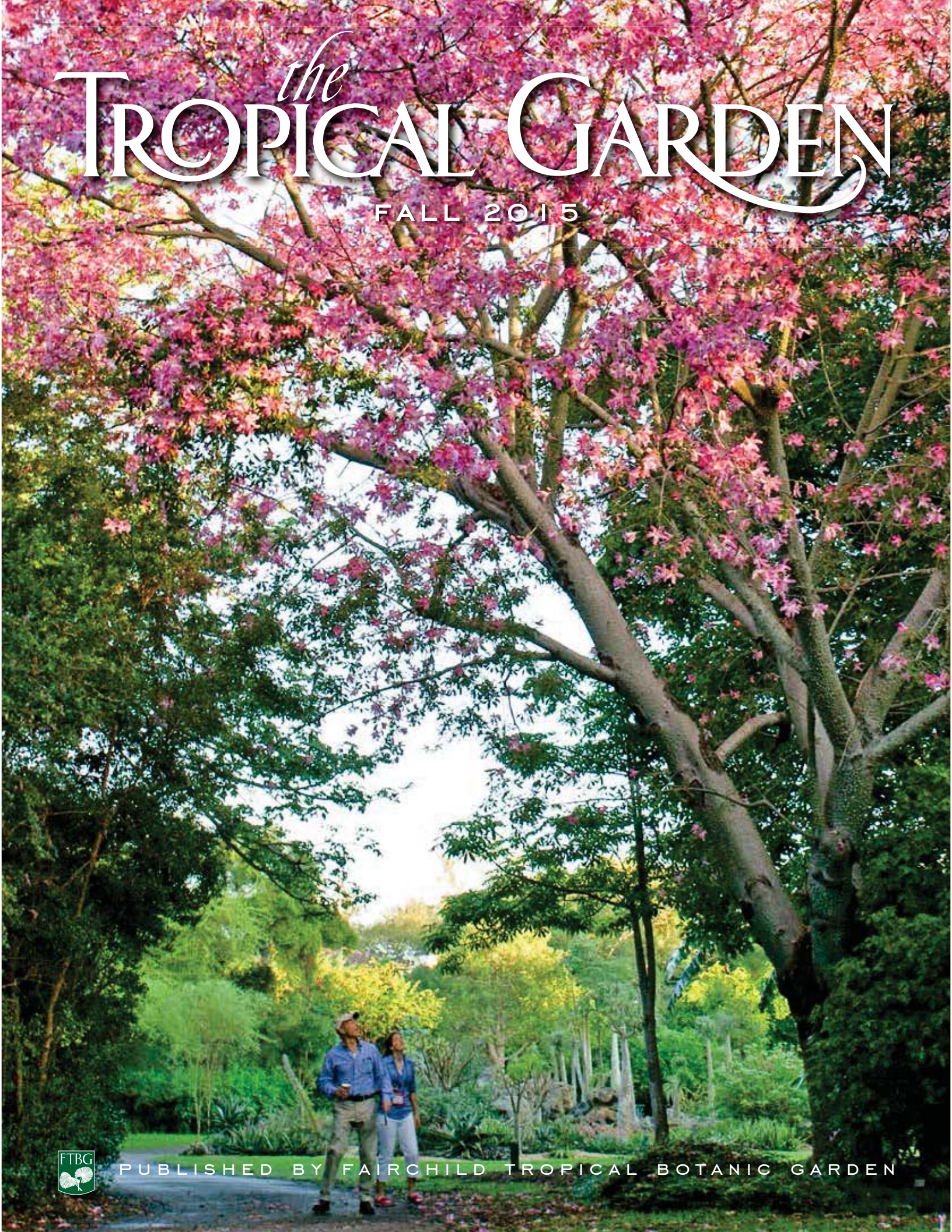
the TROPICAL GARDEN

FALL 2015



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FEATURES

DEPARTMENTS

WRITTEN IN STONE

Plant Fossils are a Trip Back in Time

Text and photos by Kenneth Setzer

Fossils are nothing short of extraordinary. Ponder them for a while—you hold in your hand the remains of something that lived and died perhaps hundreds of millions of years ago, and subsequently managed to become preserved and quite literally weather through eons and ice ages and catastrophic asteroids. It's a wonder any fossils exist at all.

Otozamites

This cycad-like plant lived alongside the very first mammals in the Triassic Period, during the rise of the dinosaurs. The foliage so closely resembles a cycad, that it requires a microscopic look at the stomata to tell them apart. Their reproductive structures are also distinct from cycads, and previously led researchers to consider them ancestors of flowering plants, but this is no longer the case. Cycadeoids such as this disappear from the fossil record during the Cretaceous Period.

Triassic Period, 195–225 million years ago

Florissantia

Amazingly, something as fragile as a flower can fossilize. This flower, *Florissantia*, survived the cooler, more arid conditions developing after the Eocene Epoch, while avoiding browsers like the extinct horse *Mesohippus*. Some *Florissantia* fossils have even been dissected to reveal their preserved reproductive structure.

Upper Eocene/Lower Oligocene Epoch, approximately 34 million years ago

Lepidodendropsis

This bark impression belongs to *Lepidodendropsis*, a form genus of a tree-like lycopod. Lycopods, including modern-day *Selaginella*, fall within the oldest-known division of extant vascular plants. A defining characteristic of lycopods is microphylls—leaves containing a single vein each. Compare that to the complex venation of just one maple leaf!

Lower Carboniferous Period, 325–345 million years ago

A recent donation of dozens of plant fossils to Fairchild by Dr. David Lee, Florida International University professor emeritus of biology, has allowed us to add to the fossil specimens already stored at our Herbarium. We can now learn more about life forms that lithified so long ago as to really be a bit beyond human comprehension. "I've always been interested in the evolutionary history of plants and the fossils that help tell that story," Lee says. "I donated [the fossils] to FTBG because I thought their educational potential might be put to good use."

The collection also includes fossils from Dr. Patricia Gensel, a professor of biology at the University of North Carolina at Chapel Hill and one of the world's experts on Devonian plants. Lee spent some time with her. "That meeting led to her donation of most of the fossils you have seen," he explains, "but with a few from collections I'd pulled together for teaching at FIU."

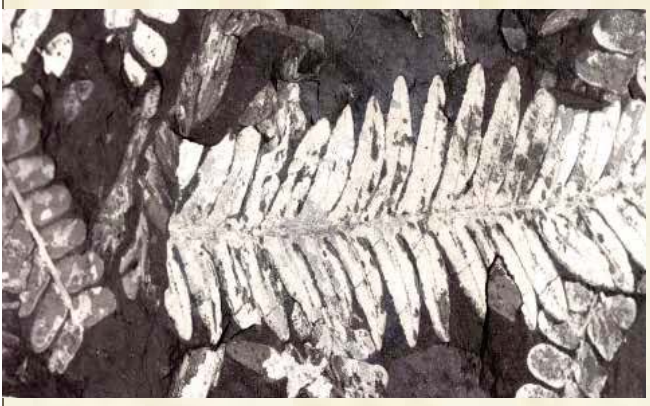
Lee's relationship with Fairchild goes back decades: He helped establish the original partnership between the Garden and FIU. "I have had a long and friendly relationship with the Garden, some 35 years," he notes. Indeed, among Lee's publications is "The World as Garden: The Life and Writings of David Fairchild," a unique anthology of Dr. David Fairchild's writing.

Holding these fossils leaves me longing to glimpse a time of giant millipedes, massive dragonflies and the tropical river delta that was Illinois. In these pages are just a few of the remarkable remains we have explored in Lee's donation.

Calamites trunk

Calamites were giant horsetails that developed hollow trunks. After the plant's demise, sediment could enter and preserve a cast of the trunk's interior, like this pith cast. The living trunk was much thicker. Picture a giant *Meganeura* dragonfly, with a wingspan of more than two feet, alighting on one of these.

Upper Carboniferous Period, 280–325 million years ago



Carboniferous seed ferns

Fossils from the Llewellyn Formation of eastern Pennsylvania coal deposits are known for the pleasing contrast created by the pale fossil set against a darker matrix. The plant in the center is a species of *Alethopteris*, a seed fern (also known as a pteridosperm). Although it resembles modern ferns, it reproduced by means of seeds, not spores. Other visible species are of *Neuropteris*, another seed fern. Both *Alethopteris* and *Neuropteris* are abundant in Upper Carboniferous Period deposits.

Late Middle to Upper Pennsylvanian Epoch, 300–310 million years ago

Annularia

This *Annularia* fossil represents the foliage of *Calamites*, a genus* of huge (up to 100 feet tall) plants resembling living horsetails. They belong to the relict class Equisetopsida, represented today solely by the genus *Equisetum*.

Upper Carboniferous Period, 280–325 million years ago

**A note on names: the fragmentary nature of fossils means it is sometimes impossible to be certain how fossil plants looked in their entirety, and consequently how they are related to contemporaries and/or their descendants. As a result, paleobotanists may rely on names that are based on only a portion of a plant—for example,* Annularia *is a form genus based solely on foliage. This may result in different names for what's believed to be the same plant.*

Thank you to Fairchild Herbarium Curator Dr. Brett Jestrow for providing information on these fossils.