

Unknown Plants under Our Noses

How much backyard botany remains to be discovered?

By SUSAN MILIUS

Dedeckera's yellow flowers are hardly inconspicuous, but the plant was not recognized by science until 1976, after a California conservation activist collected it.

Ertter

If you don't think there could be any new species left to discover in your own neighborhood, California taxonomist Barbara Ertter has a story to tell you.

A botanist she knows from Santa Cruz, Calif., had a soft spot for limestone cliffs. When Dean Taylor was just a sprout of a graduate student in the early 1970s, he'd realized that oddball geology meant oddball plants. He scored one of the first coups of his career finding a population of rare plants on a cliff near Lake Shasta.

Years later, driving along Highway 299 near Redding, Calif., he spotted yet another enticing limestone cliff. When he pulled over, he realized he'd get soaked fording a serious creek on the way to the rocks, so he drove on. After that, he'd catch sight of the cliff now and again, usually on the homeward leg of a trip when he was not inclined to stop.

Finally, in 1992, he and botanist Glenn Clifton were tooling along 299 with a bit of room in their schedule when the cliff loomed invitingly. They pulled over and discovered that years of drought had solved the problem of fording the creek. They jumped from rock to rock, pushed their way through head-high shrubbery full of poison oak, and came at last to the cliff.

It was a dud, botanically speaking.

The geology might have been offbeat, but the plants were not. Taylor and Clifton

struggled back through the thicket to their car and fell to discussing what the annoying shrubbery was. They collected samples and drove on.

Not long after, Ertter of the Jepson Herbarium at the University of California,



The Shasta snow-wreath was growing as roadside shrub near Redding, Calif., when botanists finally focused on it in 1992. Since then, scientists have found more patches, including one beside a popular campground.

Berkeley got a call. Could she identify a strange shrub with white star-burst flowers?

Thus Ertter, Taylor, and another botanist ended up publishing the formal description of a rose-family species new to science. Their news roused consider-

able scientific interest because the shrub, named *Neviusia cliftonii*, or Shasta snow-wreath, was only the second species in its genus. The first is a rare plant in the southern Appalachians, more than a thousand miles away. Species of the two other closely related genera grow only in Asia.

Even more intriguing than the distribution of related plants, Ertter says, is the question of how science had missed a shrub that big, growing that abundantly in a habitat so close to a major highway that experienced plant hunters had been traveling for years.

The discovery of the Shasta snow-wreath challenges what Ertter sees as the "common perception that the flora of North America north of Mexico has, with the rare exception, been fully explored, catalogued, and mapped." That attitude is not only wrong, it's harmful, she insists.

Not much research today focuses on the taxonomy and distribution of U.S. and Canadian plants, yet a lot of decisions about what gets paved and what gets saved take into account the flora and fauna known to live there. Mistakes can waste fortunes on protecting a species that's not all that rare or, at the other extreme, can snuff out an irretrievable bit

of the planet's natural heritage.

The idea that we pretty much know it all when it comes U.S. and Canadian botany has deep roots. Drawing examples from her state's history, Ertter quotes English plant collector Thomas Bridges, who combed California and sent home batches of specimens for analysis. When he heard that some of his finds were indeed novel plants, one of his letters gets almost giddy with relief: He'd feared that "little or nothing remained to be discovered, and only gleanings were left to those of us of the present day." That was 140 years ago.

Even a renowned 19th-century western U.S. botanist, Henry Nicholas Bolander of the California Geological Survey, estimated that not more than 500 species of flowering plants covered a large swath of the West Coast. With the benefit of hindsight, Ertter remarks that thousands of plants is a more probable count for that area.

Doomsday predictions about the end of discoveries accompany every scholarly catalogue of plants in northern North America, observes Stanley L. Welsh of Brigham Young University in Provo, Utah. "Each major publication on western plants has left the impression that all of the work has been done, that nothing remains to be discovered, that everything worth naming has been named," he says.

Welsh's accomplishments give the remark an ironic edge. He holds the record, by a broad margin, for describing the most new vascular plants—ferns, conifers, and flowering plants—north of Mexico in the past few decades. Despite others' pronouncements that discovery is dead, he has named 118 plants: 61 distinctive varieties of known species and 57 that rank as new species.

So, have researchers mostly "been there, named that" when it comes to U.S. and Canadian flora? Taylor and Forest Service botanist James R. Shevock don't think so.

In one of the first studies addressing this question, in 1987, they analyzed plant novelties identified in California from 1968 to 1986. Taxonomists averaged about 10 new plants per year, with no trend toward fewer findings. Looking at longer-term rates of discovery, they estimated that at least 300 more treasures grow undiscovered somewhere in the state.

A broader analysis last year startled even its own authors. Ronald L. Hartman and B.E. Nelson of the Rocky Mountain Herbarium at the University of Wyoming in Laramie counted plant novelties recorded for North America north of Mexico between 1975 and 1994. Taxonomists have described around 60 plants each year, reaching a total of 1,197. Hartman says, "I was surprised by the magnitude."

"Even those of us who have known that there's still stuff out there have been taken aback," Ertter observes. The report inspired her to hazard the guess that per-



This lily with scented blooms grows not far from Yosemite National Park, but it was not noticed by botanists until 1996.

haps 5 percent of U.S. and Canadian plants remain undescribed or undiscovered. She came up with the number by building on Taylor's extrapolation that California still holds some 300 undescribed taxa. She assumed that the state would continue to represent the same proportion, about one-sixth, of the novelties as it has in the past.

Looking at plant exploration since 1975, Ertter notes that it hasn't just been a western phenomenon. True, California leads the states as a source of new plants, but Florida ranks number 8. Every contiguous state and Canadian province has supplied at least one floral surprise.

The discoveries in this period range from modest variations on old themes to

real eye poppers, she says. Five of the plants are so odd that botanists could find no immediate relatives, and each now has its own genus.

For example, a conservation activist named Mary DeDecker collected a shrubby buckwheat with golden flowers that rated it own genus, now called *Dedeckera*. Botanists may have missed the plant because it grows in the desert terrain of California and blooms at an uncomfortable time of year. Decker's specimens bear the collection date July 4.

Cheyenne botanist Robert Dorn discovered another oddball, now in the newly created genus *Yermo*, while riding his dirt bike along the proposed route of an oil pipeline in Wyoming backcountry. The knee-high, yellow-flowering member of the sunflower family is known only from the population he located.

Retired chemistry teacher Erwin Evert of Park Ridge, Ill., discovered the first plant in genus *Shoshonea* while he was vacationing in Wyoming. He later identified a patch of the mat-forming member of the parsley family only six miles, as the crow flies, from Cody.

Other plants that had been overlooked although in plain sight strike Ertter as strong evidence that botanists haven't yet found it all. She reels off a number of discoveries from everyday places.

No one had described *Calochortus tiburonensis*, a member of the lily family, until 1972. It grows only 10 miles from down-

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In 1996, Taylor found another new lily a short distance outside Yosemite National Park, the most visited park in the United States. This showy plant is the first with scented blooms to be found among New World members of the genus *Erythronium*.

A *Lesquerella* mustard in Colorado bears the species name *vicina*, meaning neighborly. James L. Reveal, one of the botanists who discovered it in the early 1990s, chose the name because he found his first specimen in his neighbor's yard in Montrose.

In 1982, a vacant lot at the edge of residential sprawl in Huntsville, Ala., yielded the first collected plant of what is now known as Morefield's leather flower, *Clematis morefieldii*. Its discoverer, James Morefield, had just started collecting plants. "I had no idea what I was doing," he recalls. When he took his finds to a botanist for help with the identification, Morefield learned that he'd stumbled onto a new species. He was 21 years old at the time.

Ertter adds the whimsical story of a little member of the parsley family in the genus *Lomatium*. In 1996, California taxonomists had been helping nature photographer Nigel Hancock identify plants in pictures he'd taken around the Lick Observatory on Mount Hamilton. Lincoln Constance, a leading parsley specialist, recognized one as a long-missing candidate for a new species. The records with tantalizing old specimens in two California herbaria did not pinpoint the location, and no one had collected a live specimen in years. Hancock led botanists directly to the little plant among the buildings in the main observatory complex. "The astronomers weren't looking at the plants," Ertter sighs.

Ertter believes that unknown plants will keep turning up. It's the supply of plant collectors, especially academic taxonomists, that she's worried about. She points to the list Hartman and Nelson compiled of the 56 people who described at least six new plants during the past 20 years. Their two largest categories in the list are "Emeritus" and "Deceased." These people contributed 60 percent of the new plants in the list.

Replacements do not seem to be on the way, Ertter says. She surveyed 56 current faculty members at the western U.S. schools with large herbaria to see what effort was going into western taxonomic novelties. More than half of the botanists had not described a single regional plant, and less than a quarter had described more than one plant. As one respondent explained, "[T]he value of new species' descriptions in terms of professional prestige and satisfaction of university adminis-

trators (who control raises and promotions) seems low"

North American botany "doesn't get the attention it deserves, and it hasn't for a long time," remarks Reveal, now at the University of Maryland in College Park. He ranks third among recent describers of North American plants, with 45 plants to his credit.

Taxonomists are now swarming to parts of the world that have barely begun to be described scientifically, especially the great taxonomic candy stores of the tropics, he says. In those places, a researcher has a far better chance of finding something that opens up promising



Morefield's leather flower was first identified in 1982, after it was collected in a vacant lot on the edges of Huntsville, Ala.

avenues for research.

Hartman, too, sees the field of U.S.-Canadian taxonomy shrinking. He points out that one of the continent's premier herbaria, at the Missouri Botanical Garden, has more than 50 Ph.D. taxonomists, barely five of whom work north of Mexico. "It's lonely out there," he adds, only partly as a joke.

As the academic effort dwindles for North American botany, Ertter says, "somehow, we're expecting it to get done as an avocation." That's only partly a joke. Ask Arnold Tiehm. Botany is what he does on his days off.

Tiehm works at the 1,000-room Peppermill Hotel Casino in Reno, Nev., lugging baggage and driving a limo to have a stable income. He's the only bellhop in Reno, and probably in the entire world, with a master's degree in botany and credit for finding the first specimens of 19 species—so far.

His secret? "I don't really look for plants; I look for habitat." For example, he remembers collecting plants from a set of geologically distinctive Nevada hills and turning over an unusual *Astragalus* to the expert at the New York Botanical Garden.

"Guess what I've got," the expert told Tiehm the next day. "*Astragalus tiehmii*."

That's only one of the six species named after him.

It's not clear whether Tiehm is the last of the old breed of North American plant

hunters or the first of a new one.

Despite Tiehm's success finding plants, he considers Ertter's estimate of 1,800 U.S. and Canadian plants remaining to be discovered "too staggering for me."

Reveal also rates Ertter's estimate as "probably high." He sees North American taxonomy as having reached a predictable stage of low interest. "Several years ago, I stated in print that the botanical frontier in North America north of Mexico ended in 1989. My view has not changed."

Historians of political and social history pronounce a frontier closed, Reveal says, when the population gets dense and institutions mature. American botany has passed the same landmarks. "There are systematic botanists all over the country," though few focus on local species, he says. Moreover, North American botanists no longer have to defer to experts in Europe or even on the East Coast. Instead, scholarly institutions have matured across the continent.

Perhaps most important in defining the end of the frontier, "you can't plan to go find something," Reveal says. When he started collecting, you could. He could be relatively sure of discovering something by visiting geological flukes or familiar sites at unfamiliar seasons.

"We had a ball," he says. "In September 1963, I found two dozen species in close to 10 days."

So many people have since collected specimens that predictable finds are no longer possible, he observes. "You now have to be lucky. When the frontier closes, the really good taxonomists leave, and they find the next frontier," he says.

That's the tropics. Bruce Stein, senior scientist at the Nature Conservancy in Arlington, Va., acknowledges the opportunities. "The tropical regions are really where the mother lode lies," he says. The United States has about the same number of known plant species as Ecuador, a nation less than one-thirtieth its size.

Stein has worked in the Andes and left his own name on new species, so he understands the tropics' botanical allure. Yet he agrees with Ertter about the problem of overlooking local flora. "People are so focused on the tropics that what we're seeing is really a lack of attention to the botany of our backyard," he says.

He also shares Ertter's concern that the last bits of flora, the ones we're missing, could be the most precious: plants adapted only to small, strange spots, representing a disproportionate share of the continent's biological diversity. Ertter predicts that this 5 percent, when they are found, will need protection and be well worth protecting. □