could vanish without a trace if you fell through the sphagnum mats. Incomplete records indicate that he joined the Botanical Society of America by 1970. More than 80 publications would follow.

Happier and successful experiences awaited Len when he joined the Biology Department at Tulane University in 1971. He was promoted



Photos Property of Dr. David White (note the pollinators, a fly and beetles)

to Associate in 1975 and Full Professor in 1981. The 1970s were very good to Len, as it was the decade of the birth of his son Ben and daughter Laura. His research developed during this period and he began using species of what we now think of as basal angiosperms (eumagnoliids and ANITA Group) as model systems to develop theories on the evolution of the first flowers. The refugium flora of the American south was generous and his first paper on the pollination of American *Magnolia* species also appeared in the *American Journal of Botany* (Thien, 1974). Over the following decades he and his students would go on to examine the reproductive biology of the native American species of *Liriodendron*, *Illicium*, and *Saururus*. Of course, there weren't enough relictual taxa in North America to keep him busy, which meant trips to tropical islands of the southwestern Pacific (Thien, 1980). His interest in the Winteraceae took him to New Guinea, New Caledonia, and finally to Madagascar. Len was adept at building consortiums of scientists with mutual interests who would work on different aspects of a project to produce a more holistic interpretation of the reproductive biology and phylogeny of obscure lineages (see Thien et al., 2003).

A most important feature of the Thien lab was his positive and often rapid approach to the incorporation of innovations and methods

unfamiliar to botanists. For example, to collect mosquitos carrying orchid pollinaria, he baited carbon dioxide traps with dry ice first described a few years earlier by DeFoliart and Morris (1967). As a Fellow of the Hormel Institute, a research center more devoted to biomedicine and meat chemistry, Len first worked on analyses of floral fragrances in the mid-'70s (Thien et al., 1975). He also kept up with biochemical analyses and fluorescence techniques to produce increasingly detailed and sophisticated interpretations of floral evolution. When the Biology Department split in two, the new Cell and Molecular Department became Len's, apart from the Ecology and Evolution Department. He learned genetic analyses to produce phylogenies attracting new colleagues from Japan and China. His research was supported by at least 11 state and national agencies. As more people came to Tulane to learn from him and write up their results, husband and wife repeatedly hosted and entertained graduate students and welcomed visiting scientists.

David White, his first graduate student, has great memories of being in the field with Len. Conversations were never dull. Len absolutely hated snakes, so common in Louisiana, but could never kill one unlike so many folks in the state. He was too gentle of a man. Many times, he even walked into the webs of the huge golden orb spider as it tends to spin

at eye level. For Len, his swamps and study sites were places for “critter respect.” The pollinators of *I. floridanum* are small and not willing to have their photos taken. Focusing on the spectacular red flower meant meeting a copperhead snake flicking its tongue as the lens came into focus. It became a special bonding moment between Len and David remembered long after publication (Thien et al., 1983).

With the subdivision in departments, Len’s lectures broadened. His courses in ecology gave way to molecular biology with a lab. However, Len’s passion was to teach nature’s wonders out-of-doors. Jean Lafitte National Historical Park was only a 30-minute drive from campus and a favorite for class trips. Boat trips, though, could be a challenge. On about the first scouting trip for David’s research in another part of the state, during high tide in an old university boat driven by David, a sharp turn in the bayou was missed and the vessel ended up aground 30 m into the wire grass marsh. They were marooned for more than half an hour, close to dark in an age without cell phones. Finally, a second boat came along and there was no need to wave considering the extent of their predicament. “Boy, do we feel stupid,” Len said. “No worries,” said the rescuer in his broad Cajun accent, “It happens all the time.” Len said he loved that story as, 50 years later, David has never had a similar accident nor seen such a one after thousands of boat miles.

Len always gave one of his collaborators the impression he was looking forward to retirement. During one night in a hotel in the New Caledonian countryside (he and I were investigating the floral biology of *Amborella tirchopoda*; Thien et al., 2003) he said abruptly, “Do you know what to retire means, Peter? It’s a military term and means to retreat from the field.” A few years later, though, he showed his deep loyalty to Tulane after the

university reopened following Hurricane Katrina. The highways into New Orleans were still strewn with debris. He would call me and often sounded angry describing how often he had to change his tires to and from Tulane. However, his usually unflappable manner not only explains how he progressed so well under bad conditions but helps us understand why his projects were successful even when he worked in culturally distinct, and often politically unstable, parts of the world. This must explain why, in his last years at Tulane, Chinese colleagues found it so important to work with him on the Schisandraceae, allowing him to investigate that family in the ANITA group although it’s poorly represented in the American south.

Younger botanists may still wonder does it really matter what I publish in the long-term? It did in Len’s case. Let’s return to Thien (1969). Over 50 years later, a team of scientists published an extraordinary paper in the *Proceedings of the National Academy of Science* (Lahondere et al., 2020). Acknowledging the work of Leonard Thien, they returned to that little, green-flowered orchid and its mosquitos. *Platanthera obtusata* emits a nonanal-rich scent uncommon in other members of its genus. The nonanal attribute that balances levels of excitation and inhibition in one of the insect’s antennal lobes, and the same segment also warns the mosquito to avoid incoming fumes of DEET.

Len’s legacy teaches us that making a fresh discovery is laudable, but opening an intellectual window to both current colleagues and future scientists is better. This should always remind us that science is a torch race even when it takes a half a century to pass. Leonard Thien leaves a far more knowledgeable scientific world because of his passion to learn, teach, and complete research; a noble trifecta. We thank you for your gifts.

REFERENCES

DeFoliart, G. R. and C. D. Morris. 1967. A dry ice-baited trap for the collection and field storage of hematophagous Diptera. *Journal of Medical Entomology* 4: 360–362.

Lahondere, C., C. Vinauger, R. P. Okubo, G. H. Wolff, J. K. Chan, O. S. Akbari, and J. A. Riffell. 2020. The olfactory basis of orchid pollination by mosquitoes. *PNAS* 117: 708–716.

Thien, L. B. 1969. Mosquito pollination of *Habenaria obtusata* (Orchidaceae). *American Journal of Botany* 56: 232–237.

Thien, L. B. 1974. Floral biology of *Magnolia*. *American Journal of Botany* 61: 1037–1045.

Thien, L. B. 1980. Patterns of pollination in the primitive angiosperms. *Biotropica* 12: 1–14.

Thien, L. B., W. H. Heimermann, and R. Holman. 1975. Floral odors and quantitative taxonomy of *Magnolia* and *Liriodendron*. *Taxon* 24: 557–568.

Thien, L. B., T. L. Sage, T. Jaffre, P. Bernhardt, V. Pontieri, P. H. Weston, D. Malloch, et al. 2003. The population structure and floral biology of *Amborella trichopoda* (Amborellaceae). *Annals of the Missouri Botanical Garden* 90: 466–490.

Thien, L. B., D. A. White, and L. Yatsu. 1983. Reproductive biology of a relict: *Illicium floridanum*. *American Journal of Botany* 70: 719–727.

—Peter Bernhardt, Research Associate, The Missouri Botanical Garden; and David White, Professor Emeritus, Loyola University



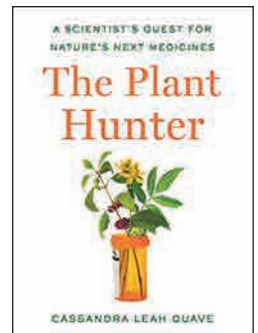
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DR. CASSANDRA QUAVE

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Plenary Lecture - Sunday, July 24 - 7:30 pm
Book signing to follow