Bulletin of the Native Plant Society of Oregon

Dedicated to the enjoyment, conservation, and study of Oregon's native vegetation

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Wild Bees and Floral Jewels: Preserving Ecological Relationships in the West

by Vince Tepedino, Research Entomologist, USDA Agricultural Research Service Bee Biology and Systematics Laboratory, Logan, Utah

The western United States is among the richest areas of bee diversity in the world. Flower patches from the Sonoran Desert to Sierran meadows buzz softly with the paeans bees pay to flowers. Most of our wild, native bees are found in the arid regions west of the 100th meridian: California has 1,500 species, Utah and Arizona more than 1,000 each, the Columbia Basin over 800, and Wyoming, that land of cool, dry summers and frigid winters, claims over 600 species. These insects are the chosen matchmakers for plants: they have evolved in intimate association with our flora. Indeed, bees have helped shape the flora and have, in turn, been shaped by it.

What do we mean by the somewhat suspect term "native bees?" We certainly do not mean honey bees, either domesticated or feral, which are native to Eurasia [and Africa], and were first established in North America in 1622. Honey bees play little part in the pollination of the rare plants bee scientists have studied. Nor are bees, which are vegetarian, to be confused with their carnivorous, less hairy relatives, the wasps. The term "native bees" refer to the 3,000 to 5,000 species that are both indigenous and ubiquitous across unpaved areas of the United States.

Most native bees are solitary: they do not, like bumblebees or honey bees, live in annual colonies or perennial hives; there is no comb or honey. Because there are no workers, there is no division of labor and no aggressive defense of the nest. Solitary thus means mostly placid females acting alone in their own best interests. These bees visit flowers for food (pollen and nectar) and, while foraging, transfer pollen from one flower to another.

In 1983, former South Dakota rancher Claude Barr capped a lifetime of fascination and work with native plants of the Great Plains by publishing *Jewels of the Plains*. "Jewels" was Barr's apt metaphor for the bright, showy flowers that many of our usually subdued plant neighbors display when the time arrives for them to reproduce. For humans, the heady odors and brilliant hues of wildflowers enliven long springs and summers on the Great Plains. For native bees, the more traditional members of the grassland community, the seasonal reappearance of flowers acts as a cue to once again assume their ongoing role in the process of natural selection—that of winged lapidaries, fashioning floral gems into jewels.

The flowers that fascinated Barr have many relatives west of the Great Plains, some of which, if not more beautiful, are even more precious. From the Colorado Plateau to the Great and Columbia basins, to the deserts of the Southwest, there are about 150 plants so rare that they have merited special designation as threatened or endangered under the Endangered Species Act. In the Southwest, these include rare barrel cacti (*Pediocactus* and *Sclerocactus* species) that bend their stamens to form an arbor over brilliant green sweat bees that have plunged, nectar-bent, into the flower. Along riparian corridors in Utah and Colorado, orchids (*Spiranthes diluvialis*) paste packages of pollen called "pollinia" to the mouthparts of visiting bumblebees and anthophorid (miner) bees. In Nevada and Utah, small andrenid (digger) bees seek pollen from nectarless rare poppy flow-

continued on page 97

In This Issue

Chapter Calendar.....95

NPSO Items for Sale 98

Mount Pisgah and Berry Botanic Garden Events 98

The Grand Old Man of Northwest Botany.....102

Native Plant Society of Oregon

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Kalmiopsis Needs Assistant Editor

Kalmiopsis is the annual journal of NPSO, which contains a variety of interesting articles about Oregon botany and botanists. Our current editor would like an Assistant Editor to train, with the eventual goal of the Assistant becoming the Editor in time. Publication and editorial experience is a must; computer skills and email address mandatory.

This is a great opportunity for someone to get involved with botanical projects, events, and research occurring in Oregon. If you are interested, please e-mail the *Kalmiopsis* Editor, Linda Vorobik, at vorobik@rockisland.com.

Send in Your Articles and Pictures

Have you been to any great wildflower areas lately? Grown any interesting natives in your garden? Have a favorite plant you'd like to rave about? Please send in your articles however short or if you're a camera buff send pictures. Don't feel like they have to be scientific. We'd love to hear any native-plant-related stories you'd like to share. And if you've read any good articles in other publications you think NPSO members would find interesting let me know. E-mail submissions to bulletin@NPSOregon.org. If you have good photos contact me first to find out about the format.

Friends of the Oregon Flora Project

We are grateful for the continued sponsorship of NPSO as we solicit funding for the new Flora and Atlas of Oregon vascular plants.

Your donation of any size will help this effort.

Please make checks payable to:
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and mail to:
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P. O. Box 402
Corvallis, OR 97339-0402

Cypripedium fasciculatum, *near Apple Creek along the North Umpqua*

State

October 14, Saturday

Board Meeting: 10:00 am. Room 206 in the Physical Education building at Lane Community College, Eugene. Directions: Take LCC/30th Ave. Exit from I-5, and go west on 30th Ave., straight through light at Eldon Schafer Drive, and continue to next LCC exit off 30th (Gonyea Road). Exit to right, and follow Gonyea Road in to west edge of campus to West Parking Lot. Go in main foot entrance on the east side of the lot, which goes up steps by a fountain. The Physical Education building will be the second building on your left (north). See LCC map at http://www.lanecc.edu/instadv/lanemap1.htm.

Blue Mountain

For information on the the Blue Mountain chapter call Jerry Baker at 541-566-3381

Cheahmill

September 28, Thursday

Meeting: Adaptive Genetic Variation in Big Deervetch is the title of a slide talk to be presented by Dale Darris, Conservation Agronomist for the Natural Resources Conservation Service. Dale conducts his research at the NRCS Plant Materials Center on the OSU campus at Corvallis. This study is being conducted in cooperation with the USFS and BLM. Big Deervetch (*Lotus crassifolius*) is an important, long-lived, native legume found on disturbed areas, roadsides, and droughty south slopes. It has an extremely deep tap root and as the name implies, has apparent wildlife forage value. The study involves germination studies, a greenhouse emergence study, and outplanting/evaluation of two large common gardens on the Siuslaw and Willamette National Forests. 7:00 pm, Carnegie Room, McMinnville Public Library.

Corvallis

September 17, Sunday

Field Trip: In search of *Aster hallii* around the Corvallis area. This is a late blooming white aster which is found in areas which are wet in the spring. Meet at the parking lot across from the Monroe Beanery at 10:00 am and bring lunch and water. We will return in the early afternoon. Contact Esther McEvoy for more information or if you plan to go on the field trip. 541-754-0893.

IMPORTANT NOTE TO FIELD TRIP PARTICIPANTS

Field trips take place rain or shine, so proper dress and footwear are essential. Trips may be strenuous and/or hazardous. Participation is at your own risk. Please contact the trip leader or chapter representative about difficulty, distance, and terrain to be expected on field trips. Bring water and lunch. All NPSO field trips are open to the public at no charge (other than contribution to carpool driver) and newcomers and visitors are always welcome. National Forests require a Northwest Forest Pass for many field trip locations. Permits can be acquired at forest headquarters and ranger districts.

NOTICE TO FIELD TRIP CHAIRS AND LEADERS

The Forest Service and other agencies have set policies limiting group size in many wilderness areas to 12. The reason is to limit human impacts on these fragile areas. Groups using wilderness areas should be no larger than 12.

Emerald

September 9, Saturday

Field Trip: Hand Lake meadow in the McKenzie Pass area. We'll take an easy 1-mile round-trip walk through subalpine woods to a lovely meadow where we will see Newberry's gentian and moonworts & grape ferns (*Botrychium* ssp.). Bring lunch and water. Permits are needed to park at the trailhead. Meet: South Eugene H.S. parking lot, 8:00 am (We'll carpool). Co-leaders: Marcia Cutler, 687-2559 and Charlene Simpson, 465-1059.

September 25, Monday

Meeting: Diversity in the Mushroom Genus Amanita Across North America, presented by OSU researcher Paul Hammond. Paul will be including his findings about the fungi's symbiotic host trees. 7:30 pm, Room 117, Science Building, LCC main campus. Directions: Construction continues at LCC, so come a little early to find your way. We'll still be meeting in the original Science building, which has just been remodeled and is on the southeast corner of LCC. Best place to park is probably on the east side of campus, near the south end of Eldon Schafer Drive (turn at the stop light on 30th Ave.). Just south of that parking area is a lighted walkway along the north side of the Science trailers, which goes right to the Science building.

October 23, Monday

Meeting: Rare and Endangered Plants of Lane County. 7:30 p.m, Room 117, Science Building, LCC main campus. Charlene Simpson, who specializes in Lane County flora, will use a lovely slide show to tell us stories of species losses, gains, and near misses. Charlene's a Charter Emerald member, Chair of our R & E Committee, and just participated in the biennial ONHP review of state listed species. Directions: See September meeting.

November 27, Monday

Meeting: Forests of Lilliput: Local Mosses and Lichens. 7:30 pm, Room 117, Science Building, LCC main campus. Nature photographer Dave Stone of Touchstone Photography and environmental educator Peggy Robinson (Emerald's field trip chair) take us for a pictorial hike into this tiny, beautiful world. Directions: See Sept. meeting.

High Desert

September

No monthly meeting.

October 24, Tuesday

Meeting: Annual Members Slide Show. 7:30 pm at the Environmental Center, 16 NW Kansas, Bend. Bring 15 of your favorite slides from summer trips and share them with the chapter. We will plan the winter meetings.

October, November

No monthly meetings.

Klamath Basin

For information on the Klamath Basin Chapter, call David Lebo at 541-883-8393.

Mid-Columbia

September 6, Wednesday

Meeting: Eliminating Yellow Star Thistle at Catherine Creek—a Success Story. 7:30 pm at the Discovery Center theatre, first The Dalles exit heading east on I-84. Marty Hudson, Weed Supervisor for Klickitat Co., Wa. will tell us how 5 acres of yellow star thistle was eradicated, and other stories from the weed front line involving knapweed, skeleton weed, and others. Bring your weed questions.

October 4, Wednesday

Meeting: Starting a Native Plant Nursery. 7:30 pm at the Discovery Center theatre, first The Dalles exit on I-84 heading east, and follow signs. Sandy Ott helped to create a Native Plant Nursery on the Umatilla reservation near Pendleton, and will tell us about it.

North Coast

for information on the North Coast Chapter call Vivian Starbuck at 503-377-4141.

Portland

September 9, Saturday

Field Trip: Mt. Hood Timberline trail from Timberline Lodge to Silcox Hut. Explore subalpine plants with USFS Botanist Carol Horvath on this 2-mile loop trail. Trail begins at 6000' and reaches 7000' at its highest point. View *Aster alpigenus*, *Erigeron peregrinus*, *Phlox diffusa*, *Spraguea umbellata* and many more! Great views, weather permitting. Please read Important Note to Field Trip Participants. Leave 8:00 am from Gateway/NE 99th Ave. Park and Ride, southeast corner of parking lot. For more information, call Carol at 503-775-2650.

September 12, Tuesday

Meeting: Biological control of weeds: Are native plants at risk? is the title of a talk by Eric Coombs, Biological Control Entomologist with the Oregon Department of Agriculture. The meeting will be held in the Fireside Room (#355) of the First United Methodist Church located at 1838 SW Jefferson St., in Portland. The room is open at 6:30 pm for socializing and the meeting will begin at 7:00 pm.

Siskiyou

September 21, Thursday

Meeting: Potluck picnic and slides. 6:00 pm at Glenwood Park, corner of Glenwood and Ashland (up Mountain to Ashland, then a short block to the right.) Bring a dish to share, a folding chair, a portable table if you have one, and some of your favorite recent plant slides to show at the meeting at 7:30 pm in Room 171 of the SOU Science Building, 3 blocks from the park. For more info call Molly Sullivan, 541-552-9908.

Umpqua Valley

Sept. 14, Thursday

Meeting: Organizational meeting to develop the fall and winter schedule. County Courthouse, Room 310, 7:00 pm. Call Richard Sommer at 541-673-3709 for more information.

Willamette Valley

September 18, Monday

Meeting: Some Native Plants and their associated Butterflies and Moths. 7:00 pm in Room 225 at the United Methodist Church, 600 State St. NE in Salem. The program will be presented by David McCorkle, Biology Professor Emeritus of Western Oregon University.

William Cusick

for information on the William Cusick Chapter call Frazier Nichol at 541-963-7870.

Dryopteris expansa, *Tidbits, Lane County*

Wild Bees and Floral Jewels

continued from page 93

ers (*Arctomecon* species), and pack so much of it onto their hind legs that they look like they have been planted in yellow barrels. Blue-violet beardtongues (*Penstemon* species) in Nebraska and Colorado offer a hirsute, modified stamen that aids pollinators in exploiting the flowers, but also dissuades less trustworthy insect visitors from doing so. Four o'clock flowers (*Mirabilis macfarlanei*) in Oregon and Idaho, beyond the distribution range of their usual moth pollinator, remain open and nectar-filled into the late morning to attract miner bees.

These plant species, and the others on the list of 150, are each limited to a few small, isolated, genetically impoverished populations on federal lands. Frequently they must compete for living space, and the attention of land managers, with mining, timber, livestock, and recreational interests. Because the danger of species extinction increases as the number of individuals and populations decline, conserving these plants requires careful management: human-caused threats must be excluded or mitigated, and informed recovery plans must be designed and implemented that will support growth in number of individuals and populations.

Recovery of any species begins with successful reproduction: extant populations cannot grow, extirpated populations cannot be restored, and new populations cannot be initiated in promising areas without a supply of new individuals. For rare plants, it is critical that these new individuals be the products of sexual reproduction, because only sexual reproduction yields individuals with new combinations of genes. This genetic enrichment of populations is all but mandatory if rare plants are to cope with the numerous environmental vagaries they are almost certain to face over long periods of time.

Because they are immobile, plants are hard-pressed to produce genetically new individuals without enlisting outside aid. The scent and shape of their flowers do not serve to attract other plants. Nor do their showy blooms make better use of water or wind to move pollen. Instead, plants have flowers because their progenitors successfully reproduced by inveigling insects, birds, bats, and other animals to transport viable pollen (which contains the male ~~zygotes)~~ from the stamens of one flower to the female stigma of another. Not uncommonly, transfer must take place between flowers on different plants, i.e., cross-pollination, for seed-set to occur.

Over the past decade, I have been studying the reproductive biology and pollinators of rare plants in the West with several colleagues at the USDA Agricultural Research Service (ARS) Bee Biology and Systematics Laboratory and the Department of Biology at Utah State University. Our purpose has been threefold. First, we wanted to confirm that rare plants need pollinators. Some scientists have reasoned that automatic self-fertilization should be a common development in rare species that produce relatively few flowers because they are less likely to attract high energy and nutrient-demanding pollinators such as bees. A second objective has been to identify important pollinators of species that require them, and to learn something of their biology. Finally, we wanted to inform land managers of the importance of pollinators of rare plants, and provide advice on how best to preserve them. The first two inquiries yielded disconcertingly uncomplicated answers: the flowers of all but a few of the 27 rare plant species we have studied must be pollinated by insects to reproduce sexually, and the insects usually responsible for pollination are native bees.

Our studies of rare plant pollination, and of the matchmaking bees that accomplish it, also reveal how conservation issues can become complex, and why managing communities or ecosystems rather than individual species is so important. Conserving endangered plants, and preserving the integrity of our native flora in general, will require not only removing direct threats to the plants, but will also require preservation of their pollinators.

For bees to be successful, they must, at the very least, have adequate nesting habitat and food, i.e., pollen and nectar. Additional requirements, such as water and leaves or other extraneous materials sometimes used in nest construction, must be readily available. The first complication of note is that there is no guarantee that acceptable nesting habitat of the bee is conterminous with the habitat of the rare plant it pollinates. Indeed, they may be distant. The remedy is straightforward: we must discover where the bees nest, and offer those sites the same protection we offer the plants.

A second complication is that some plants, like the rare poppies mentioned above, offer only pollen, while others, like the four o'clocks, are visited only for nectar. Bees need both. This means that bees visiting such "single resource" rare plants must have other contemporaneously blooming species that supply the missing food item. Clearly, we must have detailed information about the biology of all participants to ensure that such supplementary species are available, and we must be prepared to use that information in a broader, community approach to conservation.

An additional complication ensues when rare species, like the riparian orchid, are pollinated by social bees, such as bumblebees. A bumblebee colony is active for a much longer period than are solitary bees. Frequently, bumblebees fly for much of the blooming season. Thus, to have a healthy bumblebee colony in July, when the orchid flowers, means the bee colony must have adequate floral resources from the time of its inception in the spring. It is therefore necessary in some cases to include a temporal component in management plans: we must ensure that an acceptable sequence of flowers are available for the entire season.

I hope these few examples convey the many facets of the problem presented by species-centered conservation efforts, and help establish the importance of a shift to community conservation. Pollination systems are among the best illustrators of this concept

continued on page 98

Wild Bees and Floral Jewels

continued from page 97

because of the clear interdependency of our living floral jewels and their winged lapidaries.

Vince Tepedino describes himself as an ex-Brooklyn Dodger fan turned bee-chaser. With advancing age, he's incorporated more plant-chasing into his research routine—plants move more slowly than bees, and this allows him to catch his breath at high elevations. He has been at the USDA ARS Bee Biology & Systematics Laboratory at Utah State University since 1978.

Reprinted, with permission of the author, from *Wings*, the membership magazine of the Xerces Society. The Xerces Society is a Portland-based non-profit dedicated to the conservation of invertebrates.

Fall Events at Berry Botanic Garden

Fall Botanist Explorer

As leaves shift from green to golden, you're invited to join Botanist and Naturalist Carolyn Devine in her exploration of nearby green spaces. Hone observation skills (you'll get acquainted with keys and guidebooks), practice documenting your observations (a notebook is recommended), and become acquainted with nearby natural landscapes (inspiration for your woodland garden). Among other things this fall, we'll focus on all those fruits: capsules, cones, berries, and achenes. You'll gain the most from this class by signing up for all, but if you can only join us for one or a few, that's okay too. Carolyn Devine, 4 Wednesdays:

9/ 20, The Berry Botanic Garden

9/27, Oaks Bottoms Wildlife Refuge

10/4, Forrest Park

10/11, Tualatin Hills Nature Center

10:00am - 12 Noon $8/($5 members) for each class or $24/($15 members) for all four. Limit: 10

Events at Mount Pisgah Arboretum

Introduction to Nature Photography Workshop

Sunday, September 10, 9 am-noon at Mt. Pisgah Arboretum

Led by David Stone of Touchstone Photography. This beginners' workshop will teach the difference between taking pictures and creating photographs. The principles of effective composition will be practiced in the field, and all levels of experience are welcome. Bring your camera, a roll of film, and if you have one, a tripod. You may also bring samples of your work for professional evaluation and feedback. Pre-registration required; call 541-747-1504. Fee: $20 ($15 Arboretum members).

Elder Walk at Mt. Pisgah Arboretum (a new program just for seniors)

Wednesday, September 13, 2-4 pm, with Vernon Barkhurst.

These are easy strolls led by trained Arboretum nature guides, focusing on the ecosystems found at the Arboretum. Second Wednesday of each month; refreshments provided. $3 suggested donation for non-members. Please call 541-747-1504 to pre-register.

Gardening with Native Plants Workshop

Saturday, September 16, 9 am-noon at Mt. Pisgah Arboretum.

Taught by Evelyn Hess of Lorane Hills Nursery. Find out which plants are the easiest to grow and the most beneficial to wildlife in our area. Slide show/discussion and demonstration will be included. Pre-registration required; call 541-747-1504. Fee: $15 ($12 Arboretum members).

Tree Identification Workshop

Saturday and Sunday, Sept. 23 & 24, 9 am-4pm, in Eugene, OR.

Led by Whitey (Dennis) Lueck, Horticulturist and Naturalist. Two-day field trip through parks and neighborhoods of Eugene to study the native and non-native trees of the Upper Willamette Valley. Learn to identify broadleaf and conifer species. Tree keys provided. Pre-registration required, call 541-747-1504. Fee: $80 ($75 Arboretum members).

Harvest Papermaking Workshop

Saturday, September 30, 1-3 pm at Mt. Pisgah Arboretum. Taught by Aimee Yogi.

Turn your garden into handmade paper! After a short presentation on the history, process and plants used for papermaking, you will get to make your own paper. A perfect workshop for families. Fee: $6 per person or $15 per family of three. Pre-registration required, call 541-747-1504.

NPSO Items for Sale

Oregon's Rare Wildflower Poster depicts Punchbowl Falls and three of the Columbia River Gorge's endemic wildflowers. Text on the back describes the natural history of the Gorge and the mission of the NPSO. Available from Stu Garrett, 21663 Paloma Drive, Bend, OR 97701, 541-389-6981. Individuals may order posters at $12 each, plus $3 per order for shipping. Posters are mailed in tubes. Chapter treasurers may contact Stu for wholesale prices to chapters.

NPSO's Original Wildflower Poster depicts 13 Oregon wildflowers in a striking artist's rendition. Soon to be a collector's item. Available from Stephanie Schulz, 84603 Bristow Rd., Pleasant Hill, OR 97455, $5 each, plus $3 per order for shipping. Posters are mailed in tubes.

NPSO Membership Directory lists names, addresses, phone numbers and e-mail addresses of NPSO members (April 1999). Available from Jan Dobak, 2584 Savier St., Portland, OR 97210.

Native Plant Society of Oregon Membership Form

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Address _____

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Chapter (if known) _____

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Address _____

City _____ *State* _____ *Zip+4* _____

Please make checks for dues and contributions payable to:
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Send completed form and full remittance to:
Jan Dobak, NPSO Membership Chair
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☐ New ☐ Renewal

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☐ Sustaining – $50 ☐ Patron – $100 ☐ Life Membership – $500

☐ Subscription Only (*Bulletin* and *Kalmiopsis*) – $18 *Only for those who wish to subscribe, but do not want to have full membership status.*

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Membership in the Native Plant Society of Oregon is open to all.
Membership applications, renewals and change of address (include old address) should be sent to the Membership Chair.

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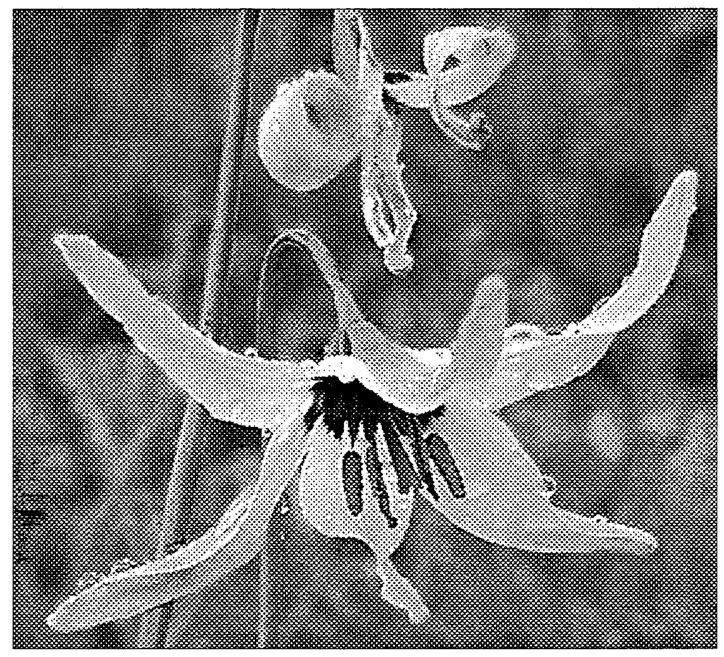
The Grand Old Man of Northwest Botany

by Rhoda Love, Emerald Chapter

As many *Bulletin* readers know, I have for several years been researching the fascinating life of Northwest botanist Louis F. Henderson (1853-1942). My researches have led me to the conclusion that at the time of his retirement from the University of Oregon in 1939 at the age of 86, Henderson probably knew the flora of Washington, Oregon and Idaho better than any living person. Due perhaps to the fact that he did not write a flora of the region, I believe his importance may not be fully appreciated today.

During my researches into Henderson's rich and varied life I traveled to Seattle, Tacoma, Olympia, Hood River, Moscow Idaho, and Pass Christian Mississippi. Electronically I visited libraries and archives at the University of Idaho, Oregon State University, Reed College, Berkeley, the University of Oregon, the University of Washington, Cornell University, Harvard, the Chicago Field Museum, and the Smithsonian.

To acquire facts about Henderson's personal life I was lucky to be able to interview one if his granddaughters as well as several other family members. In the end I amassed a 10,000 word essay with nearly 130 footnotes which I submitted to the journal *Pacific Northwest Quarterly* (PNQ), which is published by the University of Washington. Happily they accepted it, although they asked that it be cut nearly in half to conform with their publishing format. This I accomplished and I can now announce that the essay will appear in the Fall, 2000 issue of *PNQ*, accompanied by a number of the interesting images I was able to locate. The article should appear in September or early October.



Erythronium hendersonii

Bulletin readers who wish to obtain the Fall issue of *PNQ* may write directly to the publisher at: Pacific Northwest Quarterly, Box 353587, University of Washington, Seattle WA 98195-3587. The cost is $6.00 for a single issue or $24.00 for a year's subscription.