



Lingua Botanica

A Journal for FS Botanists & Plant Ecologists



So there we stood, in a dirty downtown Salt Lake City parking garage, looking at my '63 Dodge Dart. It was the early 1970s and up until that time I had spent most of my life in a rural southern Idaho potato town. In the Glens Ferry of 1970 you didn't need to lock your house and you left the keys in the car so you wouldn't lose them through the hole in your pocket. But that Glens Ferry was small, and I was restless. Craving adventure, I left home at seventeen to join the Air Force. Unlike my brothers, I was anxious to see the world. Unfortunately, this part of the world had broken a window out of my car and stolen my 8-track tape player. I couldn't believe it. To make matters worse, the cops shrugged and told me there was no chance of my seeing the tape player (or my T-Rex tapes!) ever again. Violated. Violated and deprived. Welcome to the big city, spud-boy. It seems kind of trivial now, but I was really pissed when it happened, when it happened to me. I know now that on any given day thousands of people, even nice people, are unwillingly separated from their things. But, things can be replaced, possessions are transient, objects are not the ideas they symbolize, and karma will eventually be served. The crime of theft is more troubling however, when the things being taken have value beyond an *appraised* worth. Ginseng roots bring more than \$350 a dry pound, a powerful incentive for unscrupulous diggers pillage any population they find. Sustainability be damned. Endangered pitcher plants and cacti sell for as little as \$5 each so poachers have to steal on a wholesale scale to make their margin. Wild-grown *Cypripediums* die a slow death once dug from the woods so lady-slipper rustlers maintain a recurring demand for their "product." The same desires that drive the prices for Van Gogh paintings drives the price of endangered epiphytic orchids. The difference between the too common theft of possessions and the equally too common theft of our shared natural heritage is obvious. Don't get me wrong. I believe most people are honest, and that most people have an understanding of principle and morality. Just not enough people.

the editor.

In this Issue

Vol. 2, Issue 2 2001

The Celebrating Wildflowers Hotline Number is 1.800.354.4595.

Useful URLs	2
Region 3 gets a Regional Botanist: Charlie McDonald	2
The Celebrating Wildflowers Hotline!!!	3
Plant Diversity is a Good Thing.....	4
R3 Forests Campaign Against Invasive Plants	6
Biological Controls out of Control	7
Wild Mountain Greens.....	8
Herbal Warning.....	10
Gifford Pinchot Botanical Field Studies	11
The First National Forests.....	13
Dogwood Blight.....	14
Sagebrush: The Other Cash Crop	15
Selections from the Plant Anatomy Dictionary of Last Resort.....	17
German Biodiversity Report.....	17
Resolution of Respect for Jack Major (1917-2001).....	20
Banner Plant: <i>Pediocactus knowltonii</i>	22
Afterword: Hyakutake with <i>Carnegia gigantea</i>	23

Useful URLs

The Core Historical Literature of Agriculture: "History celebrates the battlefields whereon we meet our death, but scorns to speak of the plowed fields whereby we thrive. It knows the names of the king's bastards but cannot tell us the origin of wheat. This is the way of human folly." -- Jean-Henri Fabre. This amazing site has real, complete, books available online for your reading pleasure.

<http://chla.library.cornell.edu/>

Introduction to Microbiotic Crusts: An online version of the 1997 NRCS primer cryptobiotic crusts. 16 pages of guilty pleasure from Roxanna Johnston and all your crypto-heros (Jayne, Roger, Julie, Kimble, et al)

<ftp://ftp.ftw.nrcs.usda.gov/pub/glti/MicrobCr.pdf>

Voyages of Discovery: If you're in Washington, DC before the 22nd of July, don't miss this special exhibit at the Natural History Museum, on loan from the British Natural History Museum. Otherwise, check out this link. Its 18th century botany at its best!

<http://www.mnh.si.edu/exhibits/voyages/voyages.htm>

Hit the British Museum's *Voyages* page for a more comprehensive look at the exhibit

<http://www.nhm.ac.uk/museum/tempexhib/voyages/index.html>

Centres of Plant Diversity, The Americas: This collection of pages shows areas of high plant diversity throughout the Americas. A nice resource, although the maps for Central and South America are much better than those for North America.

<http://www.nmnh.si.edu/botany/projects/cpd/>

Iowa Farmers Today's Corn Cam: Be honest, what could possibly be more fun on a hot summer day, a cold one in hand, than watching corn grow!?

<http://www.iowafarmer.com/corncam/corn.html>

New Regional Botanist for the Southwest!!!

Dr. Charles McDonald leaves USFWS to be R3 RO-Bot!

I am a native of Oklahoma where I grew up and earned a B.S. degree at Oklahoma State University. After 2 years of military service in the Army, I returned to Oklahoma State University for my M.S. degree (A Floristic Study of Washington County, Oklahoma) and then went on to North Carolina State University to earn my Ph.D. degree in botany (A Biosystematic Study of the *Polygonum hydropiperoides* Complex). After graduation, I worked as a Lecturer of Biology at East Carolina University teaching courses in general biology, field botany, plant taxonomy, and biogeography. My research interests focused on community ecology of coastal wetland plant communities.

In 1984, I joined the endangered species program at the U.S. Fish and Wildlife Service's Southwestern Region in Albuquerque, New Mexico. Since then, I have continued to work as an endangered species botanist in both the Southwestern Regional Office and the New Mexico Ecological Services Field Office doing Endangered Species

Act work to include plant listings, recovery plan development, candidate conservation, coordination with State conservation programs, and section 7 consultations with Federal agencies.

My hobbies are golfing, hiking, and backpacking. I have recently become involved in a long-term project to help design and construction about 50 miles of the Continental Divide Trail where it passes through Bureau of Land Management public lands northwest of Albuquerque.

Charlie McDonald

The Celebrating Wildflowers Hotline!!!

Kimberly Anderson, National NatureWatch Coordinator

The Celebrating Wildflower Hotline is up and going!! The hotline is sponsored by the Forest Service, and Ken Torkelson of the US Fish and Wildlife Service is our recording host. Ken would love to receive your (brief) flower bloom reports by Monday of each week (see my example below for how simple it can be). You can reach Ken by

FAX: 701-250-4412

Phone: 701-250-4418 or

EMAIL: Kenneth.Torkelson@fws.gov

Wildflower bloom reports are short, easy, and provide a service to people around the country who are avid wildflower photographers and viewers!!! All Ken needs is:

What is blooming

Where is it blooming

Directions on how to get there, since people are out there looking for wildflowers to see and photograph

Who to contact for more information (name, phone, or email)

****Extra Special** - any note of extra info that would be useful

An example: For the weekend of May 5th-6th we had the greatest opportunity to photograph beautiful blankets of flowering trillium under hardwood forests, along Highway 42 and 57 in Door County, which is the thumb extending eastward from Green Bay, Wisconsin. The Peninsula State Park, where we camped near the town of Fish Creek, had blooming forget-me-nots, trillium, and common bellwort (which is very short blooming) along their wonderful hiking paths. You can contact Kimberly Anderson, 414-297-3257, at the Regional Office of the US Forest Service or Peninsula State Park, 920-868-3258 for more information.

Remember, every contact we botanists make with the public is a Celebrating Wildflowers moment. It's a year-long program and one of our best ways to gain public support for strong botany programs on our National Forests.

Study of Plants Makes a Case for Biodiversity

By William Souder, The Washington Post, 16 April 2001

CEDAR CREEK, Minnesota -- Ecologists have voiced concern in recent years about the disappearance of plants and animals around the globe. But controversy has raged over whether Earth's diversity of species is fundamental to the stable functioning of the planet's ecosystems.

Now, a study has produced strong evidence that biodiversity does increase the health and productivity of an ecosystem. And, in a sneak peek at what the world could be like in 2050, researchers have demonstrated that preserving more species could provide a greater natural cushion against environmental insults.

A team led by Peter B. Reich of the University of Minnesota focused on a previously unexplored relationship between species diversity and steep increases in nitrogen and carbon dioxide. Both are rising largely as a result of fossil fuel consumption and chemical use by farmers. Since the industrial revolution, carbon dioxide in the atmosphere has doubled and continues to increase about 5 percent annually. Nitrogen, which naturally cycles between the atmosphere and the living tissues in plants and animals, has also doubled.

In a field experiment outwardly resembling a kind of high-tech Stonehenge, Reich grew 16 native grasses and herbaceous plants in various combinations inside six large circular plots at the Cedar Creek Natural History Area, a 5,000-acre oak savanna near Minneapolis. The plots are ringed with white plastic "vent tubes" rising vertically on the perimeters. The tubes add carbon dioxide to the air within the circles and are regulated by a computer that adjusts for wind and other variables. Nitrogen fertilizer is also applied to the soil to help achieve a composite approximation of the enriched environment the researchers believe plants will grow in 50 years from now.

As expected, all of the groups grew better with increased nitrogen and carbon dioxide, both of which are essential to plant life. But the groupings that included all 16 species were significantly more productive than any combination of fewer species. More important, the most diverse plantings outpaced the most productive single species when they were grown alone -- an outcome called "overyielding" that plant ecologists have long considered the elusive Holy Grail in such biodiversity experiments.

"The interpretation of similar data by critics of previous experiments has been that a single, super species inevitably gets included in the most diverse plots and then dominates," Reich said. "We've shown that no individual species dominates any of our plots and that different species combine to increase overall productivity."

Reich likened the diversity effect to the difference between a standard basketball team and a squad made up only of lumbering centers. "The team with an assortment of player sizes and skills will be the better one," he said.

Plants in the most diverse groupings complement one another by using resources in different ways and at different times, and there are also "positive species interactions" among different plants, Reich said. These could range from complex nutrient exchanges that are not yet well understood to something as simple as taller plants providing needed shade for shorter ones.

Andy Dobson, an ecologist at Princeton University, called the study "a beautiful demonstration of the importance of biodiversity."

"This is big science," Dobson said. "We've learned more from Cedar Creek about how our planet works that is pertinent to us than we've learned from all the space shuttle flights put together."

Reich's work is a continuation of studies at Cedar Creek by David Tilman, also of the University of Minnesota and a co-author of a report on the findings in the April 12 issue of the journal *Nature*. Tilman's experiments showing that diverse plant communities are more resistant to environmental stresses such as drought have been at the center of a long-running feud among ecologists.

Michael Huston of the Oak Ridge National Laboratory, who has been the chief critic of the Cedar Creek work, said Reich's experiment is a big improvement over the earlier ones. But the results really show only that a few dominant species, primarily weeds, account for most of the productivity gains, Huston said.

"There's clearly a diversity effect here," Huston said. "But it does not show that you need a lot of diversity, just a few really highly productive species."

Huston insisted that the emphasis on productivity, which is simply a measure of the total plant mass in each grouping, is misplaced. In nature, he said, diversity does not equal productivity.

"I'm solidly in favor of preserving biodiversity," Huston said. "I'm just not convinced this experiment makes a strong case for it. What this says is that if our sole aim is productivity, we should plant just a few weeds and fertilize them."

But Reich's findings confirm what most ecologists already believe, said Joy Zedler of the University of Wisconsin. "It's hard to think that the results could have been any different," she said. "Diversity has to be important, and it's manifest in this experiment."

Zedler shares the concern that several of the plants that did well in the experiment were in fact "aggressive weeds."

"That's not surprising either," Zedler said. "It's a little scary, though." Many ecologists see a future Earth dominated by opportunistic "weedy species" of plants and animals that can rapidly adapt to changing environmental conditions.

The findings also point to an intertwining of cause and effect, especially with respect to carbon dioxide. Recent satellite data have confirmed the role carbon dioxide plays in global warming, and other evidence links global warming to declining biodiversity. Thus plants, which absorb nearly one-third of all carbon dioxide emissions, are at the same time at risk from carbon dioxide emissions.

"Nature is in effect 'scrubbing' carbon dioxide from the atmosphere for us," Reich said. "But we don't know if there's a saturation point, when suddenly all of the carbon dioxide we produce will stay in the air. And now we have learned that a less diverse biosphere will be less efficient at carbon dioxide absorption."

Reich said that the study proves an important principle but that further work is needed to show how it applies in natural systems. "We've tested a basic theoretical question," he said. "The magnitude of the effect may not be the same in nature, but I think we're likely to see a similar relationship. And that should be a concern."

"We've gotten away with putting short-term economic considerations ahead of future environmental well-being for a long time. And that's going to be costly to us in the end."

National forests planning campaign against invasive plants

By Eduardo Montes, Associated Press

PHOENIX, New Mexico - National forests in northern Arizona are gearing up for a coordinated campaign to get rid of invasive plants that are pushing out native species and threatening the delicate balance of some ecosystems.

Invasive plants, basically nonnative weeds, trees, grasses and shrubs, have been thriving in the forests for years, and in some cases decades. But officials in the Prescott, Kaibab and Coconino national forests are making efforts to contain or eradicate them before they truly get out of hand.

"The threat is real and the threat is now," said Gene Onken, invasive species coordinator for the U.S. Forest Service's Southwestern Region, which includes Arizona's national forests.

A team made up of staff from the three forests has already put together a plan for dealing with a variety of nonnative plants. They have devised several approaches, including the use of herbicides, mowing and pulling weeds by hand and even bringing in sheep and other animals to eat them.

The plan will be released within the next month for public review and comment, which could result in some changes. Officials are hoping to get it approved by early 2002. Even then, the plan can still be appealed by anyone who disagrees with it.

The invaders, which never belonged in the U.S. forests they now occupy, arrived in Arizona through different means. Some were brought in to pretty up the landscape and then grew out of control. Others were planted as feed for livestock. Some came in the form of seeds tucked away in packing materials.

The plants have largely been successful because they have no natural enemies. They haven't been good neighbors. Many are ruining the aesthetics of the scenic areas where they've taken root, said Onken, who is based in Albuquerque, N.M.

"That's certainly a significant factor when you consider tourism is one of the major industries in the Southwest," he said.

At their worst, the invaders are threatening to choke out all the native plants in their areas, which often means some wildlife and livestock are losing a food source. Some of the plants can also increase salt levels in the water and soil or force out grasses that hold the soil in place, meaning increased erosion into water sources.

"They're changing the ecosystem," said Clare Hydock, a rangeland management specialist for the Prescott National Forest. "Many of our wildlife species won't eat these things. Livestock won't eat them. Many of them are toxic to livestock."

Some ranchlands in Montana, Idaho and Wyoming have been devastated by invasive plants, said Dave Brewer, who is coordinating the three forests' planning efforts.

"Literally, some of these ranches in the north have been taken over by the nap weed and other stuff that have taken a productive ranch and turned it into a weed patch," Brewer said.

Among the most damaging plants found in Arizona are the leafy spurge, star thistle and nap weed.

"Those are the ones that take everything," he said.

"We're starting to see plants come in and expand to where if we don't take control within the next five to 10 years we might face the same problems as other states."

The three forests involved in the joint plan aren't the only ones grappling with invasive plants. Officials at Arizona's Tonto National Forest, for example, are developing their own plan.

Brewer said officials at the Prescott, Kaibab and Coconino forests found working together made the planning easier, more efficient and allowed them to keep costs down.

"We generally have the same issues," he said. "It seemed logical to do it that way."

When Biological Control Gets Out of Control

By Carol Kaesuk Yoon

D.L. Wagner/University of Connecticut: The population of the *Hyalophora cecropia*, a moth that can grow to half a foot across, has been in decline.

Around 1869, an amateur scientist named Étienne Léopold Trouvelot staked his claim to entomological infamy when he inadvertently released imported gypsy moths from his Massachusetts home.

The price paid for this little mistake by Trouvelot (who later abandoned both the study of insects and what became his moth-infested neighborhood) has been more than a century of outbreaks of this forest-ravaging pest.

Now a team of researchers says the gypsy moth may be responsible for yet more and unsuspected harms: the decline, and in some areas the disappearance, of species of giant silk moths, a spectacular group of native insects that includes the largest and some of the most elegant moths in the country.

The problem, according to a new study published in *Conservation Biology*, is not the gypsy moth itself, but a parasitic fly brought from Europe and released into the wild to get rid of it. Catholic in its tastes, the fly, it turns out, is not only killing gypsy moths but huge numbers of wild giant silk moths.

"We're seeing massive mortality," said George H. Boettner, an entomologist at the University of Massachusetts and the lead author of the new paper. It remains unclear, he said, whether the fly is harming any of the 200 or so other species of insects, including swallowtail and tortoiseshell butterflies that it is known to attack. "People just haven't looked," he said.

Researchers praised the findings as the best explanation yet for declines in wild silk moths in the Northeast. But even more important, scientists say the study provides some of the first compelling evidence of the damage that can be done when foreign species are released into the wild to get rid of pests. This powerful and popular strategy known as biological control has long been touted as the green alternative to chemical pesticides.

"Every indication would suggest that there are a lot more stories like this out there," said Dr. Donald Strong, an ecologist at the University of California at Davis.

Scientists say the finding is sure to add to the controversy over the practice, which has involved the release of hundreds of foreign species throughout the country.

On one side, scientists say that potentially harmful foreign species continue to be released and that current regulation is inadequate to ensure that such organisms are kept out of the country.

On the other side, researchers argue that specialists have learned to avoid harmful species and that overly cautious regulation is now limiting the potential of this powerful technique. But still, nearly all the scientists agree that biological control itself should not be abandoned.

In the midst of this debate, the Agriculture Department, which has taken the lead on such regulations, has been seeking to reformulate its policy for several years. Hallie Pickhardt, a spokeswoman, declined to comment on changes being considered. The department, she said, wants to give the new administration time to assess the situation.

For years, scientists have struggled to explain the declines in wild silk moths in the Northeast, a situation that was first noticed in the 1950's. While none of the species have become extinct, many of these beauties have become increasingly rare or disappeared in regions where they were once abundant from Massachusetts through New Jersey and Pennsylvania.

"All of them declined," said Dr. Dale F. Schweitzer, a research zoologist for the Association for Biodiversity Information, a nonprofit research organization. "The crashes were obvious." The disappearances were noted by biologists as well as networks of amateur moth collectors, as these insects — like *Hyalophora cecropia*, a Godzilla among moths at half a foot across — are some of the grandest to be netted. Today several of the moths are on state endangered species lists, and the imperial and regal moths have either entirely or nearly disappeared from the Northeast.

Wild mountain greens are still plentiful

By George Ellison, Mountain Voices, 28 March 2001

There was a time not so very long ago when just about everyone made it through the winter on cured meats, stored roots, and canned or dried vegetables. The first wild greens that appeared each spring were avidly sought after and prepared using time-honored procedures. Even in this age of supermarkets and year-round produce, many of us still look forward to locating, harvesting, preparing and chowing down on the real thing.

"A timely mess of wild greens will cure most of what ails you," one of my great-aunts - a countrywoman who lived into her 90s - used to say.

The gathering of wild greens here in the Blue Ridge began, of course, with the earliest Paleo-Indians who penetrated the region 15,000 or so years ago. They brought with them an extensive knowledge of plants used in other areas and developed a keen eye for the new ones that grew here. Can you imagine, after a long hard winter in a rock-shelter, how they must have anticipated the first tangy spring greens?

Bruce Smith, an archaeologist at the Smithsonian's National Museum of Natural History, has established that the farming economy of the early North American Indians wasn't based on maize but on selected wild plants that were maintained in areas adjacent to villages. There was a systematic use of wild greens, gourds, sunflowers, and smartweeds thousands of years before maize was introduced to this continent around 200

A.D. Older members of the Eastern Band of Cherokees still know and use the potherbs their ancestors located here in the Blue Ridge.

“Before there were many cars the old folks used to walk all over the mountains gathering greens,” Cherokee Lucinda Reed told me before her death several years ago. “You can eat off the land all year round if you want to.”

Four of the Cherokee’s favorite wild spring greens (sochan, poke, ramps, and branch lettuce) are discussed in some detail below. But if you attend a community club potluck in the spring on reservation lands, there’s every chance you’ll also have an opportunity to try other potherbs as well. Bean salad (rosy twisted stalk, *Streptopus roseus*), Stacey salad (small-flowered phacelia, *Phacelia dubia*), sweet salad (Solomon’s-seal, *Polygonatum biflorum*), and bear grass spiderwort (*Tradescantia virginiana*) are collected as young plants, cleaned, and then parboiled or fried or both. The early European settlers brought with them - often unknowingly - additional plants like watercress (*Nasturtium officinale*), dock (*Rumex* ssp.), dandelion (*Taraxacum* ssp.), and creasy sallet (*Barbarea verna*) have become spring staples.

By my reckoning, raw or cooked wild greens are to be eaten with vinegar or lemon juice and a helping of buttered cornbread. If you so desire, by all means dish out the steaming greens right on top of the corn bread, butter and pepper liberally, and go to eating.

Branch lettuce (*Saxifraga micranthidifolia*) - sometimes called wild lettuce, bear lettuce, or lettuce saxifrage - grows on wet banks and in seepage areas and streams. Each basal rosette contains several toothed leaves from 4 to 12 inches long. Eat raw with a salad dressing. It’s also good with a little vinegar and chopped onions. To make it really good, drizzle on some hot bacon grease to wilt the greens. The Cherokees often boil and then fry their branch lettuce with ramps.

Poke sallet (*Phytolacca americana*) is also called poke, pokeweed, poke greens, pocan, pigeonberry, and inkberry. It can be found in abundance in open fields and along roadsides. (WARNING: Poke contains several toxic compounds. Never eat poke sallet without first parboiling it at least three times in separate changes of water. Do not include part of the root when collecting. Discard any shoots tinged with red.) Young shoots no more than eight inches long can be prepared in a number of ways: like asparagus; cut and fried golden brown in a cornmeal batter like okra; and fried whole or cut up with scrambled eggs. Young leaves are prepared as a potherb green.

Ramps (*Allium tricoccum*), also called wild leeks, are found growing on rich, wooded slopes in the heart of the Blue Ridge mountains but not in adjacent piedmont areas. It’s sometimes available at roadside stands. Ramps, which belong to the same genus as the domesticated onion, have gained a wide reputation for having a powerful taste and a lingering odor that has discouraged the fainthearted from enjoying this succulent treat. What’s all the fuss about? I find them to be delectable, and anyone who has eaten them recently will likely find them to be pleasingly aromatic. Eat the bulbs raw and see what I mean. Or, cook and mix with other greens or scrambled eggs.

Ruby Alley Bumgarner, a native of Jackson County, offers the following recipe for cheese-scalloped ramps in her “Sunset Farms Cookbook” (revised edition, 1991) for one and one-half quarts of ramps, peeled and cleaned: “Cook ramps in boiling water until tender, about 10 minutes. Drain well and place half the ramps in 2 quart casserole. Add one-half cup of processed cheese and 4 slices of buttered toast. Repeat layers of ramps

and cheese. Melt one-half cup margarine, blend in one-half cup enriched flour, stir in 2 cups of milk gradually, cook (stirring constantly) until thick, and salt and pepper. Add this hot mixture to 8 beaten eggs and gradually stir-pour sauce over layers. Top with 4 slices of buttered toast. Bake in 350-degree oven for 30 minutes.”

Sochan (*Rudbeckia laciniatum*), called green-headed coneflower by non-Indians, is one of the most prized spring greens the Cherokees gather. They sometimes call it “sochani.” Many of their gardens have semi-cultivated patches of the plant in protected areas. Closely related to black-eyed Susan (*Rudbeckia hirta*), it grows to 10 feet tall in wet areas and along damp woodland borders. The flower heads that appear in mid-summer are about three inches wide with drooping yellow rays and a center disk (unlike the purple disk of black-eyed Susan) that’s greenish-yellow. The Cherokees recognize sochan as soon as it comes out of the ground in mid-spring by its distinctive irregularly divided leaves and smell. Consult your wildflower field guides for flower and leaf-shape diagrams of green-headed coneflower. Then you will be able to locate the plant this summer along backcountry roadways when it’s in full bloom. Mark the spot and return next spring for greens. Prepare the young shoots and leaves (boiled with several changes of water) have a rich texture and zesty flavor. It’s even good cold as a snack with a little vinegar added. In the opinion of many - this writer included - sochan is the very finest of the traditional potherbs gathered in the Blue Ridge region.

“Before there were many cars the old folks used to walk all over the mountains gathering greens,” Mrs. Reed remembered. “You can eat off the land all year round if you want to. I find sochan mainly along streams. I parboil it and rinse it twice. Then I cook it with fat and eat it just like it is. My husband loves it, but I don’t cook it so much anymore because it sometimes gives me heartburn. If I cooked sochan for him, I’d just have to eat it myself.

“Poke sallet is good, too,” she added. “After you parboil and rinse it, you cook it just like sochan. I always scramble eggs with my poke. You can also quarter the stalk and cook it like fish.

“I prepare ramps pretty much the same way by chopping and adding eggs,” she continued. “A friend of mine ‘wilts’ hers by dropping the entire cleaned plant - bulb, stalk, and leaves - into hot grease so that, when ready, it’s crunchy.” Mrs. Reed refused to pick a favorite traditional spring potherb. “If I had my choice of all of them, I’d just have to take a dab of each,” she remarked. “They’re all good.”

Herbal Warning

Christine Gorman, Time Magazine, 12 June 2001

You don't have to look far to find folks who are freaked out by genetically modified foods, who won't drink cow's milk laced with growth hormones or touch diet colas sweetened with aspartame. Since we have so many hang-ups about the purity of what we eat and drink, you'd think that any company foolish enough to add substances whose quantity and quality are notoriously difficult to control to their snacks or beverages would quickly founder. Instead the exact opposite is true. In the U.S. last year, according to the market-research firm Frost and Sullivan, consumers bought \$700 million

of drinks spiked with echinacea, ginseng and other herbs. That's up from \$20 million just four years ago.

This is crazy. Most of these so-called natural foods aren't found anywhere in nature. Food manufacturers are just trying to piggyback on the earlier successes of the dietary-supplements industry. After all, that was the industry that convinced us--with a little help from the U.S. Congress--that purple coneflowers might ward off colds and that roots from an Asian shrub could boost energy levels.

There is a world of difference, however, between an herbal supplement that you might take for a few weeks at a stretch and something you could easily eat or drink every day for the rest of your life. *Ginkgo biloba*, for example, has been linked to bleeding problems. It would be a whole lot easier for you to ingest too much of it accidentally if it is found in your iced tea, your corn chips and your soup than if you take it only sporadically as a supplement.

After spending almost a year reviewing the issues, the U.S. Food and Drug Administration last week put three different manufacturers on notice that their products--which include Hansen's Healthy Start Immune Juice and Fresh Samantha's Super Juice with Echinacea--violate federal regulations governing what can and cannot be added to food. As far as the FDA is concerned, it doesn't matter that the same herbs may be legally purchased in drugstores across the country. "The standards for food are different from those for supplements," says spokeswoman Christine Lewis. The food manufacturers insist their products are safe. The FDA says companies must prove that scientifically before placing those products on the shelves.

The FDA is not alone in sounding the alarm. Like many other physicians, Dr. Robert Russell of the schools of medicine and nutrition at Tufts University in Boston advises patients who want to try botanical medicines to stick with the pill forms. "I think some of these herbals are effective," he says. "But I don't think we know enough about their long-term safety to put them in the food supply."

It's ironic that many herbally enhanced foods contain such small amounts of their active ingredients that they probably don't have any biological effect at all. What they do have plenty of, however, is excess calories, which hardly seems healthy or worth the added cost. So while the FDA and the food manufacturers duke it out over herbal additives, do yourself a favor and stock up on the true, original health foods: tomatoes, broccoli, asparagus, apples, pears and other fruits and vegetables.

Gifford Pinchot Botanical Field Studies

Sally Claggett, Gifford Pinchot National Forest

Monitoring can be tedious and expensive. Not so, on the Gifford Pinchot National Forest. Here, the Botany Program has an annual monitoring program that is exciting, rewarding, scientifically defensible, and inexpensive. Moreover, it can be replicated on a National Forest near you!

For one week, volunteers with *Botanical Field Studies* collect data in an "outdoor classroom" learning environment. The volunteers are selected through the outreach of our Partners: the Berry Botanic Garden, Portland, OR, and Portland State University. The monitoring projects themselves are selected by Forest Service

botanists and conducted jointly with the Berry Garden, who received the USFS National Rare Species Partnership Award in March 2000, in part for this work. The Botanical Field Studies Program is funded through a combination of sources. Challenge cost-shares have helped pay for the participation of outside professionals working on the project. Volunteers provide a small fee (e.g., \$35) to help cover food. For students enrolling through PSU, \$100-\$150 for each student helps defray the costs of food and instruction. The Forest Service provides accommodations (usually in available bunk houses), vans for the fieldwork, and evening speakers so that participants learn about National Forest programs other than botany.

Between 1991 and 1999, more than 250 students and volunteers have participated in the program. During that nine-year period, the Gifford Pinchot National Forest provided cost-share contractual funds of approximately \$30,000 for some of these studies. Although only 30 volunteers are reached each year, the cumulative effect and the ripple effect on attitudes about rare plants and U.S. Forest Service Programs, has been substantial.

Here is a brief description of some of our accomplishments:

- Surveyed marked plots of *Pleuricospora fimbriolata* (fringed pinesap)
- Assisted in gathering habitat data and distribution information for *Utricularia intermedia* (intermediate bladderwort), *Chrysolepis chrysophylla* (golden chinquapin), and *Orobanche pinorum* (pine broomrape)
- Relocated and monitored existing plots of *Sisyrinchium sarmentosum* (pale blue-eyed grass) at South Prairie and began survey of all known populations on federal land
- Surveyed old growth forest near Goat Marsh RNA for additional specimens of the fuzzy sandozi fungus (*Bridgeoporus nobillissimus*), a globally-imperiled species of fungus
- Began pilot studies of *Sisyrinchium sarmentosum* at Cave Creek site to determine effects of cattle grazing on population health of the species (results indicate severe restriction of sexual reproductive capacity in grazed sites)
- Relocated two historic locations of *Penstemon barrettiae*, Barrett's penstemon
- Conducted pre- and post-treatment vegetation study to evaluate success of controlled burn in the fall of 1998 to maintain a meadow near Cakney Butte for winter browsing by ungulates
- Prepared baseline ecological data at the Sawtooth berry fields prior to treatments to restore huckleberry production
- Participated in the T.T. Munger RNA Ecological Status Monitoring
- Helped in vegetation survey of Gotchen Aspen Meadow
- Surveyed noxious weeds, inside and outside of areas grazed by cattle. Helping with the survey was an urban youth group (pictured) who performed the study over a two-day period as a means of experiencing the forest ecosystem and learning about scientific objectives.
- Surveyed of South Prairie Bog to determine the general ecological health of the site

- Aided in stand reconstruction survey in nesting and roosting sites for the spotted owl

Many of the plants mentioned above are, or were rare, and now have improved management strategies thanks to the Botanical Field Studies Program.

With proper supervision, volunteers have shown to be reliable researchers for various kinds of field studies. For surveys, volunteers have quickly learned appropriate search images. Detailed monitoring can be undertaken when several volunteers work in teams, double-checking each other's work. Working with volunteers substantially increases the amount of work that can be supported on a limited budget, and is worth considerable effort to foster and continue in the future as funds will continue to be limited.

For more information on the Botanical Field Studies Program call Nancy Fredricks, 360-891-5111, or Sally Claggett, 509-395-3374.

First National Forests

Which National Forests came first? Here's a list of the first National Forests in each Region.

Region 1 – Northern Region

Bitterroot National Forest, Hamilton, MT. 22 February 1897

Flathead National Forest, Kalispel, MT. 22 February 1897

Lewis and Clark National Forest, Great Falls, MT. 22 February 1897

Region 2 – Rocky Mountain Region

White River National Forest (includes former Holy Cross National Forest), Glenwood Springs, CO. 16 October 1891

Parts of the Shoshone National Forest were the former Yellowstone Timberland Reserve, established 30 March 1891

Region 3 – Southwestern Region

Prescott National Forest, Prescott, AZ. 10 May 1898

Region 4 – Intermountain Region

Targhee National Forest, Jackson WY. 22 February 1897

Uinta National Forest, Prov, UT. 22 February 1897

Region 5 – Pacific Southwest Region

Sierra National Forest, Fresno, CA. 14 February 1893

Region 6 – Pacific Northwest Region

Mount Baker National Forest (formerly Washington National Forest), Bellingham, WA. 22 February 1897

Region 8 – Southern Region

Ouachita National Forest (formerly Arkansas National Forest), Hot Springs, AR. 18 December 1907.

Region 9 – Eastern Region

Chippewa National Forest (formerly Minnesota National Forest), Cass Lake, MN. 23 May 1908

Region 10 – Alaska Region

Chugach National Forest, Anchorage, AK. 23 July 1903

Swaths of Flowering Dogwood Fall Prey to Fungus Blight

By Les Line, Associated Press, 8 May 2001

The loss of the dogwood is more than aesthetic. Its berries are a vital bird food, and its leaves enrich forest soil.

Signs of spring's northward advance abound in the deciduous woodlands of eastern North America: trilliums nodding in a warm breeze; morel mushrooms popping up through brittle leaf litter; the sweet flute song of wood thrushes returning from tropical wintering places; and of course the big white or occasionally pink blossoms of flowering dogwood.

But eye-catching dogwood displays along sunny roadsides are deceiving. A common small tree in Appalachian forests from southern New England to Georgia, flowering dogwood (*Cornus florida*) has been devastated in many areas by a fungus blight similar to the disease that obliterated the American chestnut, a dominant tree in these same forests, early in the last century.

In Great Smoky Mountains National Park on the North Carolina-Tennessee border, more than 90 percent of the dogwoods have died in heavily shaded cove and alluvial forests since the disease, called dogwood anthracnose, was first noticed there in the late 1980's. While the mortality rate has been as low as 57 percent in drier and more open forest types like oak-hickory stands, a report issued last month by Dr. Michael Jenkins, the park's ecologist, predicts that flowering dogwood will largely disappear from the Smokies as larger trees die and are not replaced by new cohorts or regeneration.

The loss of dogwoods is more than an aesthetic blow. The tree's bright-red berries, rich in fat and protein, are a vital food source for thrushes and other forest birds fueling up for the fall migration. "The wood thrush has lost most of its habitat," said Dr. Kerry Rabenold, a professor of biology at Purdue, who has documented the dogwood's decline in Indiana forests. "This is the final insult."

Dogwood leaves also have a high calcium content and decompose rapidly, enriching the forest soil. The loss of dogwoods from lower elevation forests could have a damaging effect on soil acidification, nutrient availability and numerous ecological relationships, Dr. Jenkins wrote.

Dogwood anthracnose was first noticed in 1978 in southern New York and western Connecticut. Brown leaf splotches are an early symptom, but it is the larger cankers that develop on the main limbs and trunk what kill the tree, sometimes in just two years.

By 1987, the disease had spread as far south as Virginia and West Virginia. At Catoctin Mountain Park in Maryland, a fabled dogwood viewing spot, 89 percent of the trees were dead by 1988. "We still have dogwoods along the central road where they get a lot of sun," said Jim Voigt, the park's resource manager.

"But it's rare to find one in the forest."

Dr. Kerry Britton, a plant pathologist with the United States Forest Service in Athens, Ga., said the fungus, identified in 1991 as *Discula destructiva*, "likes cool, wet situations where it can produce spores all summer long."

The disease, Dr. Britton said, has now reached as far south as Atlanta and northwest Alabama, but some parts of the dogwood's range remain untouched, most

notably the coastal plain from Virginia to Florida. "It's too hot and too dry" for the fungus to thrive, she said, adding that "except for a little strip, it has not crossed the Mississippi River."

The origin of dogwood anthracnose, which also broke out in western flowering dogwood (*Cornus nuttallii*) in the Pacific Northwest in 1979, remains a mystery. The disease's sudden onset and rapid spread led many plant scientists to conclude that the fungus had arrived on nursery stock imported from Asia. But Dr. Britton said, "I've been to China three times and didn't find the fungus."

The disease is fairly new in the Midwest, Dr. Rabenold reported. Instead, scientists counting trees at Purdue's Ross Biological Reserve attribute a 43 percent decline in flowering dogwoods since 1981 to a drastic change in forest composition.

"Indiana, like much of the Midwest, was once dominated by oak-hickory forest," Dr. Rabenold said. "This type of forest relied on frequent small fires to clear out the understory and allow new trees to grow. A recent history of fire suppression, however, has allowed other trees to slowly take over."

The main culprit in the dogwood decline, he said, is the sugar maple, a fast-growing tree that produces a lot of shade. "Dogwoods don't do well in full sunlight," he said, "and they also don't do well under maples, which form a complete canopy, allowing little sunlight to penetrate."

But Dr. Rabenold dismissed the idea of managing forests by cutting down maples to encourage dogwood growth. "It's possible this decline is a natural phenomenon and we shouldn't interfere with it," he said.

And Margery Daughtrey, a dogwood expert at the Cornell Horticultural Research and Extension Center on Long Island, believes that *Cornus florida* can make come back in the woods of the Appalachians. "The disease went through like wildfire but you can still find healthy trees in the forest," she said. "However, it may take longer than our lifetimes."

Sagebrush: The Other Cash Crop, Planting for the Future

By Hanna Wolfson, Associated Pres, 12 June 2001

LEHI, Utah -- The bags piled high at Granite Seed Co.'s busy warehouse are labeled with names familiar on the Western range: sagebrush, winter fat, creosote bush, lupine.

But these days, the native seeds Granite sells are in high demand. With landscapers, rangeland restorers and government agencies hungry for native plants, species that have long been ignored or even considered pests are becoming a potential cash crop for Western farmers.

"Over the last decade there's been a real move toward native plant materials, just based on the fact that it makes a lot of sense to put native plant materials back out there," said Granite manager Bill Agnew. "When someone calls and wants needle-and-thread grass, it's really important that you be able to provide them with that type of species."

To do that, Granite buys seeds from collectors who harvest them in the wild or from farmers who grow natives as a crop. Most are sold to federal agencies for restoring lands damaged by wildfires, logging or grazing.

But with last year's record fire season and another bad summer expected, seed growers say they may not be able to keep up with the government's demand. In such years, the prices of native seeds can soar to hundreds of dollars a pound, up to 200 times what cultivated grasses cost, according to Neil West, a professor of rangeland ecology at Utah State University.

"I know of some ranchers that actually sold their cattle, seeing that the seed demand was coming, let their own grasses grow and then harvested them for seed and made more money than they could off selling cattle," West said. "I think these are new crops that the agricultural community should consider."

The demand for native seeds began in 1977 with the passage of a federal law requiring mining companies to replant their lands and use native materials to do it.

Since then, watering restrictions in many cities have attracted home-owners to xeriscaping, or the use of native, drought-tolerant plants in landscaping. Transportation departments also began to use more native wildflowers and grasses alongside highways. the agricultural community should consider."

But most of the native plant business comes from the U.S. Forest Service and the Bureau of Land Management, which are concerned about the fire danger posed by some invasive weeds.

The problem, growers say, is that these agencies do not spend the same from year to year -- their purchases depend on the fire season and federal appropriations -- creating a boom-and-bust cycle.

West said ranchers with extra land or farmers whose center-pivot sprinklers leave bare corners in their fields might make extra cash raising native plants. Most species are perennial and require little water or other help, he said.

That is what retired elementary school teacher Merrill Johnson and his son, Robert, counted on when they began growing native plants on the family's 2 acres in central Utah several years ago. Now they run a small nursery and mail-order business out of their Holden home as Great Basin Native Plants.

"We started off just by getting seeds off of trees around town and planting them and seeing what happened," Merrill Johnson said. "Then after a couple of years, we tried native seeds."

They sell most of their plants to the Red Butte Garden & Arboretum in Salt Lake City and to residential landscapers along the Wasatch Front, as well as a few golf courses. They hope to expand to government contracts, but they have found the native plant business is not as easy as they had hoped.

Some of the seeds are hard to collect, or, once collected, hard to separate from the chaff, Johnson said. Others are hard to grow or only produce viable seed every other year.

"The thing to keep in mind is that growing native grasses is not the same as growing cereal grains. It takes different management skills and different equipment," said Mark Musto of Landmark/Sun Mountain Seeds, a native seed company in Spokane, Wash. Weed control is especially important. A dry summer can be devastating, and prices fluctuate widely, he warned.

But Musto said many people will still be lured by the promise of a profitable harvest.

"The bottom line is the deal, and for growers of most of the commodity agriculture crops -- grains or legumes -- that market has really suffered the last few years," he said.

Selections from A Plant Anatomy Dictionary of Last Resort

Fred D. Slack, Ohio State University, from Plant Sciences Bulletin:37(4) 1991

Anomalous Secondary Growth: Razor stubble.

Casparian strip: What the friendly ghost does before taking a shower.

Phellogen: A "manly" drink, opposite of galogen.

Pistillate: The usual reason why people lose gun fights.

Phyllotaxis: What you're required to do every year by April 15th

Sapwood: A really stupid tree.

Biodiversity Report Submitted to German Government

German Advisory Council on Global Change, 13 September 2000

BERLIN-The "German Advisory Council on Global Change" (WBGU) is presenting its annual report today to the State Secretary Simone Probst (Federal Environment Ministry) and the State Secretary Wolf-Michael Catenhusen (Federal Ministry for Education and Research). In this report, „World in Transition: Conservation and Sustainable Use of the Biosphere“, the experts come to the conclusion that, in view of the dramatic loss of biological diversity, there is an urgent need for international action; otherwise the development chances of future generations are at risk. Irreplaceable ecological systems, such as the tropical rain forest or coral reefs, are endangered. Every day natural species are lost due to human intervention.

It is feared that this development will lead to serious damage to our environment. Through the loss of gene reserves, food production for the ever-increasing world population is also at risk. Destruction of the diversity in ecological systems not only diminishes the natural heritage of mankind, but also undermines the service provided by the living nature to general functioning of the "Earth system". Therefore, protecting biological diversity is at the same time protection of climate and soil.

For a successful international „biosphere policy“ which reaches beyond the classical biodiversity policy because of its relationship to climate and soil protection, the WBGU recommends that as many participants and institutions as possible are integrated, since the state cannot manage this task on its own. According to the experts, it is a question here not only of protecting the gene and ecological system, as well as the diversity of species, but also, of ensuring their sustainable use.

Protect 10-20% of the global land area: The Advisory Council considers that further development and consolidation of existing global systems in protected areas to be an urgent matter. For this purpose an area of at least 10-20% of the global land area should be legally protected. New nature reserves should be identified according to ecological criteria, a connection between existing nature reserves established and these should be developed with the objective of setting up a nature reserve system. However,

the implementation of the European Guidelines (Flora-Fauna-Habitat Guideline, Bird Protection Guideline) in Germany is still unsatisfactory. Latest investigations have shown that a world-wide nature reserve system, encompassing about 15% of the global land area, would cost about 50 billion marks per year. Over 12 billion marks have already been spent today world-wide for the conservation of nature reserves; therefore financing of the remaining 38 billion marks by the international community is not an impossible task. By reducing and restructuring environmentally harmful subsidies, for example for agriculture, suitable funds could be released.

Intergovernmental Panel on Biological Diversity: Scientific advice on international biosphere policies is inadequate. For this reason, in 1995 the first scientific survey on the situation regarding biological diversity was submitted in a global report of the UN. This work has not been carried on continuously, however. As a first step it should be examined to what extent these tasks could be achieved by a closer linking up of existing institutions. However, it can be assumed that on this basis the establishment of a scientific expert committee for biodiversity will be necessary, for instance in the form of an „International Panel on Biological Diversity“ (IPBD). In a panel of this kind all the leading scientists could be brought together, as this has already been achieved in climate politics.

Conserve the diversity of cultivated plants: Conservation of biological diversity is of great importance for safeguarding global food security. The WBGU therefore recommends the promotion of as much diversified agricultural production as possible. A „red list“ of endangered cultivated plants should be drawn up, since many traditional varieties, the raw material for developing new varieties of food crops, are in danger of being lost. A large part of the collections of rare plant varieties („gene banks“) throughout the world is considered to be at risk. Existing collections must therefore be safeguarded, supplemented by particularly important varieties and linked up globally. In doing so it should be ensured that „backup copies“ of collections also exist.

Support nature sponsorship: It will hardly be possible to protect biological diversity globally by public financing alone. Therefore the WBGU suggests that the efforts already initiated by various non-governmental organisations to create a privately operated and tax-privileged „biosphere fund“ should be supported politically. The objective of such a fund should be to protect available areas of strategic importance for the biological diversity of the Earth, which are not yet under state care. For this purpose a public limited company could be established, whose shareholders would have the right to vote or a claim to profits, for example, through tourism. The WBGU recommends furthermore that the tax liability of foundations in Germany is reduced, for example in the form of an amended foundation law, with tax privileges for environmental foundations.

Integrate bioregional management in existing area planning: The WBGU recommends that the strategy of „bioregional management“ is applied to land utilization. This should be orientated towards the categories „protection before utilization“, „protection through utilization“ and „protection despite utilization“, and aligned with the integration of all important participants. It should be examined as to what extent this approach can be more effectively coupled to the German planning system. Integration of protection and utilization of the biological diversity can be more easily achieved with

bioregional management than solely through measures ordered „from above“. This concept is particularly suitable for development co-operation.

Implement the Biodiversity Convention more resolutely: The Convention on Biological Diversity is currently the central international regulatory instrument for biological diversity. This was brought into being in 1992, and has been ratified by 178 parties up to now. In this convention the contracting parties commit themselves to conservation of biological diversity, sustainable use of its components and benefit sharing. Implementation of these objectives ought to be carried out more energetically in Germany. For this purpose, sectoral strategies should be developed in the federal ministries, as has already taken place in the Federal Ministry for Economic Cooperation and Development (BMZ). Close co-operation of the federal ministries is an important prerequisite here; therefore the WBGU recommends the setting up of an “Interministerial Working Group for Biodiversity Policy“.

Obligatory regulation of forest protection: Uncontrolled logging is still proceeding, making the realisation of a successful climate policy more and more difficult, and destroying valuable biological diversity. In order to improve world-wide forest protection, in the past the WBGU has called for a forest protocol to the Biodiversity Convention, and still considers this solution to be the most promising one. In a forest convention, to be negotiated and established by the UN-Organisation for Food and Agriculture (FAO), equal rights of protection and sustainable use, like already anchored in the Biodiversity Convention, would have to be reintroduced. However, more important than an agreement is its quick adoption and its legally binding status.

Reinforce the MAB programme of the UNESCO: The UNESCO programme "Man and the Biosphere“ (MAB) provides good conditions for regional implementation of the Biodiversity Convention. In particular the WBGU welcomes the trend to larger, better linked and increasingly crossboundary biosphere reserves. However, the MAB-programme could be used more effectively as an instrument in international co-operation for biosphere protection. Since this programme has no financing mechanism of its own, the states should be encouraged to use the possibilities of the GEF to a greater extent.

Intensify bi- and multilateral co-operation: Germany is involved to a considerable extent in international biosphere protection, and is the third largest contributor to the Global Environmental Facility (GEF). Germany is also leading in implementing debt for nature swaps. The initiative of the Federal Republic regarding debt relief for the heavily indebted, poor developing countries ("Cologne Debt Initiative“) is also expressly welcomed by the WBGU, since it provides the affected countries more scope for action - also for nature conservation measures. Nevertheless, in view of the declining trend in Official Development Assistance by the OECD countries over many years, with at the same time a growing pressure from global problems, greater financial commitment of the international community is absolutely necessary. With great concern the WBGU noticed that the international community is further away than ever from the 0.7% target. In the opinion of the scientists an increase in funds for German development co-operation to a target figure of 1% of the gross national product is desirable, in accordance with the resolutions of the Earth Summit of Rio de Janeiro, and is appropriate to the urgency of the problems.

The WBGU: The WBGU was established by the Federal Government in early 1992 as an independent scientific advisory council. The following reports have appeared

so far in the "World in Transition" series: Basic Structure of People-Environment Relations (1993), The Threat to Soils (1994), Ways Towards Global Environmental Solutions (1995), The Research Challenge (1996), Sustainable Management of Freshwater Resources (1997), and Strategies for the Management of Global Environmental Risks (1998). The Council also prepared special reports on the occasion of the climate summits in 1995, 1997 and 1998. In 1999 the council published a special report on Environment and Ethics.

RESOLUTION OF RESPECT FOR JACK MAJOR, 1917-2001

By M.G. Barbour, P.A. Castelfranco, R.W. Percy, and M. Rejmanek, UC Davis, CA

Reprinted from the Bulletin of the Ecological Society of America

Jack Major was on my dissertation committee. He was a generous and endlessly encouraging man who was forever interested in any and all aspects of alpine ecology. Our occasional chats are among the greatest treasures of my grad school experience. Even the mountains will miss him. the editor.

Jack Major, Professor Emeritus of Plant Ecology at the University of California, Davis (UCD), died 13 February 2001 in Davis at the age of 83. Professor Major had a profound impact on the direction of plant ecology in the United States during the second half of the 20th century. Besides his immediate family--brother Ted, wife Mary, and sons Paul, John, and James--he left behind many students and colleagues who fondly remember his great academic gifts to them and who join the family in their grief of his loss.

Jack's academic home for most of his career was the UCD Botany Department, where he taught from 1955 until retirement in 1981. His spiritual home, however, was in mountains: the Uinta Mountains of Utah, the Sierra Nevada of California, the Grand Tetons of Wyoming, the Brooks Range and the Juneau ice fields of Alaska, and the Himalayas of Nepal. This was the environment that he most often shared with graduate students and those undergraduates fortunate enough to take his plant ecology classes. He truly was the ideal scientist described by Poincare, as someone who "...does not study Nature because it is useful to do so. He studies it because he takes pleasure in it... [and] because it is beautiful."

Jack was born 15 March 1917 in Salt Lake City, UT and completed high school there in 1935. He went on to Utah State Agricultural College (now Utah State University) and received a B.Sc. in Range Management in 1942. For the next several years he served in the Army's 10th Mountain Division, the justifiably famous unit of 1000 skiers and alpinists who trained hard in the mountain west before participating in the Italian campaign of World War II. After the war, a number of men from that Division went on to become conservationists, ecologists, and leaders in the promotion of recreational skiing. Between 1946 and 1953, Jack attended graduate school at the University of California, Berkeley, obtaining a Ph.D. in Soil Science under the direction of Professor Hans Jenny. During this time he also met and married Mary Cecil, thanks to an introduction from brother Ted who had met Mary by chance on a rock climbing expedition in the Grand Tetons. She, too, had a love for the mountains.

Jack was hired as a member of a young weed science group in the Botany Department at UCD. His strong interest in the ecology of undisturbed mountain vegetation, however, conflicted with the weed group's focus on plants in agronomic, low-

elevation settings. This habitat bias gradually distanced him from weed science, and a 1964 Fulbright Fellowship to Innsbruck, Austria was to cement a lifetime's focus on vegetation science.

He had a driving curiosity that made him an extensive reader of, and correspondent with, scientists who specialized in a wide range of topics, including those who wrote in other languages. As a result, he was far ahead of his time. For example, we have correspondence in 1948 between Jack and Sewal Wright, a major contributor to the synthesis of Darwinism and Mendelism. Wright responded to Major's query of how to determine the relative importance of multiple interacting factors that explain a plant community's distribution limits, by describing his own original statistical method, path analysis. Path analysis has only been used regularly in the ecological literature for the past dozen years, but it was part of Jack's education 40 years earlier. Another example: Inspired by his major professor's book, *The factors of soil formation* (Jenny 1941), he wrote a paper that proposed to use differential equations to describe vegetation-environment relationships for any given plant community (Major 1951). Not for another quarter of a century, however, did any ecologist actually begin to use differential equations in the description and modeling of plant communities.

One measure of Professor Major's vision and impact is the fact that several of his earliest papers are still cited today, in some cases more often now than originally. According to the ISI Web of Science, "A functional, factorial approach to plant ecology" has been cited 91 times in the past 25 years. His superb synthesis of California's flora, geology, and ecology, "Endemism and speciation in the California flora," (Stebbins and Major 1963) has been cited 102 times in the same period, and a third paper, "Buried viable seeds in California bunchgrass sites and their bearing on the definition of flora," (Major and Pyott 1966) has been cited 138 times--at the rate of seven times per year for the most recent 5 years. His work on primary succession following glacial retreat (Crocker and Major 1955) is a classic, cited nearly 300 times in the last 25 years and still described in many textbooks nearly a half-century later.

Jack was one of very few Americans to practice the phytosociological protocols widely used in Europe (and throughout the non-English-speaking world) for sampling and classifying vegetation. Consequently, releve-style sampling and syntaxonomy were employed by most of his students in their theses and dissertations. Jack's gentle leadership in pulling reluctant American ecologists across a then-narrow bridge of communication into the rest of the world was without doubt of seminal help later to Robert Whittaker in the 1970s when his travels and publications widened that bridge. Only now -- 20-30 years after his students have finished their graduate degrees--are phytosociological papers becoming accepted and publishable in the US. A retrospective appreciation of the value of his work, (and that of his students) to conservation and park management was written by David Parsons on the occasion of Jack's retirement.

He was a gentleman scholar: learned but soft-spoken and modest to the point of self-effacement. If presented, in conversation, with an opinion contrary to his own, he was sincerely quizzical and would quite innocently ask why one thought that way, rather than offering a defensive or challenging counter-statement. In this manner, Jack made those around him feel equally learned. Even when he disagreed with them, his own contrary opinions were delivered so delicately and non-confrontationally (usually ending

with his traditional phrase, "Is this alright?") that the recipients might not realize their logic had been shredded until reflecting on it some days later.

His forte in teaching was with small groups, because his low-key manner was not well suited to large lecture sections or busloads of fieldtrip students. On hikes in the field, a student had to be self-motivated enough to keep up and crowd close around him while he pointed out species and talked of their indicator value. Those who hung back missed a great education. His method of teaching was Socratic, inviting questions and asking questions back, usually including his stock phrase, "Is this alright?" because he didn't want to lose anyone.

We miss you, Jack; but fortunately your perspectives, publications, and personal memories do remain with us. We give special thanks to Robert Burgess for his assistance in preparing this testimonial and his 1996 publication. To use your own phrase, Jack, "Is this alright?" We hope it is.

And on his grave some kindly person wrote,
Never did he jump on a bandwagon...
He preferred to walk.
---"Epitaph" by Paul Castelfranco (1991)

Banner Plant: *Pediocactus knowltonii*

Each month, a different plant graces the banner of *Lingua Botanica*.
This edition's Banner Plant image comes from PLANTS <http://plants.usgs.gov>
Thanks this month to Teresa Prendusi and NatureServe.

Knowlton's cactus, known only from Colorado and New Mexico, is a small succulent with solitary or clustered stems, up to 5.5 cm tall, but usually only barely protruding from the soil. The stem is dotted with small projections, each encircled at the top by a ring of white spines. From mid-April through early May, pink, yellow-centered flowers bloom on top of the stems.

Currently, the only known viable population is on about 5 ha of land in New Mexico's San Juan County and, probably, in adjacent areas just over the Colorado border. **This species was virtually driven to extinction by cactus collectors within 2 decades of its discovery: starting from an estimated population size of more than 100,000 plants in 1958, the population was reduced to less than 100 plants by 1978.** That population was given protection by The Nature Conservancy, and natural germination of seeds remaining in the soil has since brought the population up to 9,000 individuals. Protecting the plants from cactus poachers is still the highest conservation priority for this species. A program to reintroduce the species to other sites within its historic range has also shown some promise and may lessen the threat of extinction.

Most of the desirable/poachable cacti are in the genus *Pediocactus*. Just about every species in New Mexico, Arizona, Colorado, and Utah is federally listed. The biggest problems in Utah have been with *P. despainii* (San Rafael cactus) and *P. winkleri* (Winkler cactus). The BLM, FWS, FS are currently jointly investigating illegal collection activities for them. Other *Pediocactus* species at risk are: *P. paradenei*, *P. knowltonii*, *P. sileri*, *P. simpsonii*, *P. peeblesianus*. The other major cactus poaching activity that has gotten lots of press lately is the Barrel cactus, both in California and in

Southern Nevada. There was a USA Today article last year that claimed that between 1991- 1997, poachers stole over 15,000 barrel cacti from federal lands (including the National Parks). Apparently there is a Mexican "cactus cartel" operating where stolen cacti are sold to makers of "biznaga," a Mexican candy. Several folks have already been convicted for these crimes.

Rare cactus culture is especially popular in Europe. Many, if not most of the listed threatened and endangered American cactus species are available for sale there, and at very "reasonable" prices. Knowlton's cactus goes for 18,000 Lire in Italy (\$8.20), 35 Francs in France (\$4.75), 9.3 Euros (\$8.25), or you can buy five seeds for 10 Swedish Krona (about a dollar).

Afterword: Comet Hyakutake with *Carnegie gigantea*

Image from Astronomy Picture of the Day Archives, <http://antwrp.gsfc.nasa.gov/apod/archivepix.html>
Image taken by Rick Scott and Joe Orman, 27 March 1996. Hyakutake will not return for 15,000 years...



The opinions expressed in *Lingua Botanica* are not necessarily those of the USDA Forest Service or the editor. The USDA prohibits discrimination in all its programs and activities. Pass your copy of *Lingua Botanica* around to all your friends. Contributing submissions are always welcome.

"in the end all [resource management] decisions are moral, not technical." JW Thomas 1994
To subscribe to the *Lingua Botanica*, just send an email to Wayne Owen at <wowen@fs.fed.us>.

