

AMONG GIANTS: GUY STERNBERG, OAK GURU

BY JAYSON DeGEETER, ASLA / PHOTOGRAPHY BY NOPPADOL PAOTHONG

OPPOSITE

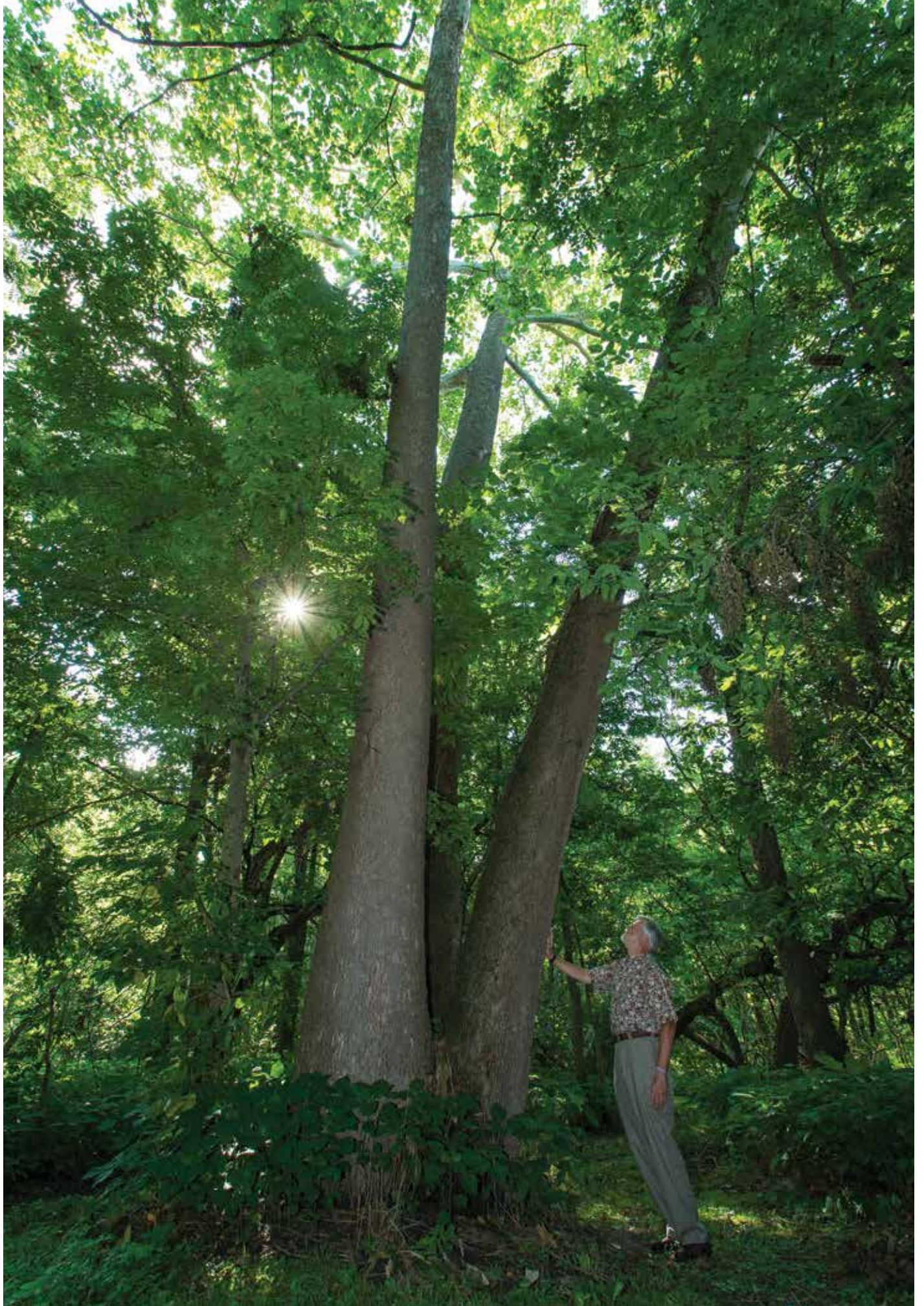
Guy Sternberg admires a 125-foot sycamore (*Platanus occidentalis*) along Rock Creek, which bisects the Starhill Forest Arboretum in Petersburg, Illinois.

“OAKS ARE NOTORIOUS outcrossers. They’ll take pollen from anything that is closely related to them,” Guy Sternberg says, as he nods toward a fastigate oak specimen called ‘Chimney Fire.’ We are standing near the entrance of Starhill Forest Arboretum, which he owns with his wife, Edie, in Petersburg, Illinois. Sternberg is tall, and his voice is commanding.

“If you know the history of fastigate oaks, they all originate from one English oak (*Quercus robur*) growing outside Harreshausen, Germany; its genetics are in every one of the upright oaks you see today.”

Here in Illinois, he adds, the upright English oak with its spindly branches doesn’t like the heavy ice and snow loads. “It also gets powdery mildew. But when the upright English oak pollinates with swamp white oak (*Q. bicolor*), you get *Quercus x warei*, which is mildew resistant and has a nice warm-brown fall color. Now, when that cross is crossed by white oak (*Q. alba*), you get ‘Chimney Fire’ (*Q. x reifii* var. *warei*); that has everything the others do, plus fall color.”

Sternberg is revered for knowing oak trees better than most people. ‘Chimney Fire’ is one of the 22 tree cultivars introduced by Starhill Forest Arboretum.





ABOVE

More than 2,000 trees grow on 48 acres at Starhill Forest Arboretum.

On the drive along County Highway 4 to Starhill Forest, the route falls under the shadow of the Gudgel Oak, a historic *Quercus alba* specimen dating to 1759. There's also the Wayside Hawthorn (*Crataegus mollis*), planted around 1930, part of one of the early highway beautification projects in Illinois. Inside the arboretum itself, you find the Cannonball Osage orange (*Maclura pomifera*), the state champion staghorn sumac (*Rhus hirta*), and the champion dwarf hackberry (*Celtis tenuifolia*). Sternberg was instrumental in recognizing each of these historic and champion trees, along with many others throughout Illinois and elsewhere.

He is well-known in the world of arboriculture for his work in tree preservation and hybridization. His work at Starhill Forest Arboretum may bring the next generation of giants into being.

In 1976, Guy and Edie Sternberg began building Starhill Forest Arboretum in their spare time. Guy was employed as a landscape architect for the Illinois Department of Natural Resources, and Edie worked as the chief of health promotion and chronic diseases for the Illinois Department of Public Health.

The land they chose for the arboretum was farmed and grazed until the mid-1800s; specimens from that period still grow on the site. The oldest trees introduced by the Sternbergs sprouted off-site in 1964 and were transplanted soon after the couple bought the property.

The arboretum now occupies 48 acres that hold a world-renowned collection of woody plants, herbaceous plants, nonhardy (conservatory) plants, and natural habitat communities. The Sternberg home—filled with art, photos, and trinkets cele-



CLOCKWISE FROM LEFT

Acorns from various oaks; Guy Sternberg inspects for pests in the arboretum's nursery; tropical and subtropical oaks spend the summer in an outdoor growing area.



brating all things arboricultural—sits near the arboretum's entrance—sits next to its research facility.

About 10 percent of the arboretum is devoted to native habitats. These areas—upland forests, ravine forests, riparian corridor, floodplain forest, and a re-created prairie display garden—are managed for preservation, study, and teaching, but also as wildlife habitat. In these uncultivated areas, there are about 60 native woody plant species.

On the remaining 90 percent of the arboretum, “We focus on natives,” Sternberg says. “We try to focus on natural species collected in the wild from known habitats, known climates, but very few cultivars. We aren't going to have 100 crabapples.”

The arboretum's accession records include data on nearly 2,000 woody taxa currently growing in the collec-

tion, of which “700-some,” by Sternberg's count, are oaks. The number doesn't quite capture its stature. The oak collection, or quercetum—the arboretum's primary scientific collection—is a living reference component of the American Public Gardens Association's North American Plant Collections Consortium. Of the 20 APGA-certified oak collections found in North America, this one is the largest. The collection at Starhill Forest includes rare oak species, varieties, cultivars, nothospecies, hybrids, and more than 100 tropical oak taxa wintered in greenhouses.

Sternberg's detailed information about each specimen's origin, or provenance, is the foundation of the collection's significance. Owing to the rigorous record keeping and meticulous seed collection methods, trees growing at the arboretum, unlike trees sourced from nursery stock, are comparable to trees grow-

ing in pure stands and can be studied as such. “Provenance is everything,” Sternberg says. Twenty-five fields of data are maintained for each tree in the collection. The data includes the GPS location where the seed was collected, the date each tree was propagated, and how it was cultivated.

There are, for example, the bur oaks. “We have provenance test plantings here of bur oak (*Quercus macrocarpa*) representing 80 sites from across its entire natural range,” Sternberg explains. “They will all grow here because we're at the center of its range. There's a lot of flexibility in a bur oak's genetic makeup.”

This diversity is driven by the tree's evolutionary need to thrive in specific growing conditions, Sternberg says. “As they spread from their initial point of evolution and go toward the northwest, those that aren't hardy, those that can't mature seeds ↘



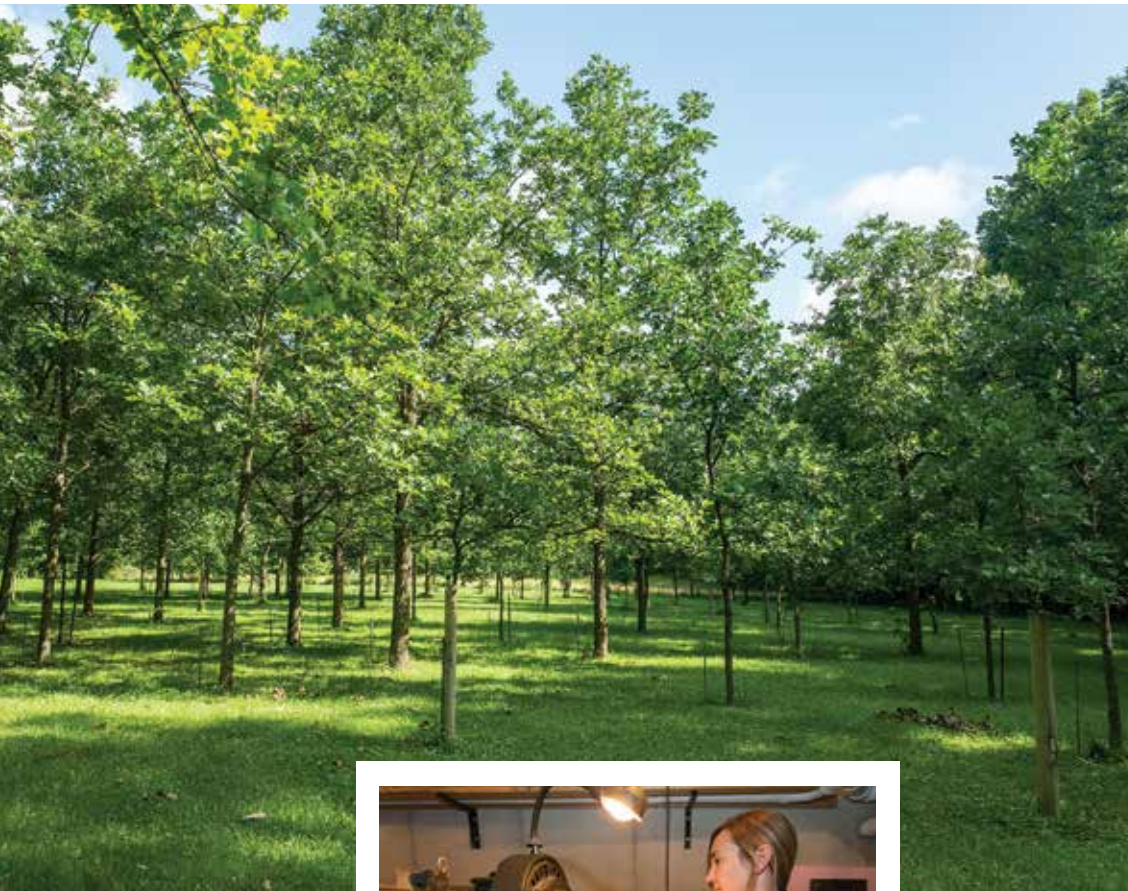
CLOCKWISE FROM LEFT *Quercus* 'Firecracker'; the shed wall displays antique forestry and farming tools; oak-related artwork and specimens on the walls of the house; wire screens protect rare seeds and seedlings from rodents; the county champion *Maclura pomifera* (Osage orange) tree.





“A GOOD TINKERER PRESERVES ALL OF THE PARTS. THAT’S WHAT I’M SAYING: LET’S PRESERVE ALL OF THE PARTS.”

—GUY STERNBERG



CLOCKWISE FROM TOP LEFT

A dissecting scope identifies an oak hybrid by examining its abaxial trichomes; the arboretum tracks 25 fields of information for each of its trees; Manager Alana McKean makes inventory labels for trees; a provenance test plantation of bur oak (*Quercus macrocarpa*).





ABOVE

Trees at Starhill Forest are placed in seemingly random patterns, but planting spots are chosen to combine a tree's cultural needs with its aesthetic potential.

OPPOSITE

Eddie Sternberg, Alana McKean, and Guy Sternberg check background information on one of their rare trees.

↳ in a short growing season, those that can't tolerate the wind or the prairie fire—they all drop out." The trees that are left are those best adapted to the site. "The same species goes down to Texas, where they have a long growing season, have to tolerate droughts, different types of soil; the genetic collection is for a different set of circumstances."

By carefully selecting seed stock from disparate locations and planting the specimens together in test plantings, Sternberg and other researchers are able to study the genetic variations among plants of differing provenance.

"What we want to do is say: 'OK, that's from Manitoba, that's from Oklahoma, that's from Texas. They're in the same soil, same hydric regime, same sunlight; anything that would have been an influence on that particular individual tree is eliminated.'"

What's left is the tree's ancestry: the genetic predispositions for form, height, leaf size, and so on. "We're going to study the trees to see which leafs out first in spring, which bears fruit at an earlier age, and so on."

During a walk around the arboretum, Sternberg points out *Quercus vaseyana*, a large shrub that hails from the Rio Grande Valley. Nearby, there's *Quercus canbyi* from the Monterrey area of Mexico; it is managed at the arboretum as a dieback perennial. "In mild winters, it survives aboveground," Sternberg says. "After the brutal winter of 2014, it sprouted back from the base."

Andrew Hipp, the herbarium curator of the Morton Arboretum in Lisle, Illinois, has found the collection at Starhill Forest to be particularly useful to his research into the origins and evolution of plant diversity. "[Sternberg's] contributions to our



oak studies have been profound,” Hipp says. In 2012, Hipp and six of his colleagues turned to Sternberg’s quercetum as a starting point for collecting leaf tissue used in DNA sequencing. “Guy was one of the first people I contacted. His collection of oaks is well renowned.” Hipp goes on: “Guy was a wonderful collaborator in this project. [His] decades spent collecting oaks enabled us to sample oak populations that we would never have had the time to visit on our own in Mexico and North America.”

The variations among Starhill Forest’s plantings bear innumerable insights. For example, Sternberg mentions that bur oaks hailing from Saskatchewan produce small acorns beginning when the trees are between five and 10 years of age. Meanwhile, a bur oak from Texas may be 30 years old and still not bear acorns. But when it does, he says, its acorns are as big as golf balls.

“When you think about it, if a tree in Saskatchewan grows a big acorn, it will never mature before the freeze. It’s the little acorn that can reproduce and spread. But if you’re in Texas with a long growing season, is a little bitty acorn going to stand up to the drought as well as the big acorn with a lot of food value?”

In the face of climate change, this sort of research is crucial.

As scientists such as Andrew Bell, the curator of woody plants at the Chicago Botanic Garden, prepare for climatic variability and uncertainty, the diverse collection at Starhill Forest Arboretum has considerable value. “In Chicago, we are looking to environments in eastern Oklahoma, western Missouri, and northern Arkansas for clues into the future of our region’s climate,” Bell says. “Wild collected seed sourced from trees found across a species’s range—particularly where conditions

are less than ideal for the species—is anticipated to produce trees more adaptable to harsh conditions.”

To navigate the host of unknowns associated with climate change, genetic diversity is key. Preserving this diversity leaves intact a plant’s natural ability to adapt.

“You’re trying to select for the future,” Sternberg says, “trying to select so what we have is a palette to work with that can thrive in our environment: the soil, the climate, the wind—the conditions that you have with urban situations—ice storms, summer droughts, all the things that we’re faced with in the central part of North America that are getting worse and more unstable by the minute. No one tree is going to carry floods and droughts and all, but if you have a certain set of circumstances in your community, you plant a tree that’s in the middle of those circumstances.

PLANTING SEED FROM DISPARATE LOCATIONS TOGETHER IN TEST PLANTINGS ALLOWS STERNBERG TO STUDY GENETIC VARIATIONS AMONG PLANTS OF DIFFERING PROVENANCE.

“A good tinkerer preserves all of the parts. That’s what I’m saying: Let’s preserve all of the parts.”

There’s more to it than being a good tinkerer, though. He frowns on what he calls “cookbook ecology” and insists the research be exacting. “You have to make sure that what you are doing—as a landscape architect, as a nurseryman, as a homeowner—is the best you can do from all aspects.”

Sternberg’s convictions about plant research have won him many admirers. “The story of Guy’s arboretum is, on its own, inspiring,” Hipp says. “But more inspiring still is the way he conducts himself as a person. Organized, kind, clear-sighted, Guy manages to teach his colleagues and interns as much about being a human as he does about plants.”

Guy and Edie Sternberg are both technically retired, though neither intends to slow down. The arboretum’s operations continue to expand. “Edie does all of the work with the herbaceous plants, handles all of the paperwork, and manages the fund-raising,” Guy Sternberg says. “I focus more on the woody

plants, the landscape design concepts, and the lectures.” He grins: “Each of us has a specialty that allows us to work without being constantly challenged by the other.”

He admits: “Edie is the engine, brakes, and throttle behind the scenes at the arboretum.”

Guy Sternberg is active as a tree consultant, writer, lecturer, photographer, and advocate. He holds an honorary adjunct research appointment to the Illinois State Museum Botany Department and adjunct faculty positions in biology at Illinois College and at the School of the Chicago Botanic Garden. He also remains involved with the National Famous and Historic Tree Program. Then there are the books: Sternberg has coauthored two reference books with James W. Wilson, one of which, *Native Trees for North American Landscapes* (2004), won the National Arbor Day Foundation Media Award and the National Council on Botanical and Horticultural Libraries Annual Literature Award.

The arboretum is an active teaching environment. Since 2005, the Sternbergs have guided interns from Illinois College in Jacksonville, Illinois, who are given all kinds of responsibilities on the grounds. In 2008, the Sternbergs established a relationship with Illinois College that formalized adjunct faculty positions for the Sternbergs and promises—as stated by then-president Axel Steuer—to “carry forward the Sternbergs’ educational vision for the arboretum in perpetuity by creating an off-campus teaching and learning environment consistent with Illinois College’s educational mission.”

As for the 22 tree cultivars introduced by Starhill Forest Arboretum, they are available in North America through Forrest Keeling Nursery and in Europe through Pavia Nursery. Professor Reinhold Luebbert of Germany, in his *World Compendium of Oaks*, chose to honor Sternberg by naming the stable hybrid (nothospecies) of *Q. shumardii* x *Q. buckleyi* as *Quercus x sternbergii*. ●

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