

Bulletin of the

# NATIVE PLANT SOCIETY of OREGON

To increase the knowledge of members and public in identification and conservation of the native plants of the Pacific Northwest

Volume 21 No. 9

September 1988

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## CHAPTER NEWS

### IMPORTANT NOTE TO FIELD TRIP PARTICIPANTS

Field trips will take place rain or shine, so proper dress and footwear are essential. Trips may be strenuous and/or hazardous. Please contact the trip leader for information about difficulty, mileage, and terrain. Your participation is at your own risk. Bring water and lunch.

### Blue Mountain

For information, contact Bruce Barnes (276-5547).

### Corvallis

For information, contact Dan Luoma (758-8063).

### Emerald

10 Sept., Sat.

**Field trip** to the Mackenzie and Willamette Rivers to see the willows and grasses. Leave at 10 am from South Eugene High School, 19th and Patterson. Leader: Peter Zika (work 683-6495, home 369-2881). "Come and learn your willows."

10 Oct., Mon.

**Meeting.** Time to be announced, at Amazon Community Center, 2700 Hillyard St., Eugene. Slideshow on natural history of Costa Rica, by Marjorie Willis, NPSO State Vice-President and employee of Oregon State Parks Department.

### High Desert

For information, contact Joyce Bork (389-5579).

### Mid-Columbia

7 Sept., Wed.

**Meeting.** 7:30 pm at Mosier School. "Penstemon Program" presented by Bruce Meyers of Husum, Washington, who cultivates and hybridizes penstemons on his property and has locally studied this genus for years. He has slides as well as keys from the American Penstemon Society.

### North Coast

1 Sept., Thurs.

**Meeting.** 7pm at State Office Building, 3600 3rd St., Tillamook.

11 Sept., Sun.

**Field trip** to Lees Camp. 1:30 pm.

For information, contact Clarice Maxwell (842-7023).

### Portland

10 Sept., Sat.

**Field trip** to Indian Heaven. Leave at 8 am from Gateway MAX Park-and-Ride. Leaders: Elizabeth Handler (244-5320) and Carroll Dubuar. 8-mile hike at elevation up to 5100 feet.

- 13 Sept., Tues. **Meeting.** 7 pm at First United Methodist Church, 1838 SW Jefferson St., Portland. Esther Hammond will present a program of the late Dr. John Hammond's pictures of Oregon wildflowers.
- 17 Sept., Sat. **Field trip** to Elk Meadows. Leave at 8:30 am from Gateway MAX Park-and-Ride. Leaders: Jan and Dave Dobak (248-9242).
- 24 Sept., Sat. **Field trip** to Mt. Hood Meadows. Leave at 9 am from Gateway MAX Park-and-Ride. Leader: Shep Wilson (228-7823).
- 1 Oct., Sat. **Field trip** to Sheep's Canyon on southwest slope of Mt. St. Helens. Leave at 8 am from Lloyd Center parking lot nearest NE 16th and Clackamas. Leader: Charlene Holzwarth (284-3444). 6.4 mile hike.

## Siskiyou

8 Sept., Thurs.

**Meeting.** 7:30 pm at Rm. 171, Science Building, SOSC. Mary Paytzel will give a program on "Butterflies of the Siskiyous."

## Willamette Valley

19 Sept., Mon.

**Meeting.** 7:30 pm at First United Methodist Church, corner of SE Church and State Sts., Salem. (Use the Church St. entrance.) Wilbur Bluhm will present a multi-image slide show entitled "The Willamette Valley as the Settlers Found It." He will discuss the original landscape and flora of the valley and identify some alien species that you might have thought were native. Wilber is considering writing a book on the subject.

No formal trips are scheduled for this month. However if there is sufficient interest, impromptu trips will be held. Notification will be by telephone tree. If you know of a good spot to visit in September, or want to be on the telephone notification list, call Clint Urey (743-2802) or Glenn and Barbara Halliday (371-1025).

There will be a mushroom field trip on October--details in the October *Bulletin*.

## Wm. Cusick

For information, contact Rachel Sines (963-0674).

### RED, WHITE & BLUE BERRIES

...and other fruits of the season, will be in a display by Portland chapter at the annual Wintering-in of the Oregon Historical Society at Bybee-Howell House on Sauvie Island.

Saturday, September 24, anytime between noon and 4 p.m., come with a picnic to enjoy the island autumn...the free cider, craft displays (candlemaking etc.), tours of the house and farm museum. Books, prints of old photos and a few food items will be for sale, otherwise all free. NPSO's display has drawn a lot of interest in three previous years.

From Hwy. 30, cross the bridge to Sauvie Is. and turn left, and proceed to signs for the house in view on your right.

### Lecture on Tropics at Garden Club

Dr. William L. Theobald will give a lecture and slide presentation on "Helping Save and Understand the World's Tropics" Monday, October 3, at 1:30 pm, at the Portland Garden Club, 1132 SW Vista Ave., Portland. This lecture is one of the Portland Garden Club education series.

Dr. Theobald is Director of the Pacific Tropical Botanical Garden on the island of Kauai. The Garden's emphasis is on rare and endangered species.

#### IMPORTANT ADDRESS

Robert Meinke  
Endangered Species Office  
Plant Division  
Dept. of Agriculture  
635 Capitol Street NE  
Salem, Oregon 97310-0110  
378-6458



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## ANNUAL MEETING HIGHLIGHTS

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### Membership report:

Blue Mt.	23
Corvallis	50
Emerald	67
High Desert	37
Mid-Columbia	36
North Coast	15
Portland	247
Siskiyou	70
Willamette	60
William Cusick	13
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Total	618

Sixty-five members attended the banquet dinner and annual meeting. Certificates of appreciation were presented to: Sara Barnum, Jan Dobak, Marge Ettinger, Mary Falconer, Barbara Fox, Russ Holmes, Charlene Holzwarth, Russ Jolley, Julie Kierstead, Rhoda Love, Esther McEvoy, Pat Rogers-Rochna, Marjorie Willis, and Shep Wilson.

Four Field Research Grants in the amount of \$400 each were presented to Paula Brooks/Stephanie Schultz, Wayne Rolle, Carolyn Wright/Dave Gross, and Peter Zika. The Leighton Ho Memorial Field Botany Award (\$400) went to Jennifer Dimling of the University of Oregon. Mary Falconer announced that the Jean Davis Memorial Scholarship (\$1000) was awarded to Wayne Rolle who will pursue his studies at Oregon State University.

The amendment to Article X of the By-Laws, as presented in the May issue of the *Bulletin*, was approved unanimously. After the business meeting, Susan Cochrane, coordinator of the State of California's Endangered Plant Program, shared insights as to how NPSO members could help Oregon's program succeed. She has found that a positive attitude towards the importance of native plants coupled with continuing involvement in public policy and educational efforts are most effective.

The Board of Directors approved a provision for non-membership subscription to the *Bulletin*. Agencies and organizations that want to receive the *Bulletin* without formal affiliation with our organization will be able to do so at the regular rate.

Bob Meinke spoke on the progress of the Oregon Endangered Plant Program (see the June issue) and urged members to be involved in field monitoring. This was in agreement with Jean Siddall's request that more people contribute to the work of the R&E Committee.

Sallie Jacobsen and Margie Willis gave a presentation on alternatives to planting *Ammophila arenaria* in the dunes. Their discussion of landscaping with natives set the stage for the next presentation by Dean Apostol and Tami Katz. They informed us about an upcoming seminar on using and managing for natives in the landscape. Various issues surrounding landscaping with natives will be addressed at the Oct. 8<sup>th</sup> meeting in Portland. There was a great deal of discussion concerning plants dug from the wild to supply landscaping needs. NPSO opposes digging plants for the garden unless they are being salvaged. Our

guidelines encourage digging up plants in true salvage situations. The primary problem centers around how to determine if plants offered for sale were obtained properly and how to make our dominant position against digging clear to the public.

One-thousand dollars was donated to the Jean Davis Memorial Scholarship Fund principal by vote of the Board. This was done because the principal no longer generates enough interest to cover the scholarship. The next Board of Directors meeting will be Saturday, October 22, 10 AM, in The Dalles. A specific location with map will be announced in the next *Bulletin*.

— D. L.

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### WOODS, WETLANDS, AND WILDFLOWERS DESIGNING WITH NATIVES

On Saturday, October 8<sup>th</sup>, at the Rock Creek Campus of Portland Community College, there will be a one day conference on the subject of landscaping with native plants. This conference is being organized by the Cascadia Native Landscape Center and the Oregon Chapter of the American Society of Landscape Architects. Speakers will include, Fred Hall, chief plant ecologist for Region 6 of the U.S. Forest Service, Arthur Kruckeberg from the University of Washington, Dennis Wagner of the University of Oregon Herbarium, Julie Kierstadt from Berry Botanical Garden, and others. Subjects to be presented and discussed will include: Regional plant geography of the Pacific Northwest, designing native landscapes, plants of promise, managing native plant communities, wetland restoration, and protection of native plant species. The purpose of this conference is to explore the major issues related to native plant landscaping and to build a foundation for future research and projects.

This conference should be of particular interest to those Native Plant Society members who are interested or involved in projects related to restoration or management of native plant communities. The cost for attending is \$15.00 (\$10.00 students and A.S.L.A. members). A box lunch is \$5.00. Pre-registration is not mandatory, but it is advised since space will be limited. Make checks payable to: Cascadia Native Landscape Center, 1143 S.E. Umatilla, Portland, Or. 97202. For further information call 236-0395.



## Rare Buckwheat Rediscovered After 87 Years

Two Oregon naturalists, working in cooperation with the State Department of Agriculture's Endangered Species Program in Salem have succeeded in rediscovering a plant thought by many botanical authorities to have become extinct. Three small populations of the Golden Buckwheat (*Eriogonum chrysops*), a low, shrubby species last observed some 87 years ago, were located in late May by Carolyn Wright and Dave Gross in the Dry Creek area of northern Malheur County. Wright, a biological consultant and graduate student at Oregon State University, and Gross, a U.S. Forest Service employee, live in Tygh Valley. Both are avid botanists well acquainted with the flora of eastern Oregon and are members of the state's Native Plant Society.

The Golden Buckwheat, a wild species distantly related to cultivated buckwheat grown as a grain crop, belongs to a family of plants found predominantly in arid climates in North America. Many of the wild buckweeds have very limited distributions, often the consequence of special adaptation to unusual volcanic soils. As a result, recent intensive searches for the Golden Buckwheat, dating to the mid-1970's, often concentrated on such habitats. Field work had focussed in Harney County since the only previous collection of the species, by William Cusick in 1901, was taken from an area southeast of Burns on the "Northern Stein's (Steens) Mountain" according to the original records. Cusick, a pioneer cattle rancher from Union, Oregon, was a prominent early day amateur naturalist who traveled throughout the state at the turn of the century in search of botanical novelties.

"The inability by botanists to relocate the original collection locality for the Golden Buckwheat was frustrating," says Bob Meinke, coordinator for the state's Endangered Plant Species Program. "Since we had so little collected material upon which to base conclusions a theory was eventually circulated that the plants collected by Cusick might merely be a variation of some other, possibly common, wild buckwheat from the area, and therefore relatively unimportant. The recent rediscovery conclusively shows that they do represent a distinctive, rare species worthy of management consideration."

Wright and Gross were able to relocate the species after piecing together many bits of information. After several summers searching in the Steens Mountains area proved fruitless, the pair decided to try and get additional details about Cusick and his 1901 travel itinerary. A crucial piece to the puzzle came when they learned of the existence of an old stage coach line that ran south from Vale, Oregon, to Winnemucca, Nevada, by way of Harper (in Malheur County) and then along the east base of the Steens Mountain. Taking a trip to Harvard University, where many of Cusick's collections were deposited, the couple examined notes and labels from his 1901 collecting trip. They discovered that some plant collections labelled "Northern Stein's Mountain" were additionally noted as being taken at 4,000 feet elevation. "That seemed to indicate a location other than what we commonly think of as the North Steens, where elevations are 5-6,000 feet" said Wright. "We thought maybe we should look farther north."

The big break came during archival work at the University of Oregon, which houses many of Cusick's early field notebooks. It was within these records that the pair was able to ascertain that Cusick had been in the Dry Creek area on June 10, 1901, the day Golden Buckwheat was collected. "We knew (at that point) where to look," commented Wright. "Cusick had actually extended the definition of the Steens Range about 45 miles beyond where we think of them today."

Within two hours of beginning to search in the Dry Creek area on May 30, Wright and Gross had discovered their quarry. "We think we pretty much retraced Cusick's route because we found each of the other plants he collected the day he discovered the Golden Buckwheat populations," said Wright. The species was found growing on barren hilltops in three separate areas, on a volcanic surface known as welded tuff. An estimated 5,000 plants were observed.

Although the species is located in a very limited area, it is unlikely it will be formally designated as threatened or endangered in the near future under the provisions of the recently passed Oregon Endangered Species Act. "The habitat of the species is not easily impacted by grazing or other ranching activities," said Meinke, after a site inspection in June. "We will continue to monitor the known populations, however, for disturbance or decline in numbers, and may work with the Bureau of Land Management in developing management guides to ensure the plant's perpetuation."

Hurrah! Carolyn and Dave, Mid-Columbia Chapter members! These two also rediscovered the obscure buttercup, *Ranunculus reconditis* in Oregon. See NPSO *Bulletin*, March 1986.



## LEIGHTON HO FUND NEARS \$2,000

by Rhoda Love

The NPSO Board, at its January meeting, established a special fund in memory of LEIGHTON HO, former Emerald Chapter President, who drowned in a tragic accident in Hawaii December 20, 1987 (see NPSO Bulletin, Feb, '88, p. 13). Leighton was a tireless worker in the cause of Oregon's rare plants and endangered habitats and he is very much missed.

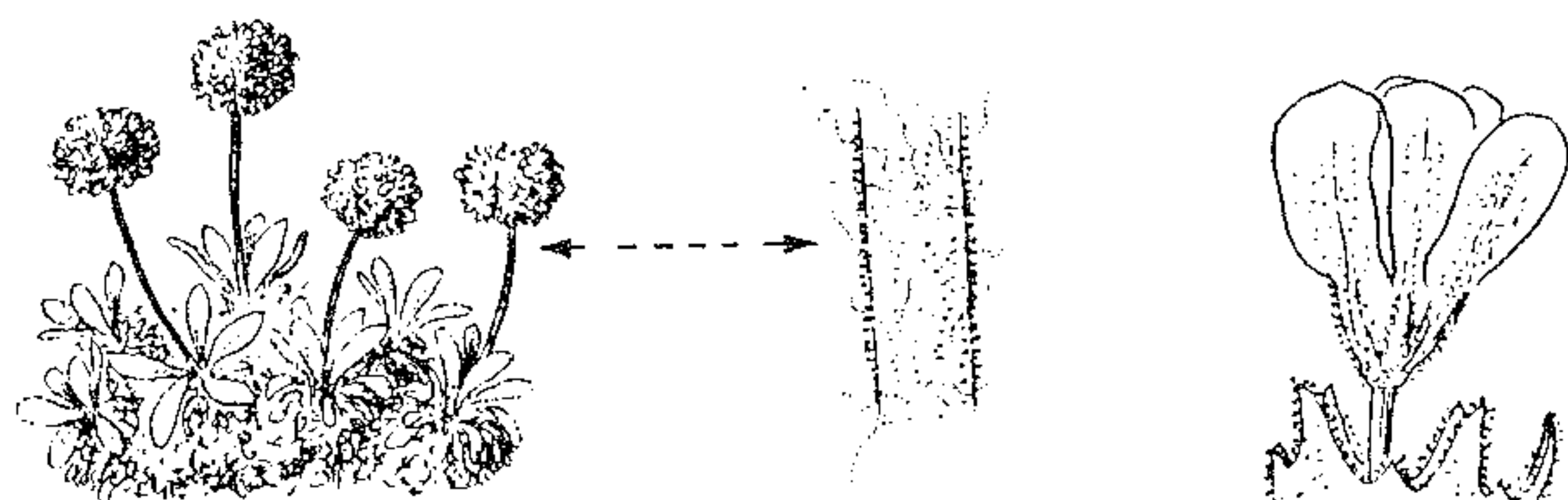
Monies have been pouring into the fund from Leighton's family in Hawaii and from his many friends. According to Daphne Stone, NPSO Treasurer, the fund had reached \$1,995.53 by June, 1988. The Leighton Ho Fund is to be used for NPSO Summer Research Grants. It is hoped that the fund will continue to grow and that, with wise investment, it can be made to provide NPSO summer grants for a number of years to come. Not only will the Leighton Ho Fund provide needed monies for research on Oregon plants, but it will help to keep Leighton's name and memory alive.

The summer grant is now called the Leighton Ho Memorial NPSO Grant, and the 1988 recipient, whose name was announced in a brief ceremony at our Annual Meeting at Silver Falls, June 25, is JENNIFER DIMMLING, of Eugene, who will use the \$400 grant to study *Sidalcea cusickii* in the Coast Range.

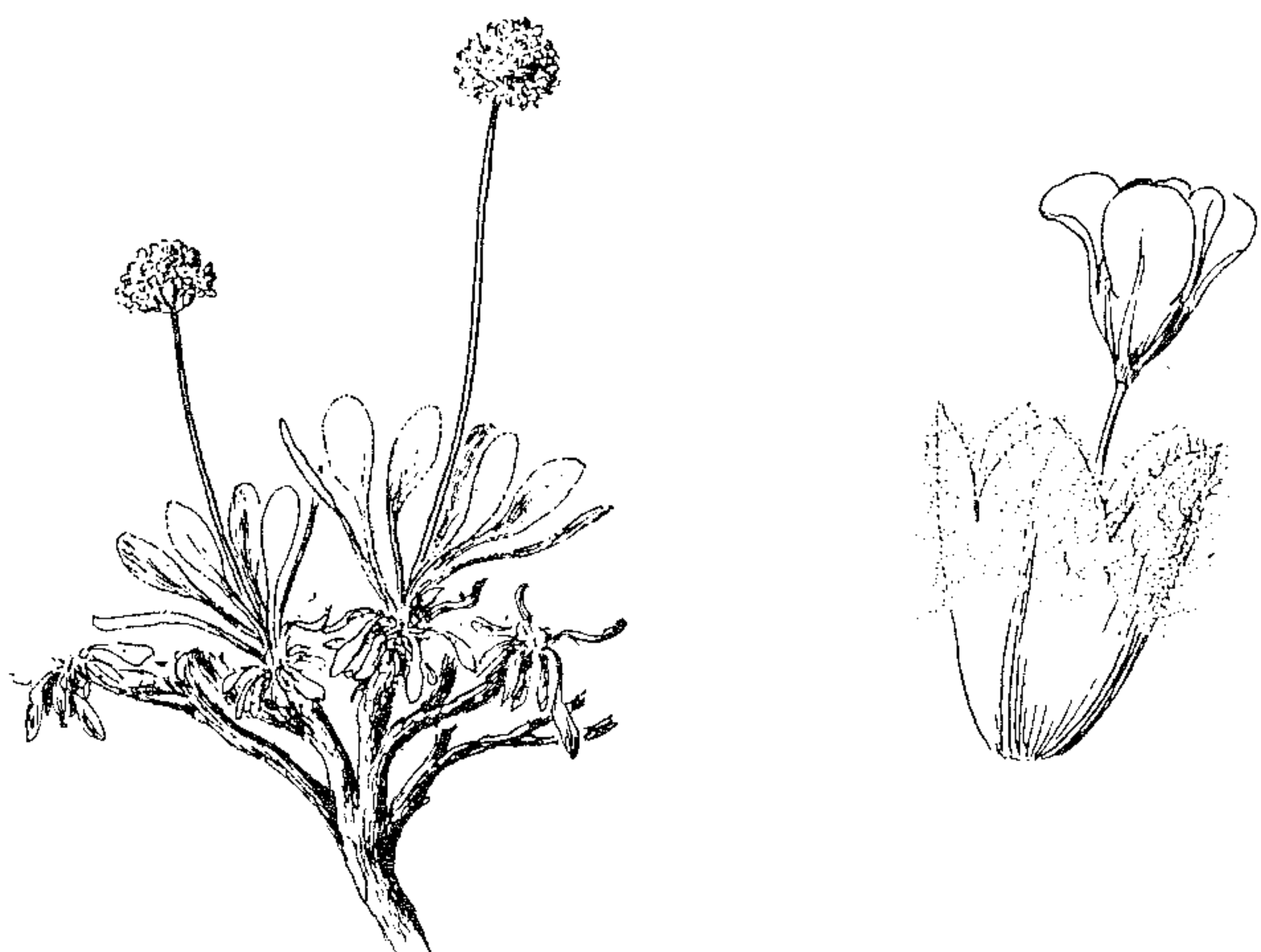
We hope that the fund will continue to grow so that the Leighton Ho Grant can be awarded for many years in the future. Friends of Leighton, who have already contributed are encouraged to contribute again, perhaps on an annual basis, and other friends of Leighton and of NPSO and its important work, who have not yet contributed, are encouraged to do so. Any Bulletin reader who wishes to contribute to the Leighton Ho Fund, may send a check, made out to NPSO, to:

Leighton Ho Fund  
c/o Daphne Stone, Treasurer  
Native Plant Society of Oregon  
1934 Cleveland St.  
Eugene, Oregon 97405

The following family members and friends of Leighton have contributed to the fund thus far: Aileen and William Ho, Karen Nishimura, Jannell Sorensen, Margaret Hutchinson, David Calderwood, Stanton and Joan Cook, Rhoda and Glen Love, Evelyn and Lee Everett, Elaine Nishimura, Gary Hade, Sandy Poinsett, Janice and J. W. Gerdemann, Fanny and George Carroll, Thomas E. Mallory, Daphne and Jeffrey Stone, Wanda Manning, Jeff Herbert, Linda Romens, Cheryl Suter, Marcia Harlacker, Carlos and Linda Cabera, Jolene and Joel Boucock, Marcia Locke, Kim Stone and Bob Maeda, Jacque Larsen, Rita Bowman, Judith McClain, Peggy Fitzgerald, Timmie Bigornia, Grant Beardsley, Jo Hudleston, Nancy Scott, Roberta Roche, Marcia Brooks, Marisa Wampler, Steve Erfurth, Julie Schiller, Ron Davis, Fran Ross, Joel LeCaptain, Genny Haberly, Cheryl Wobbe, Amy Crook, Bev Leach, Mari Baldwin, Steve, Bethel and Lisa Edens, Jerry Wood, Leslie Weaver, Freeman Rowe, Gail Baker, McKenzie Flyfishers, Margaret Markley, Nadine Smith.

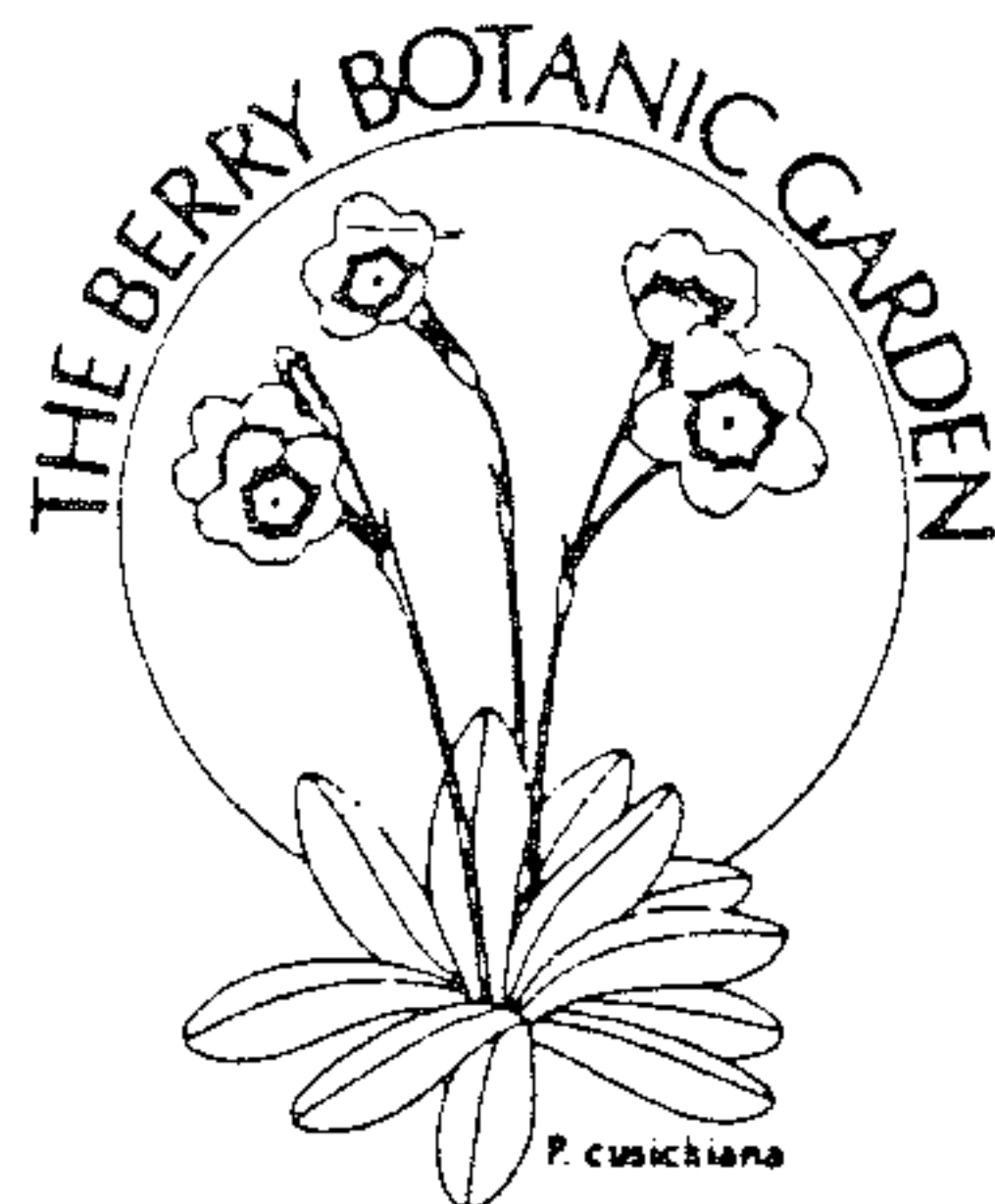


alpine material



E. chrysops

(reproduced from Hitchcock et al., *Flora of the Pacific Northwest*, with permission from the publisher)



The Berry Botanic Garden will hold its Fall Plant Sale at Miller Hall, World Forestry Center, Portland, Oregon, on Saturday, October 1st, from 10:00 am to 3:00 pm.

Public is welcome. Free admission.

If you're looking for choice bulbs for fall planting, unusual alpine plants for rockeries, hard-to-find perennials for borders, and select trees and shrubs, come to this sale! Plants are grown by local specialty nurseries and by the Berry Garden from its own collections.

This fall's sale will also feature seeds from native and garden sources, a fine assortment of garden books, alpine troughs, pots, botanical prints, and garden tools.

The plant sale is a fund raising activity for the non-profit Berry Botanical Garden and helps to further the Garden's work in the areas of plant conservation, horticultural education, and botanical research.



# The Cobra Lily

ROBERT HORNBACK

*To even the most insensitive observer, the first glimpse of this plant must surely be an experience never to be forgotten. Complete with an expanded hood and forked tongue, the [leaf] resembles nothing so much as a yellow-green cobra poised to strike. So great is the similarity that it seems strange indeed that this is a case of pure accident of design rather than of intentional mimicry . . .*

Adrian Slack, *Carnivorous Plants*

One of the most bizarre of western plants, the cobra lily (*Darlingtonia californica*) is also one of the largest and showiest of carnivorous plants (sometimes called insectivorous, their prey consisting mainly, but not entirely, of insects). But unlike the more famous carnivores such as Venus' flytrap (*Dionaea muscipula*), which is rare in nature although easily propagated in the greenhouse, the cobra lily resists domestication. To be fully appreciated, it should be seen as it grows in the wild.

At the Darlingtonia Botanical Wayside, a small state park on the central Oregon coast, cobra lilies grow by the hundreds in a protected bog that is easily viewed from a wooden observation deck. Here, near the northernmost limit of its range, the plant achieves astonishing size in the mild coastal climate.

The cobra lily is not, however, limited to maritime regions. Showing surprising adaptability, it occurs as far as 130 miles inland, flourishing in isolated spots among the Siskiyou Mountains of southwestern Oregon. Its range also extends south to Truckee Pass in California's northern Sierra Nevada, where it can be found at elevations as high as 8,500 feet, and it is common throughout the Klamath Mountains of northwestern California. It was in the Klamath, in fact, that the plant was first discovered. In October 1841, while traveling from Oregon to San Francisco, William Brackenridge, assistant botanist on the Wilkes Expedition, found cobra lilies growing in a marsh near a small tributary of the upper Sacramento River, a few miles south of Mt. Shasta.

John Torrey described the species in 1853, placing it in a new genus that he named for his friend, Dr William Darlington. *Darlingtonia californica* is the only species in the genus, and the only western representative of the pitcher plant family (Sarraceniaceae), whose other members are found throughout eastern and southeastern North America and in Venezuela. The cobra lily is, of course, not really a lily; it's not even a monocot. But its unusual appearance so excites the imagination that the plant has earned such colorful names as cobra orchid, cobra plant, and calf's head.

The menacing-looking "cobras" are the plant's highly modified tubular leaves, which rise directly from creeping perennial rhizomes anchored by short, fibrous roots. Growing in dense rosettes, the tube-like leaves lie along the ground or stand upright to a height of two to three feet. Each tube, as it widens gradually from base to top, twists a full 180 degrees. This torsion, and a narrow, keel-like "wing" that spirals along the length of the tube, suggest the

structural strength necessary to support the dome-like inflated hood that crowns the tube's apex. Beautifully sculptural, each tube represents an impressive example of natural engineering, since a large hood can become bigger than a softball.

Facing outward from the center of the rosette, the hood dangles a showy, red, fishtail-shaped appendage (the blade of the modified leaf) at the outermost edge of its lip. Immediately behind this appendage is the narrow mouth of the tube, facing downward but above the wing. The hood is a yellow-green latticework of veins, in the interstices of which are numerous translucent windows. These form miniature skylights, called areolae, that allow sunlight to enter the tube. Composed of glassy cells completely lacking chlorophyll, the areolae transmit light so well that the hoods glow like lamps when the plants are backlit in the morning or late afternoon.

Scattered over the outside surface of the tube are tiny glands that secrete sugary nectar. These nectaries are especially numerous on the wing and the fishtail appendage. Inside the tube the glands are concentrated on the nectar roll—a flap of tissue that curls inward around the rim of the mouth—and are thinly scattered throughout much of the interior. All across the underside of the hood are small, sharp, backward-pointing hairs. Long, soft, downward-pointing hairs line the lower wall of the tube, while the remaining surface is smooth and slippery. The bottom of the tube is filled with fluid secreted from the wall.

Although delicate and attractive, the cobra lily's velvety flowers are in no way as showy as its leaves. Appearing in late spring or early summer, they rise on straight stems that carry them usually just below but sometimes above the tallest hoods. Each nodding flower is borne singly and has five long yellow-green sepals that arch out around a tight ring of five somewhat shorter dark purple petals. Pollinating insects enter the flower through any of five small openings near the base of the petals. Inside the petals, the stamens are arranged in a close ring around the top-shaped ovary; there are five stigmas on the short, stout style. The abundant seeds, which mature within ten weeks of fertilization, are small, tan, and fuzzy.

## Puzzle of the Cobra Lily

Charles Darwin, who published his *Insectivorous Plants* in 1875, conducted no research on *Darlingtonia* but concluded "from the excellent observations" of two amateur American botan-

ists working in California that it and the other pitcher plants were almost certainly carnivorous, "though the fact can hardly be considered as yet fully proved." This characteristically conservative statement set him apart from earlier researchers, who had suggested that pitcher plants were none other than divinely placed water fountains for thirsty birds. Many years passed before botanists began to understand how these intriguing plants were able to lure, trap, and digest their prey. The cobra lily, because of its geographic isolation and the fact that its structure is distinctly different from that of other pitcher plants, proved an especially difficult puzzle.

Some of the most detailed and comprehensive studies of *Darlingtonia* were conducted during the 1870s by the frontier naturalist Rebecca Merritt Austin, who made careful observations of the pitcher plants growing near her home in Plumas County, California. She mapped the plants' nectaries, noted their pollinators, and discovered much of what we now know about the digestive fluids in their tubes. Her scientific dedication even extended to sitting among the plants throughout a summer thunderstorm to confirm her belief that rain does not enter the pitchers.

Writing early in this century, Luther Burbank presented some unusual conclusions about how the California pitcher plant functioned. For, although he prided himself on his keen powers of observation, the famed horticulturist failed to notice the plant's nectaries (an excusable oversight, as the enticing fragrance emitted by these glands is much more noticeable to insects than to humans). Burbank hypothesized that insects were attracted to the plant because it seemed to offer "a haven from the sun and rain . . . in a cozy chamber, well-lined and weatherproof."

Botanist Mary Elizabeth Parsons, writing at the same time as Burbank, described the cobra lily in her popular *Wild Flowers of California*. Her detailed observations, while more accurate, were colored by an even stronger anthropomorphism:

Nothing could be cleverer than the nicely arranged wiles of this uncanny plant for capturing of the innocent—yes, and of the more knowing ones—of the insect world who come within its enchantment. No ogre in his castle has ever gone to work more deliberately or fiendishly to entrap his victims while offering them hospitality, than does this plant-ogre. Attracted by the bizarre yellowish hoods or the tall nodding flowers, the foolish insect alights upon the tube and commences his exploration of this fascinating region. He soon comes upon the wing, which often being smeared with a trail of sweets, acts as a guide to lure him on to the dangerous



entrance to the hoodlike dome. Once within this hall of pleasure, he roams about, enjoying the hospitality spread for him. But at last, when he has partaken to satiety and would fain depart, he turns to retrace his steps. In the dazzlement of the translucent windows of the dome above, he loses sight of the darkened door in the floor by which he entered and flies forcibly upward, bumping his head in his eagerness to escape. He is stunned by the blow and plunged downward into the tube below. Here he struggles to rise, but countless downward-pointing bristly hairs urge him to his fate. He sinks lower and lower in this 'well of death' until he reaches the fatal waters in the bottom, where he is at length ingulfed, adding one more to the already numerous victims of this diabolical plant.

Among the plant's victims Parsons listed ants, bees, flies, hornets, butterflies, grasshoppers, moths, and beetles. Flying insects are lured to the trap by nectaries on the fishtail appendage—a perfect landing platform—and crawling insects enter the tube by climbing the long nectar-coated ramp created by the spiral wing. Burbank added frogs, toads, mice, and even small birds to this grisly potpourri, noting that their bones were sometimes found in the tubes. These unlucky creatures are secondary victims of the plant; entering the tube to feed on trapped insects, they find that they themselves are unable to escape.

Unlike most pitcher plants, the cobra lily produces no digestive enzymes. The bodies of its victims are decomposed by the action of bacteria living in the fluid at the bottoms of the tubes and creating a nutritive solution that is slowly absorbed by the plant. Other pitcher plants open their lids just before a storm, which enables them to collect rainwater. But the cobra lily can't pull back its hood, so it fills its tubes with secretions from its inner walls; young tubes contain fluid even before they open. The level of the fluid inside a tube tends to stay above that of the accumulated food, with the secreting action apparently occurring in response to the amount of acidity and concentrated nitrogen in the tube.

Because this acidic broth contains no wetting agent (that is, nothing to quickly remove buoyant oils from the bodies of captured prey), it is harmless to creatures that can swim. So the cobra lily does provide a "cozy haven" for miniature aquatic communities of mites, maggots, and microscopic protozoans. One of these tiny creatures, the water mite *Saraceniopus darlingtoniae*, is not known to live anywhere else. It has been suggested that the cobra lily's living fauna has developed a symbiotic relationship with its host, helping to break down insects for easier absorption by the plant.

In trying to account for the cobra lily's carnivory, scientists have suggested that the plant's animal diet supplies it with the essential nitrogen that is lacking in its soil. It follows that, having developed this novel mode of food-gathering, these plants can exploit nitrogen-poor environments where there is little competition from ordinary plants. But while the cobra lily, like most terrestrial carnivorous plants, flourishes in nitrogen-poor soils, the

ecosystems in which it is found are certainly not devoid of competitive plants. It usually grows in strongly acidic sphagnum bogs kept cool and moist by slow-running water from a creek or spring. The sphagnum moss forms a thick sponge over the nutrient-poor soil—usually derived from serpentine rock—where its crowded, upright stems create a strong capillary action that draws water upward through the dead sphagnum below into the living mossy "turf" above. These boggy ecosystems are so specialized that they are sometimes referred to as Darlingtonia seeps.

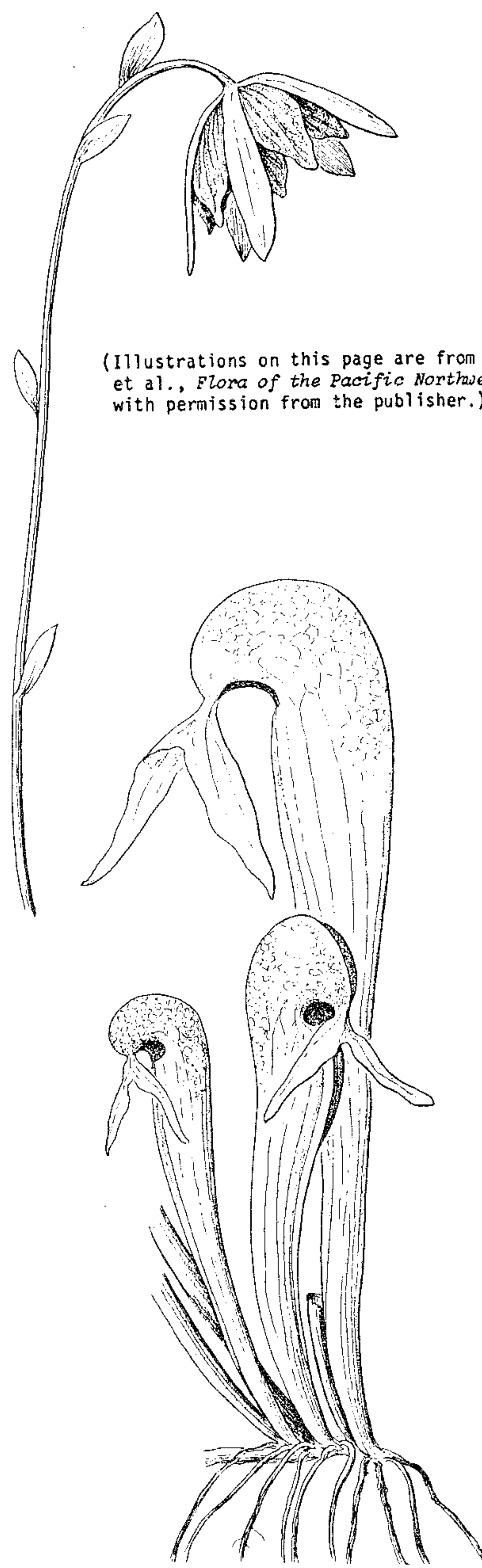
Cobra lilies have neighbors such as sedges, deer fern (*Blechnum*), skunk cabbage (*Lysichiton americanum*), thimbleberry (*Rubus parviflorus*),

western hemlock, and red cedar, as well as ericaceous shrubs such as rhododendron, Labrador tea, salal, huckleberry, and wild cranberry. It is also associated with two other carnivorous plants: the round-leaved sundew (*Drosera rotundifolia*), and more rarely, the common butterwort (*Pinguicula vulgaris*).

## Cultivating Cobra Lilies

From the cobra lily's unusual natural habitat, it is easy to understand why the plant is such a challenging subject for gardeners. It is poorly adapted to the mixed terrarium plantings commonly used for displaying carnivorous plants, but can sometimes be grown successfully outdoors in partially shaded locations throughout the milder western climate zones. Although cobra lilies do not require running water around their roots, they must be kept cool and moist at all times (some growers drench their specimens with icewater to keep them healthy in warm weather) and they need high humidity to develop their fullest size. For best results, the plants should be potted in live sphagnum moss and set in shallow trays of water. Specimens are most readily available as sections of mature adult plants, which are the least difficult to establish. They may also be propagated from root and rhizome cuttings, from whole young leaves, and, with great patience, from seed.

Any would-be grower of cobra lilies should be warned that most commercially available specimens of the plant are collected illegally in the wild. Conscientious gardeners can, however, locate one or two domestic mail-order sources for greenhouse-grown specimens. The plant is listed as a threatened species, which places it just a step away from the endangered category. Even so, advertisements in pulp newsmagazines have promoted this unfortunate plant as a potent, easily grown charm against household insect pests, so collection of the plant will no doubt continue. Most of these collected specimens will die slow and useless deaths in environments to which they are totally unsuited—a tragic waste, especially when set against the astonishing beauty afforded by a cobra lily growing in its natural home. ♀



(Illustrations on this page are from Hitchcock et al., *Flora of the Pacific Northwest*; used with permission from the publisher.)

*Darlingtonia californica*

### Sources:

Seed-grown *Darlingtonia* plants are available from the Siskiyou Rare Plant Nursery, 2825 Cummings Road, Medford, OR 97501. Other sources of carnivorous plants include: Plant Shop's Botanical Garden, 18007 Topham Street, Reseda, CA 91335; and Country Hills Greenhouse, Rte. 2, Corning, OH 43730. The International Carnivorous Plant Society is at the Fullerton Arboretum, Department of Biology, California State University, Fullerton, CA 92634.



## PLANT SURVEYS: BEGINNERS' LUCK

Eight of us met Lois Kemp at Ripplebrook district office on June 15 to join her in a sensitive plant survey, one of the steps in Forest Service planning process for a timber sale. These surveys, plus the updating and revision of Sensitive Plant Field Guide (it's beautiful, don't ask, it's only for USFS personnel) and handbooks, are Lois' 1988 projects for Mt. Hood National Forest. Sensitive plants: those rare, endangered or threatened to any degree.

Years of field work is compressed into the handbook, listing 49 Sensitive Plant species for MHNH. Separate charts showed us habitats, flowering times, colors, families and indicated that five of the 49 were of documented occurrence, 14 suspected, in the Bear Springs district where we were going.

So, equipped with GS and aerial maps and the handbook pages appropriate for our search, we followed Lois down Roads 46, 42, 4220 and 4240013/270 into T7S R8E Sec. 11, the Bow Timber Sale, Units 1 through 14.

For the most action in one day, a loop through Units 6, 7 and 4 looked promising. Unit 6 proved to be a dry forest of Douglas fir, western and mountain hemlock, noble and silver fir, some blowdown, not enough rhododendron and vine maple to hamper us or obscure the clintonia, linnaea, pyrolas etc. Our targets were more apt to be in wet forest, meadows, dry cliffs, grassland or alpine slopes. But, Lois reminded us, "Look at everything...you never know!"

Unit 7 was in similar forest until we neared the west boundary, next to Trapper Springs Meadow. Here was a bog "within a generally forested area", one of the specified habitats. Yew, cedar and Engelmann spruce led us into a swamp/bog of sphagnum moss, caltha...and while the rest of us were distracted by the beauty of Kalmia occidentalis in its prime, Esther Kennedy concentrated on the task we came for, making the find of our day: one of the beautiful bushy club-mosses, threatened in Oregon, Lycopodium annotinum.

While Esther began to fill out the lengthy sighting form, Lois directed the rest of us, after flagging the site thoroughly, to hunt for other populations (several were found) and to check distance from Unit 7 boundaries.

Although not within the unit, most populations of LYAN (first two letters of genus and species) were within from six to 20 feet of the boundary. Logging could not avoid the plants and would surely destroy this habitat. The spring-fed stream feeds Warm Springs River. In the final space of the sighting form, for remarks and recommendations, our request was to amend the

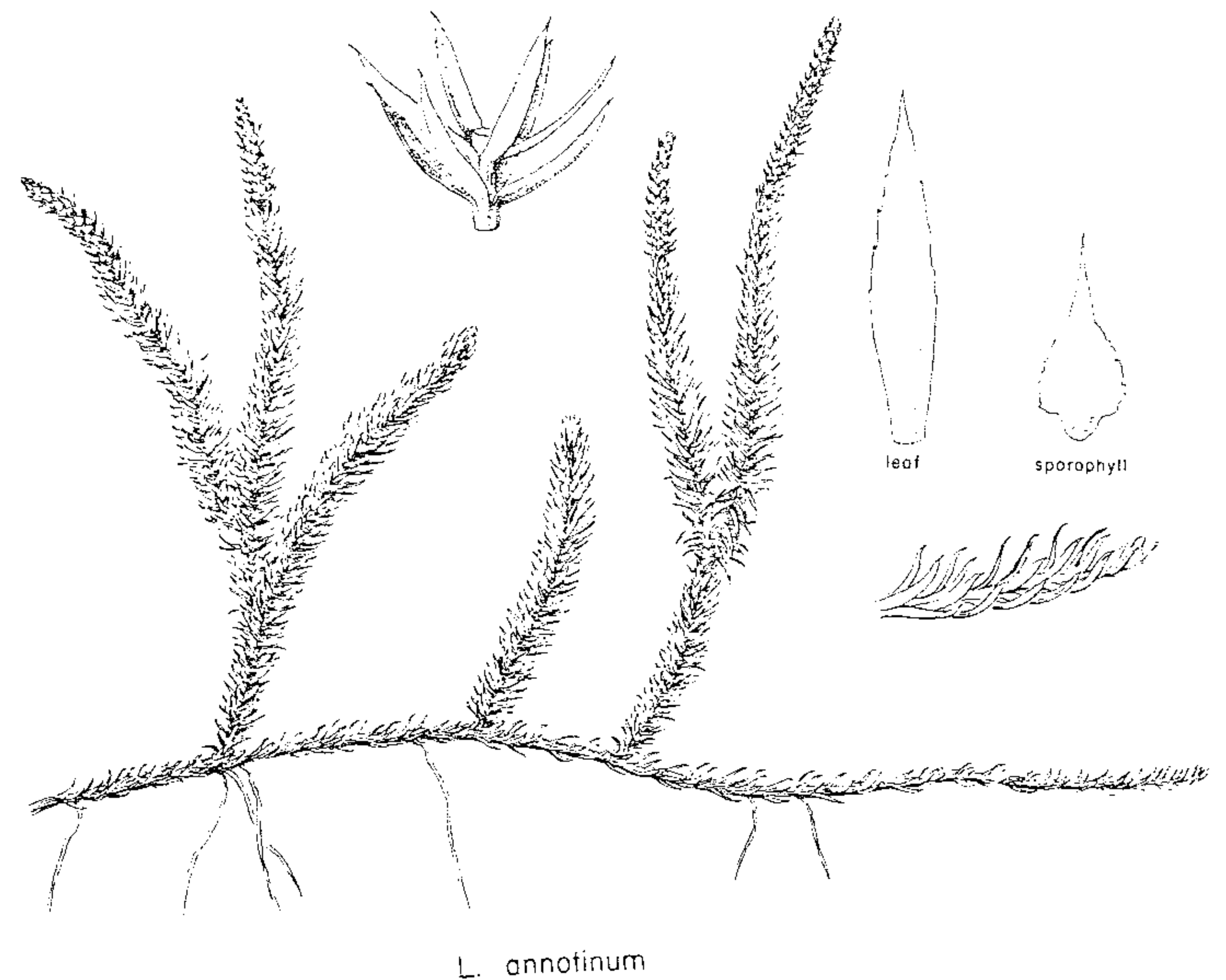
unit boundary to preserve this part of Trapper Springs Meadow.

Piece of cake? We went right out and found an important plant? Plant surveys are not often so neatly done. We had Lois guiding us. Unit boundaries were already marked. Normally the botanist has a map and must determine the proposed sale location. We were in relatively open and level terrain and in good company. Lois, and the five part-timers who comprise the survey crew for MHNH this summer, go alone, up/down steep ridges, over/under blowdown, relying on compass to find the way home. Two-way radio is a required companion for emergency. Many rough scrambling days may pass without a "find."

We came home with great respect for the work of these survey folks. A figure that sticks in mind: in 1987 53 sightings of 17 Sensitive Plant species were made in MHNH projects (roads, sales, gravel pits etc.) In every case the protection measures suggested by the botanist were followed.

Now here's the postscript to our day. Lois reports that the boundaries of Bow Unit 7 have been amended to leave our LYAN colonies undisturbed.

--Louise Godfrey



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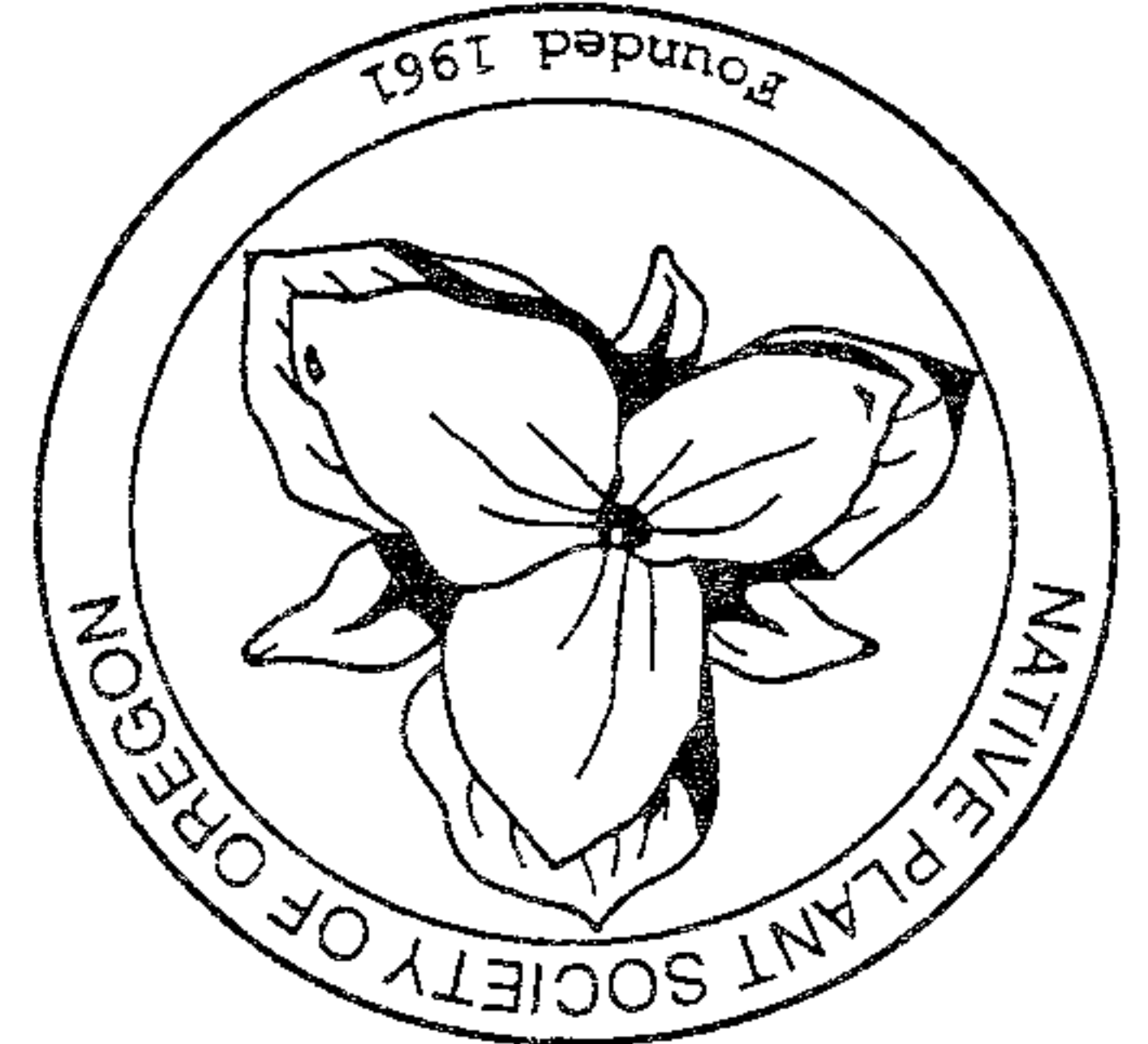
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