American Rock Garden Society

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THE BULLETIN

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CALENDAR OF COMING EVENTS — 1986

Feb. 28-March 2	Western Winter Study Weekend	Empress Hotel Victoria, B.C.
June 28-July 2	Second Interim International Alpine Conference (and Annual Meeting)	Boulder, Colorado

Cover Picture: *Pulsatilla occidentalis,* Glacier Park, Montana
Sharon Sutton, photographer

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Bulletin of the
American
Rock Garden Society

Alpines '86

The Rockies: Preview and Background

Meeting in the Rockies: Alpines '86

For most people, the Rocky Mountains are a place to ski in the winter and drive rapidly through on vacations with one's family in the summer months. The region contains a lion's share of the North American National Parks and Monuments, stretching from Jasper and Banff in Canada to the Mexican border. The Rocky Mountain region also contains a large proportion of North American wildflowers and alpine plants which are of interest to rock gardeners.

So rich and so diverse is the flora of the Rockies that new species of showy flowers — penstemons, bladderpods, and eriogonums — are still being described every year from this area. There is no definitive flora

covering this region in the way that Gray's *Manual* covers the eastern United States. The very diversity of flowers and microclimates causes a considerable amount of perplexity: Does this desirable penstemon come from a desert valley or from a subalpine bog? Do you plant this unknown allium in the sun or the shade? What exactly are the climatic bounds that *Aquilega jonesii* will tolerate in cultivation?

Rock gardeners have explored the Rockies extensively throughout the 20th century. Early issues of the *Bulletin* are filled with detailed accounts of Rocky Mountain plants by Kathleen Marriage, Carlton Worth, Claude Barr, and Frank Rose. Recent decades have introduced many new explorers to their ranks.

Nearly every article written about the Rocky Mountains mentions some new species or even new genus of endemic plant which promises to have rock garden value. *Androsace, Anemone, Aquilegia, Aster, Caltha, Clematis, Delphinium, Draba, Gentiana, Primula, Ranunculus, Saxifraga, Senecio, Trollius* — these genera are all well represented in the Rockies as they are in most mountain ranges of the Northern Hemisphere.

Just as islands isolate plants and animals and lead to rapid genetic drift, the hundred or so mountain ranges that comprise the Rocky Mountains have created numerous laboratories of genetic inbreeding and variation among wildflowers. Of the twenty species of primrose in North America, over half are restricted to the Rockies, many of them endemic to only a single mountain range. Among the principal genera of Rocky Mountain plants, species seem to be evolving before our eyes. There are hundreds of species of *Cryptantha, Erigeron, Eriogonum, Lesquerella, Penstemon,* and *Phlox*. The center of distribution of most of these genera is in the Rocky Mountain region.

The Rocky Mountain Garden: A New Kind of Gardening

Rock gardening may aspire to mountain heights, but it was born and nurtured in maritime climates. Britain, Japan, the northeastern United States, and the Pacific Coast are moderated by the influence of the ocean. Rain can fall most times of the year and usually does.

The Rocky Mountains are separated from maritime influences by the Cascades, the Sierra Nevada, and vast deserts and plateaus to the west. Even larger stretches of continental landmass intervene to the east. The keynote, then, throughout the Rockies is drought. Long rainless periods occur at nearly any time of year. Large intermountain regions are treeless, sustaining a meagre cover of xerophytic shrubs and herbaceous plants.

This is a region where cushion plants occur at every elevation, in practically every ecological zone. Tiny herbaceous plants predominate throughout the Rocky Mountain region. For rock gardeners, the palette of plants is bewildering in variety and form. Relatively few Rocky Mountain plants have been grown long enough in cultivation for superior garden forms to be selected.

Rocky Mountain gardening is therefore bound to be different. The plants that grow here are far less accustomed to competition from trees and shrubs. They grow on far less fertile soils and are much more subject to heat and drought. Traditional rock gardens are designed to grow plants from the European Alps, the Cascades, the Himalayas. New techniques are required to grow plants from continental mountains such as the Rockies or the endless ranges of Central Asia.

The Second Interim

International Rock Garden Plant Conference

In June and July of this year, six hundred rock gardeners from all parts of the world will convene in Boulder, Colorado, to explore the subject of Rocky Mountain plants. What are the principal groups of plants from this vast continental landmass and how can they be grown? Are they impossible to manage in gardens in wetter climates? How can one obtain these plants? How can they be propagated? These questions hint at what is to come.

Pre-Conference Tour

A hundred rock gardeners will initiate the conference with a pre-conference tour starting in Phoenix, Arizona, in the middle of June. Rising to Flagstaff, Arizona, through Oak Creek Canyon, they will observe how the subtropical desert flora that characterizes the Mexican element of the Rockies is quickly replaced by a boreal forest along the Mogollon rim of the Colorado Plateau. This interplay between the Mexican floristic element and the northerly Canadian flora is a principal theme throughout the conference. The pre-conference tour will visit a tremendous range of ecosystems throughout northern Arizona and southern Utah where the landscape is dominated by rocks and natural rock gardens; the Grand Canyon, Zion, Bryce, and Capitol Reef National Parks are arguably the grandest rock gardens in the world. They are filled with dozens of desirable rock plants many of which are completely unknown to domesticated rock gardens.

The Conference Opening

The conference convenes Saturday, June 28 when the Annual Meeting of the ARGS will be held. This is the day when the conferees will have time to linger over the numerous displays, exhibits, plant shows, and art shows that are staged in the immense Events Center situated alongside Kittredge Commons on the campus of the University of Colorado. There will also be a large plant sale held on the floor of the Events Center with over a dozen nurseries displaying thousands of unusual alpines for sale to conference participants.

Shuttle buses will take conferees on a short tour to the nearby foothills to see fields of calochortus, penstemons, and a wealth of lowland wildflowers

for which the Boulder Mountain parks are famous. The tour will include the gardens of Mary Maslin and Allan Taylor, the former garden well known to members of ARGS through the writings of T. Paul Maslin. The Taylor garden features western American plants and is full of unusual penstemons, cacti, and xerophytic shrubs as well as a rhododendron section.

In the late afternoon the first sessions will convene with the first speakers preparing the conferees for the four days of field trips that are to follow. Speakers have been chosen for their knowledge of Rocky Mountain alpine plants either in gardens or in the wild.

The Speakers

Frederick Case has written extensively on trilliums and on orchids of the Great Lakes so that many members of ARGS associate him with woodland gardening and the eastern deciduous woodlands in particular. Fred and his wife Roberta are equally interested and knowledgeable about the wealth of alpine plants that grow in the western states. They have explored widely from the southern Rockies all the way to Alaska. In this presentation, Fred will concentrate on the alpines of the Beartooth Plateau, considered by some to be the richest stretch of tundra in the United States. He will show how some of these plants have adapted to cultivation in the Midwest as well.

The gardens of Geoffrey Charlesworth and Norman Singer in South Sandisfield, Massachusetts, are well known for their extensive collections of herbaceous plants. Using raised beds to ensure drainage, they have managed to grow a broad spectrum of western American alpines hitherto thought impossible to grow in the eastern states. Geoffrey will describe his experiences and show how western alpines can be adapted to eastern conditions.

Norman Deno has evolved a different technique for growing western American alpines and dryland plants. By spreading 6 to 10 inches of sand over his native soil, Norman has grown many westerners for a number of years. Norman's goal is to select plants adapted to the higher humidity and rainfall of central Pennsylvania, so he tries to encourage self-sowing and the building of reproducing colonies. Such difficult groups as eriogonum, western phlox, shrubby penstemon, and even cactus have proven long-lived under this regimen. Norman obtained many of his finest plants from Claude Barr with whom he had a long-standing friendship. He has also explored extensively throughout the West on field trips.

Jack Elliott, President of the Alpine Garden Society of Great Britain, is well known as a superlative grower of alpines from all parts of the world. He delights in growing plants from seed and over the decades has grown a wide range of western alpines. Jack grows a bewildering variety of calochortus and fritillarias in his alpine house, many of which were exhibited in a special display at the last International Rock Garden Plant Conference. He is regarded as a connoisseur of the best alpines.

Loraine Yeatts has climbed most of the high mountains of Colorado and is well known in the region for her artistic photographs of alpine and desert plants. She is an amateur botanist and enthusiastic gardener who seeks out the unusual plants throughout the West. In her talk she will not only show us

Erwin Evert is a botanist and gardener who spends his summer exploring wide stretches of Wyoming and Montana and his spring and fall gardening near Chicago. Over the last 10 years he has discovered a number of new species of alpine plants as well as a fascinating cushion plant in the carrot family that is so distinctive that it was deemed worthy of a new generic status. *Shoshonea pulvinata* is named for the canyon east of Yellowstone where Erwin has concentrated his explorations of late. In his talk Erwin will show many of the rarest and most interesting plants of the Middle Rockies, revealing that many are not so rare after all.

Olafur Gudmunsson is editor of a leading horticultural journal in Iceland as well as an enthusiastic seed grower. His specialty is *Lewisia,* but Olafur has grown hundreds of other interesting western plants at his island home. It is intriguing to see how well many of these have adapted to maritime conditions.

Robert Heapes is an expert photographer and rock gardener who has spent years in seeking out unusual plants throughout the Colorado piedmont. He has served as naturalist in Roxborough State Park south of Denver where he compiled a plant list and key for use by staff there. He has documented with photographs the plantings at the Rock Alpine Garden at Denver Botanic Gardens. There can be no better guide to reveal the wealth of plants that grow below the alpine heights in the Colorado Rockies.

Atsushi Kuyama, currently secretary of the Japan Alpine Garden Society, has recently designed and planted an immense rock garden featuring alpines from around the world in Awaji Island in southern Japan. The climate there is warm temperate, so he must cultivate many of the higher alpines in a special climate-controlled alpine house. He will share his experience growing western American alpines in this very different setting.

Elizabeth Neese is a botanist who has carried on extensive research throughout the Great Basin. Very much interested in gardening as well as botany, she has sought out and photographed plants worthy of cultivation throughout this rich, little-explored region. Two areas where she has done intensive field work include the Henry Mountains in the Colorado Plateau country and the Uinta Basin which was extolled by Dwight Ripley. She is currently completing a flora of the latter region. Her slides will reveal a wealth of cushion plants unknown to cultivation.

Otakar Vydra has amazed gardeners on the West Coast with his slides of his extensive garden in the mountains of Czechoslovakia. He is a pioneer in the crevice technique of rock gardening in which boulders are literally built of smaller rocks allowing crevices where alpines can be planted. This method has proven ideal for growing difficult western American alpines.

places few people ever see, but she will reveal adaptations that both alpine and desert plants have evolved to aid them in their struggle for survival.

Field Trips

However fine the talks, they will serve only as introductions to the field trips which will follow from Sunday to Wednesday. Each day the buses will take conferees a little higher into the Rockies revealing a variety of desirable native plants in each ecological zone. Knowledgeable guides will be at each location to lead conferees on hikes to see all plants of interest. These field trips are the heart of the conference, the opportunity to encounter nature head on.

Post-conference Tours

Just to tempt you even further, the post-conference tour will take a hundred travelers up through the Laramie Plains into Wyoming and the eastern ranges of the Rocky Mountains. Medicine Bow or the Snowy Range, Big Horns and Beartooths may be names of your dreams but to visit them along with Yellowstone and the Grand Tetons — perhaps the scenic prizes of the Rockies — can only entice you to attend the Second Interim International Rock Garden Plant Conference even more. Perhaps 3 weeks of "Rock Gardening" from the very start to a final ending in Denver would be too much for some, but for rock gardeners, I very much doubt it.

The Rocky Mountain Chapter of the ARGS and the Rockies themselves await you this summer!

— The Committee

Westward Ho! — Hardly do we cross into Wyoming "on U.S. 30, before delightful small plants appear. We must be on the alert for *Penstemon erianthera* (lavender), *angustifolius* (intense blue) and *exilifolius* (tiny white), not to be confused with the larger P. albidus). Just west of Cheyenne, the road crosses the low Laramie Range, where in spring precious (and still unintroduced) *Mertensia humilis* is said to sheet the summits with blue. It could be found, a few years ago, along the highway itself at the very edge of Laramie, in company with a tiny Phlox. Brilliant gaillardias and many other plants call for frequent stops while travelling the few miles between Cheyenne and Laramie. I suspect that a bit of search would reveal *Polemonium mellitum,* with long cream trumpets, in shady rock crevices."

Dr. C. R. Worth
ARGS Bulletin, May-June, 1950

Anemones in the West

What group of hardy plants is more adaptable or varied in nature or the garden than anemones? One or another species of *Anemone* can be found from the permafrost of the arctic to the littorals of the Mediterranean. In America, *A. tuberosa* thrives in the desert Southwest, among cacti and agaves. *Anemone caroliniana* is still common along the eastern fringes of the Great Plains. For many rock gardeners, the most frequently cultivated anemones are woodland groundcovers that thrive best in light shade. The common European wood anemone, *A. nemorosa*, is typical of this group.

American Woodland Anemones

Few people realize that there are several species of *Anemone* growing in North America that superficially resemble the European wood anemone. The best known of these is the eastern wood anemone, *A. quinquefolia*, which occurs sporadically in rich deciduous woods throughout the eastern United States and Canada. It is rather more frail and delicate than its European relative and seems to be less vigorous in cultivation. It differs in having leaflets divided in five rather than three segments.

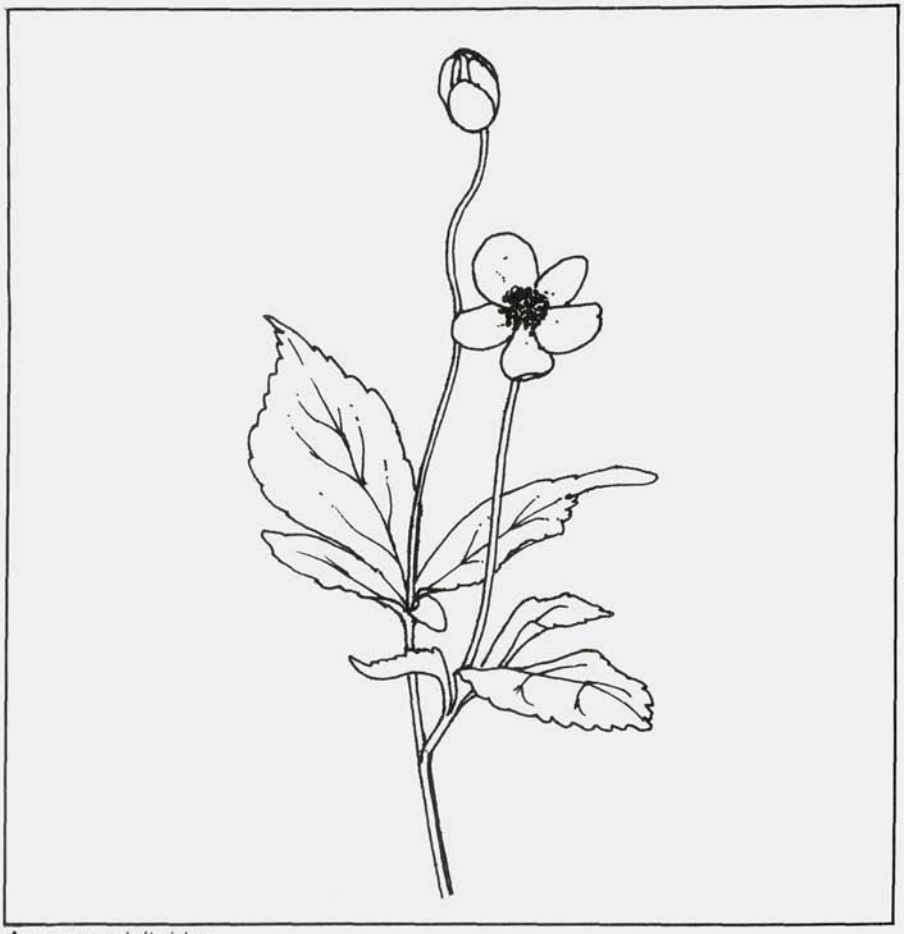
Anemone oregana, *A. deltoidea*, and *A. lyallii* are three rhizomatous anemones found widely to the west of the Cascades in cool woodlands. *Anemone oregana* also is found on the drier eastern Cascades and Blue Mountains of Washington and Oregon. There are even records of some anemones quite like these far to the east in the Uinta Mountains of Utah. Though most of the forms of the western wood anemone in cultivation closely resemble the European species in general effect, they lack its adaptability in cultivation.

One wood anemone largely restricted to the interior ranges of the West is *A. piperi*. Like *Waldsteinia idahoensis* and *Coptis occidentalis*, this is a narrow endemic to the wet mountain ranges bordering the Idaho panhandle. *A. piperi* is much larger and more vigorous than other western wood anemones. It would be an interesting plant to attempt in cultivation, although I know of no one who has thus far managed to grow it.

Mountain Anemones

The anemones most commonly encountered at higher elevations in the Rocky Mountains are clump-forming meadow plants with deeply divided, hairy foliage and comparatively small blossoms. These are the thimbleweeds: so noticeable with their neat, spherical, cottony seed heads; so irresistible to seed collectors. Needless to say, this group of relatively unattractive anemones is quite frequently listed on *indices seminorum.*

The tall thimbleweed (12-18 inches in some forms) with deep red flowers



Anemone deltoidea

occurring throughout the Rockies is called *A. multifida* or *A. globosa.* It has proven a little too easy in cultivation and will quickly spread by self-sown seeds in any open or partly shaded situation. A tiny form is found in the higher mountains of the Great Basin and western Rockies and has been segregated into a different species, *A. tetonensis,* by some authors. It looks exactly like the cultivated plant that goes by the name of *A. X lesseri.* I expect this putative hybrid may trace its ancestry to the Rockies.

The loveliest representative of this section is unquestionably *A. drummondii* which occurs in a variety of forms throughout the western and northern portions of the Rockies, the Cascades, and the Sierra. It is usually intensely hairy and quite compact in size. The flowers vary from a pale white

tint to quite deep blues and are much larger than in other anemones of the thimbleweed persuasion. It has been compared to the European *A. baldensis* as well as to a refined, dwarf pulsatilla. Unfortunately, *A. drummondii* doesn't seem very easy to keep or bloom in the garden.

Alpine Anemones

Two anemones that occur sporadically throughout the Rockies are usually found near timberline but often far above. *A. narcissiflora* is by far the best known of these. It is abundant in the high mountains of much of Eurasia, and several subspecies have been described in Alaska. It is absent in most of the Rockies, but in central Colorado it suddenly becomes a common plant in the large willow thickets at lower alpine levels around South Park and Trail Ridge in the northern and eastern portions of the Front Range.

Anemone narcissiflora forms low mounds of dark green, deeply divided foliage crowned with clusters of large vivid white flowers, two to five on a stem, each of which is filled with a bright boss of yellow stamens. From a distance they resemble narcissi of the tazetta ilk.

The Colorado form of *A. narcissiflora* is so much larger of flower and smaller of stature that is has been described as a separate species by botanists with splitter tendencies. However, modern botanists usually recognize *A. zephyra* now only as *A. narcissiflora* ssp. *zephyra*. The seeds of this anemone form flat, ovoid, purple flakes that quickly lose viability in storage. It is imperative to sow them shortly after ripening to obtain any germination at all. Because of this, few people have managed to grow this lovely plant in their gardens.

Anemone parviflora is widespread in the tundra of Alaska and northern Canada, but occurs sporadically throughout the Rockies down to Colorado. It forms tiny mats of deep green leaves which are wedge shaped or cuneate and quite distinct from any other anemone. It is so small and blooms so early in the season that it is easily overlooked by hikers and botanists.

When its flowers first open, they are nearly stemless and resemble a few-sepaled dryas. As the season progresses, the stems elongate to 5 or more inches, ending in a spherical seed head that eventually explodes, much like the thimbleweeds, into a cottony mass. Since *A. parviflora* usually grows near lingering snowbanks and along icy rivulets, it is no surprise that it is difficult in cultivation.

Pasqueflowers — Queen of Anemones

Over the last hundred years the pasqueflowers have been batted back and forth relentlessly between *Anemone* and *Pulsatilla* by botanists. There is no question that there is a wealth of distinctive plants in this group distinguishable from other anemones in a variety of characters. It really matters little to gardeners what generic name may be in fashion.

Some westerners confuse the issue hopelessly by calling them all wild crocus since they are among the earliest flowers to bloom in the prairies and mountains throughout their range. *Pulsatilla patens* is certainly one of the most widespread wildflowers in the West, occurring from the Great Plains and pinyon-juniper woodlands up to subalpine forests and climbing above 12,000 feet in parts of the Saguache Range of central Colorado. It is possible to find pasqueflowers blooming from late March to late June and early July in most years if one knows just where to go.

Typically, the common pasqueflower is a pale lavender muted with many hairs on both the sepals and the foliage, enchanting to the early flower hunters. It is obviously closely allied to the common European pasqueflower, *Pulsatilla vulgaris,* which is usually so much more virulent a violet in tone. The native species appears to be rather more difficult to grow than the European species — probably a recommendation to most gardeners. *Pulsatilla vulgaris* can quickly become a nuisance by self-sowing, although only the most hard-hearted gardeners eliminate it altogether from their gardens.

In England, gardeners delight in growing their common pasqueflower with the common primrose, *Primula vulgaris,* a combination occasionally echoed in the American prairies when *Pulsatilla patens* grows among wrinkled puccoons, *Lithospermum incisum.*

If it is possible to tame the pasqueflower, the old man of the mountain remains a holy grail to most gardeners. Surely no western plant speaks more eloquently of alpine heights than *P. occidentalis.* Rarely found far below timberline, it seems to grow best on exposed ridges far above the trees. It is common throughout the Olympics, Cascades, and Sierra and through the Rockies from Alberta to Montana south and west to the Wallowas. Superficially it resembles the large white-flowered phase of the European *P. alpina* so common in the granite portions of the Alps.

The foliage in our species, however, is much more finely divided into a deep green filigree that resembles nothing so much as some strange rattlesnake fern. The flowers are that virginal shade of white that seems reserved for alpines and tropical orchids. They are somehow rounder and more open than the flowers of the lavender species. The seed heads which develop do not form the hysterical starry mop so typical of pasqueflowers. Instead, they look far shaggier and more substantial and constitute even more of a spectacle than the flowers.

Occurring as it does in much wetter mountains, *P. occidentalis* often doesn't come into bloom until deep snowbanks melt in July or even August some years. It is much more familiar to summer tourists than its widespread cousin.

Other Anemones

Quite a few other anemones occur in America; some, like *Anemone cylindrica,* are simply giant thimbleweeds with tiny flowers suitable only for

gardeners with the most unquenchable curiosity. *A. canadensis* is often sold in wildflower nurseries. This tall slender plant is quite lovely, forming white constellations of flower in meadows and open woodland in the central parts of the United States and southern Canada. It can be a pest in gardens, however, unless one has a special bed for behavioral problems.

Anemone tuberosa is America's only anemone largely restricted to desert regions. It has a low mound of foliage springing up very early in the season and a tall stem with pale pink or orange blossoms. *A. tuberosa* is widespread in rocky habitats within the chaparral of the southwestern United States. Most of the regions where it grows rarely experience prolonged frost. It has not yet proven hardy in Colorado.

Anemone caroliniana, like certain Mediterranean anemones or *A. keiskeiana* from Japan, has the peculiarity of producing its mounds of foliage in midwinter. In early spring it covers itself with aster-like many-sepaled blossoms of bright blue, pink, or white. It is quite common in some parts of the southern Great Plains where farming has not utterly supplanted the native vegetation. It appears to be difficult in cultivation.

The American anemones might not compare in variety to those in Eurasia, nevertheless, like our native primroses and gentians, they display novel features that cannot be found in their Eurasian cousins. We should get to know them better.

Penstemon secundiflorus, a Generic Penstemon

Penstemon is the first genus of American wildflowers to have inspired the formation of a specialist society dedicated solely to their study and to promoting their cultivation. One can understand the need of such a society in view of the fact that the genus includes almost three hundred species plus a plethora of subspecies, forms, and hybrids. Penstemons have been almost as successful in attracting monographers and taxonomists as they have at attracting gardeners and pollinators. Pennell, Penland, Keck, Crosswhite, and most recently Noel Holmgren, have added immeasurably to our knowledge of this group of plants. For gardeners, the various penstemon handbooks and field identifiers published by the American Penstemon Society are especially valuable.

Even a dedicated, card-carrying member of the American Penstemon Society will confess that a large proportion of the species that are available are often similar in general appearance. So few of these generic penstemons have been described in the past that even someone who would like a tall herbaceous penstemon is sometimes hesitant to test the waters.

The generic penstemon grows from 15 inches to a yard in height with opposite, clasping leaves along its stem; leaves can be toothed or more or less entire with more or less glandular pubescence. Basal leaves are lanceolate and glaucous or else bright green. Flowers within a species or among the entire range of generic penstemons seem always to vary from pink through lavender and muddy purples to dazzling blues.

Although taxonomists keep delineating more generic penstemons, we really don't need more; we just need to get to know the old penstemons better.

Penstemon secundiflorus is an example of a generic penstemon. Descriptions indicate that it grows from 8 to 36 inches high. Flowers are blue to pink. The foliage can be quite variable in its glaucousness. The descriptions are so vague they inspire no one to grow them.

Upon reading most published accounts of plants I know well in the field, I understand how celebrities must feel when reading about themselves in checkout stand tabloids. Scientific descriptions can be nearly as misleading since the diagnostic characteristics that distinguish a penstemon in a key are not necessarily those that distinguish it in nature or in a garden. Botanists tell us that what delineates *P. secundiflorus* in the combination of glaucous, linear to broadly oblanceolate foliage; ovate to ovate-lanceolate sepals; a corolla bearded within; and a lax, open and strongly one-sided inflorescence.

To recognize this penstemon, know that it grows from southernmost Wyoming along the base of the Big Snowy Mountains and the Laramie Hills in Albany County extending south along both slopes of the Front Range in Colorado as far as the southern foothills of the Sangre de Cristo range in New Mexico.

West of the Continental Divide this penstemon is highly variable and rather unattractive. This form is sometimes segregated as *P. s.* subsp. *lavendulus* — a name to remember and avoid. It has narrow foliage, shorter stature, and flowers of indeterminate color.

Typical *P. secundiflorus* is rather tall, 18 to 30 inches. Leaves are thick to the point of succulence and covered with a glaucous bloom that can actually be rubbed off. They are sharply pointed. Similar leaves extend up the stem to the comparatively large flowers. Much rounder than most penstemon flowers, they resemble bignonias or gesneriads in shape and texture.

The color and texture of these flowers is more reminiscent of seashells than *any* other penstemon. Their color wavers pleasingly between lavender and pink and is such that it glows on cloudy days and stands out in the sun.

In nature, *P. secundiflorus* is selective of its habitat. It is never near the glowing aquamarine *P. angustifolius* which insists on alkaline prairie loams. Neither does it grow next to *P. virens* which prefers the acid duff under ponderosa pines. *P. alpinus* occupies the same sort of habitat as *P. secundiflorus,* only at higher elevations where conditions are wetter.

Penstemon secundiflorus selects only the steepest slopes on undis-

turbed sites where bedrock is shallow. It is occasionally found in sterile pastures and rarely in sparse woodland. Like so many western penstemons, this species prefers road cuts to any natural site. On coarse granitic roadbanks throughout its range, thick colonies bloom in early June. It is rarely found above 8,000 feet where bright blue *P. alpinus* takes over, blooming later in summer.

I suspect that even in nature *P. secundiflorus* is not long lived. Occasionally one finds evidence of rot at the base of older plants in the mountains which is not surprising. The caudex is so fat and succulent that it looks edible to a human, to say nothing of a hungry microbe.

Even so, this is one of the more adaptable species in cultivation. Considering its natural habitat, it adapts readily to scree. Remember its height, however. It seems to be tolerant of clay, even vegetable loams. Its average life span in cultivation is about 5 years regardless of soil. A plant that grew spontaneously in a crevice of a granite boulder in my mother's garden in Boulder has lived many years without showing any signs of flagging. Perhaps if gardeners in wet climates really want to succeed with wet-sensitive penstemons, they need only sow them onto boulders where they often thrive naturally.

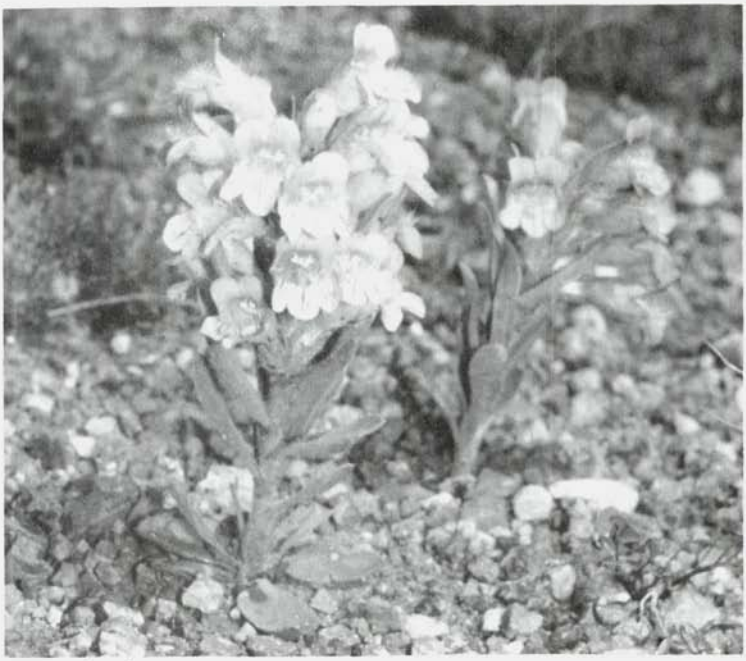
I think this plant is well worth the effort. I wouldn't want to be without *P. secundiflorus,* a generic penstemon.

Penstemon eriantherus **Pursh**

Otherwise intelligent people racing across America's interstate highways have been known to mutter strange and uncomplimentary things about the vast intermountain region. Wyoming, for instance. What is it good for? Miles and miles of cold desert. Never a tree. Just rocks and stunted sagebrush, not much else.

I hope that rock gardeners never fall into this sad mode of thought. Most of us possess more than a little trace of misanthropy and love of freedom. Surely space, like beauty, is its own excuse for being. Nevertheless, the great cold deserts of North America, those seemingly desolate wastes — the Malpais of New Mexico, the Navajo and Colorado deserts of the Four Corners region, the Gunnison and Grand valleys and the Piceance Basin of Colorado, most of Nevada and southern Idaho, the Uinta Basin and the Great Salt Lake Desert of Utah, the Red Desert and Laramie Plains of Wyoming — possess hundreds of endemic plants which are among the loveliest rock garden plants available to us in our art.

Penstemon eriantherus is one such gem. The variety prevalent over most of the eastern end of its range is the type, *P. eriantherus* var. *eriantherus,*



Penstemon eriantherus Photo: Phil Pearson

which reaches its southernmost stations in the Laramie Plains in one of its finest manifestations. Not quite so common there as it is farther north, colonies consist of a few hundred individuals scattered a mile or so apart. It blooms several weeks before *P. laricifolius* var. *exiliifolius* takes over with its ivory bells. Thick mats of astragalus occur nearby. *Eriogonum ovalifolium* is often blooming on gravelly benches near *P. eriantherus. Penstemon* umbellatum in an especially bright yellow, compact form is quite common a month after *P. eriantherus* finishes.

The sagebrush that fills these meadows is very tiny and forms perfect gnarled bonsai only a few inches high. This is *Artemisia pedatifida,* endemic to these regions. Many other flowers distract a visitor to these barren plains: *Lithospermum incisum, Phlox bryoides,* and in July, the southernmost colonies of *Lewisia rediviva* are refulgent in the gravelly foothills farther west. Wandering onto wetter territory, a visitor may find some of the thickest and reddest colonies of *Dodecatheon pulchellum* in the west. *Primula incana* is not especially showy, perhaps, but delightful to find scattered among its larger and more dramatic cousins, the shooting stars.

The shrubby (Dasanthera) and heather (Ericopsis) penstemons are probably the two sections with the greatest number of gardenworthy species especially appealing to rock gardeners. *P. pinifolius* and *P. gairdneri* are outstanding in drier climates and have pleasing foliage textures.

No other penstemon I have grown can boast foliage that sparkles. It sounds absurd to relate this fact, but it is my duty. The Great Plains form of *P. eriantherus* produces tiny crystals on its leaves that actually sparkle in the sun. While unquestionably novel, the effect is less garish and more pleasing than it may sound.

Flashy gimmicks aside, the plant still has something going for it. During May and June no need to worry about foliage; it is hidden by dozens of lavender trumpets which are produced all along the 6- to 10-inch stems. On the Laramie Plains its color is invariably pale pink or lavender, varying considerably from plant to plant. This soft color is pleasant, especially since it highlights the mesh of dots and dashes that stipple the throat of each flower. Providing a final touch is the obligate "bearded tongue." As in other species of this section, the staminode of *P. eriantherus* is very large and prominent. The specific epithet means "hairy anther," especially descriptive since it is completely covered with yellow hairs.

Penstemon eriantherus, hairy anther apparent Photo: Phil Pearson

Most connoisseurs when first seeing *P. eriantherus* in bloom would cherish a plant, preferably sooner than later. Seed is produced in such quantity and the plants grown from seed are so much more vigorous, the are well worth the wait.

For many years I had no luck in growing this plant. It doesn't seem to like gravel or scree and frankly detests rich soils. When I first came to Denver Botanic Gardens, I was puzzled by a large area of gumbo clay. This soil is quite similar to the adobe clays where this and other penstemons often thrive. A few plants collected 100 miles north of Denver were put into this bed; they have proceeded to wax and flourish. The bed is watered during the hottest summer months with no ill effects which bodes well for the cultivation of *P. eriantherus* in wetter climates.

If yours is a heavy alkaline soil, you too may succeed with this penstemon. I remind you, however, that it is adapted to a very long and cold and dry winter in nature where snow doesn't melt but sublimates over most of the intermountain region. If it is somehow protected overhead, I am sure that it would prove hardy anywhere. I doubt that it would winter-kill no matter how cold, as long as it remains dry.

Whatever your success in growing it, a healthy specimen of *P. eriantherus* in full bloom is sheer delight!

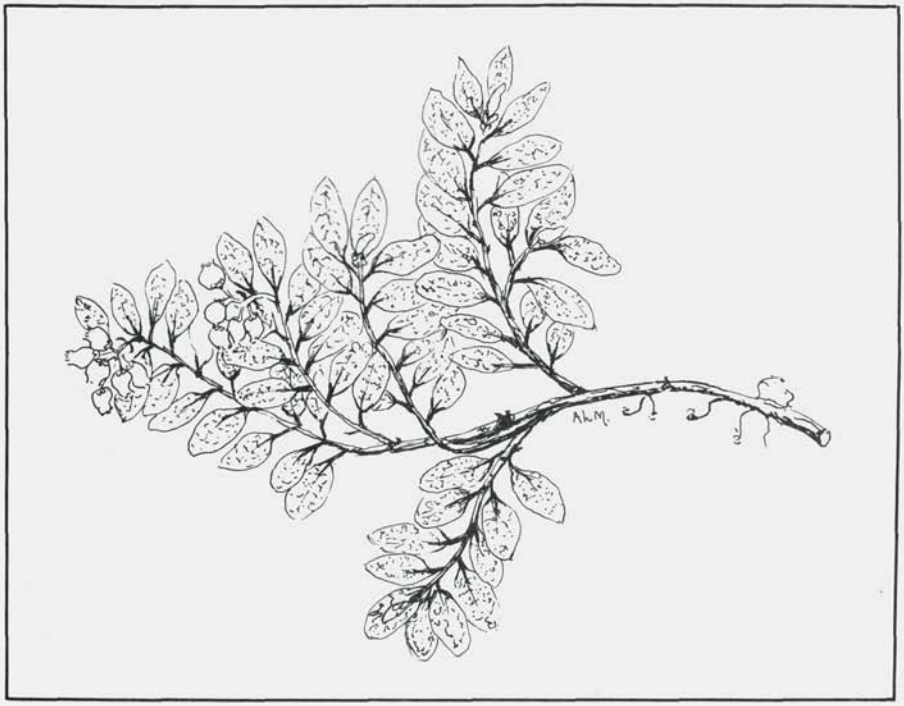
Tough Broadleaf Evergreens Arctostaphylos That Can Take It

Surely no climate is harder on broadleaf evergreens than the steppe climate. On the Great Plains, for instance, winter sun can burn with an almost summery intensity while temperatures fluctuate well below freezing for days and weeks on end. Winds are as characteristic of steppes as grasses, sun, and drought. Drought, especially, can last for weeks at almost any time of the year. Steppe climate soils tend to extremes as well, usually comprised either of heavy clays or virtually pure sands. They are usually alkaline as well, a condition that is considered inimical to the growth of conventional broadleaf evergreens.

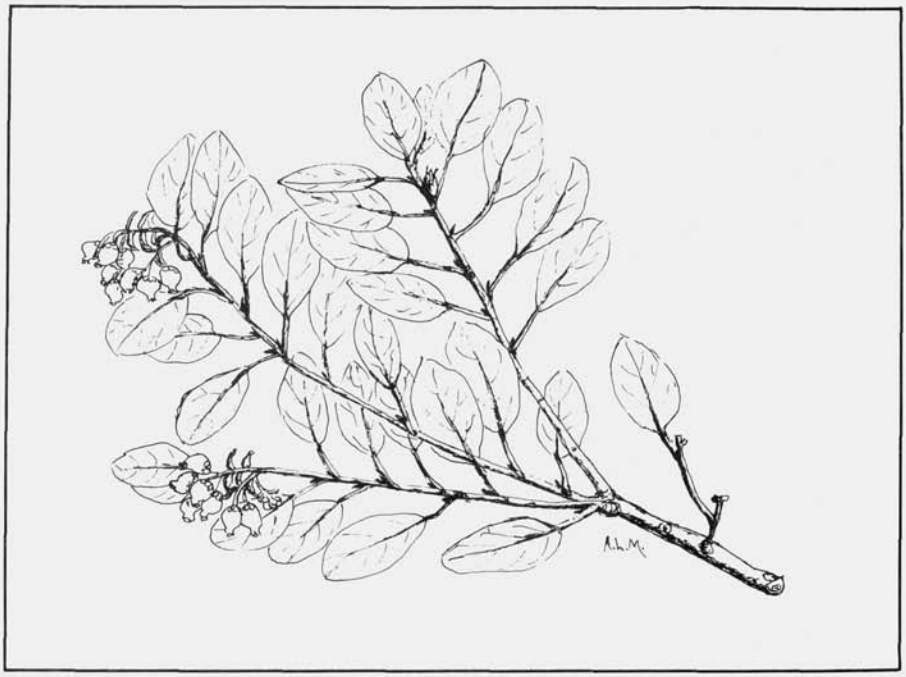
Nostalgic gardeners in the Denver area who yearn for maritime climates manage to grow rhododendrons, skimmias, even Bull Bay magnolias. Rock gardeners especially are adept at studying the special microclimates that permit one to grow everything one shouldn't. But even in an ideal microclimate, under the greenest thumb, a rhododendron here somehow seems to have a poignant air about it reminiscent of that Chinese princess who was married off to a Mongol chieftain and spent her life on the wastes of Ulan Bator.

Of course not all broadleaf evergreens are mesophytes. The steppes and deserts of the world are filled with such plants that thrive on the worst drought and coldest winds. The only mistake these misguided plants insist on making is to refuse to *look* like broadleaf evergreens. Saltbush (*Atriplex* spp.) for instance occurs in a marvelous array of forms, leaf shapes, and textures. Most members of this genus are reliable evergreens that just happen to be gray to the point of whiteness. Sophisticated gardeners in wetter climates would love to grow these trim, refulgent bushes in their gardens to contrast with the prevailing greens. But just as rhododendrons abhor a drought, atriplex detests humidity and water.

There nevertheless exists a paradoxical group of plants that seems to combine the best of both worlds. Several species of manzanitas are found growing at higher elevations far to the east of their center of distribution in California. That state might be likened to nothing less than an oversized growth chamber. Manzanitas have proliferated within its margins where they are not only common but characteristic of practically every ecotone. California is so mild, however, that even manzanitas from the highest elevations west of the Sierra crest seem to be tender in continental climates. But beyond the borders of that state, the plants seem to gain tremendous hardiness.



Arctostaphylos uva-ursi



Arctostaphylos patula

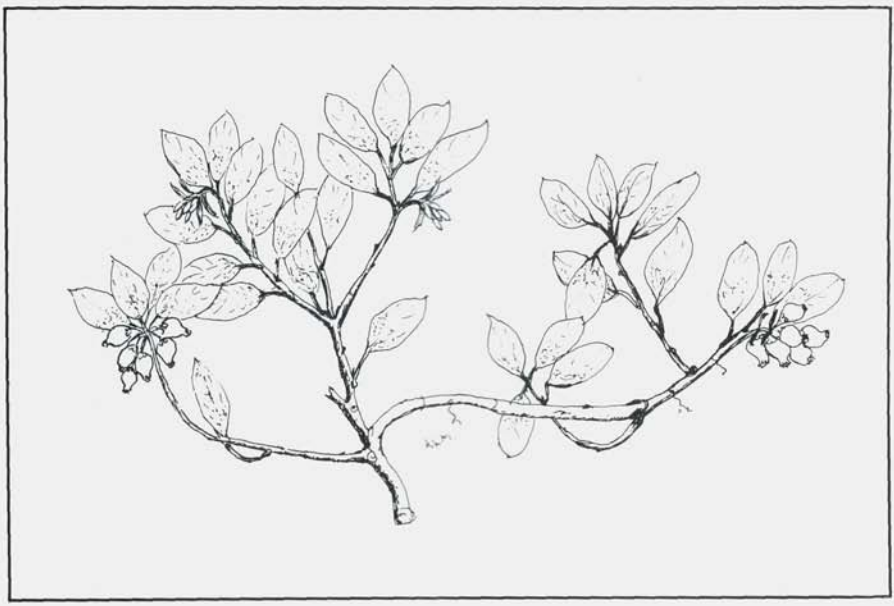
In addition to the universal kinnikinick *(Arctostaphylos uva-ursi),* four true manzanitas extend into the harsh continental climate that prevails north of the Mogollon rim in Arizona. Three of these have thus far proven to be hardy in the steppe climate that extends along the base of the Front Range in Colorado. All three of these are superb garden plants that will do well under ordinary garden conditions here; yet they will endure quite heavy clays as well as alkalinity and neglect. Once established they can go without artificial watering altogether. These are obviously plants with tremendous potential as ornamentals in any cold winter climate where broadleaf evergreens are at a premium.

Arctostaphylos patula (Greene's Manzanita) — Named for the irascible botanist prone to splitting who began his career in the mountains of Colorado. This manzanita is perhaps the hardiest of all the larger members of the genus. On the high mountains of western Colorado, it grows in areas where -30° F is a yearly phenomenon and -50° F has been known to occur. It nevertheless maintains an almost virulent green color throughout the entire growing season. The flowers commonly open in late winter, frequently as early as February, and extend well into April most years. These can be quite large and showy, varying in color from pure white to an almost red hue. If flowers, habit, and foliage were not enough, the trunks of *A. patula* seem to

be of an especially lustrous mahogany color. The berries are decorative, although they are typically more of a muddy brown color than bright red. Birds relish them and they rarely last long into the fall. How many plants can boast this many virtues?

Arctostaphylos patula seems to be the best-known species of these easterly manzanitas, perhaps because it is so common throughout much of Utah's spectacular canyon country. There it's not unusual to find acres of badlands where manzanita forms the dominant element along with pinyon pines and Utah juniper. On a typical winter day the sky is of an Italian blueness. Looking at a vista mottled with white snow, green manzanitas, and stark red and orange cliffs, one realizes how realistic Georgia O'Keefe was in her landscapes.

The variety of form found in *A. patula* is practically unbelievable. Tiny-leaved individuals are found alongside big-leaved plants. Some plants seem to grow no more than a foot and a half tall while in protected spots there are forms of this manzanita taller than a man. The latter are obviously to be avoided in small rock gardens. At least one small form is well established in Colorado: a seedling of *A. patula* appeared spontaneously in Allan R. Taylor's garden in Boulder from some plants originally brought from the wild. This seedling has unusually broad leaves and resembles most tall forms of *A. patula.* However, after many years it has retained a prostrate habit rarely exceeding half a foot in height. Many cuttings have been taken from this plant



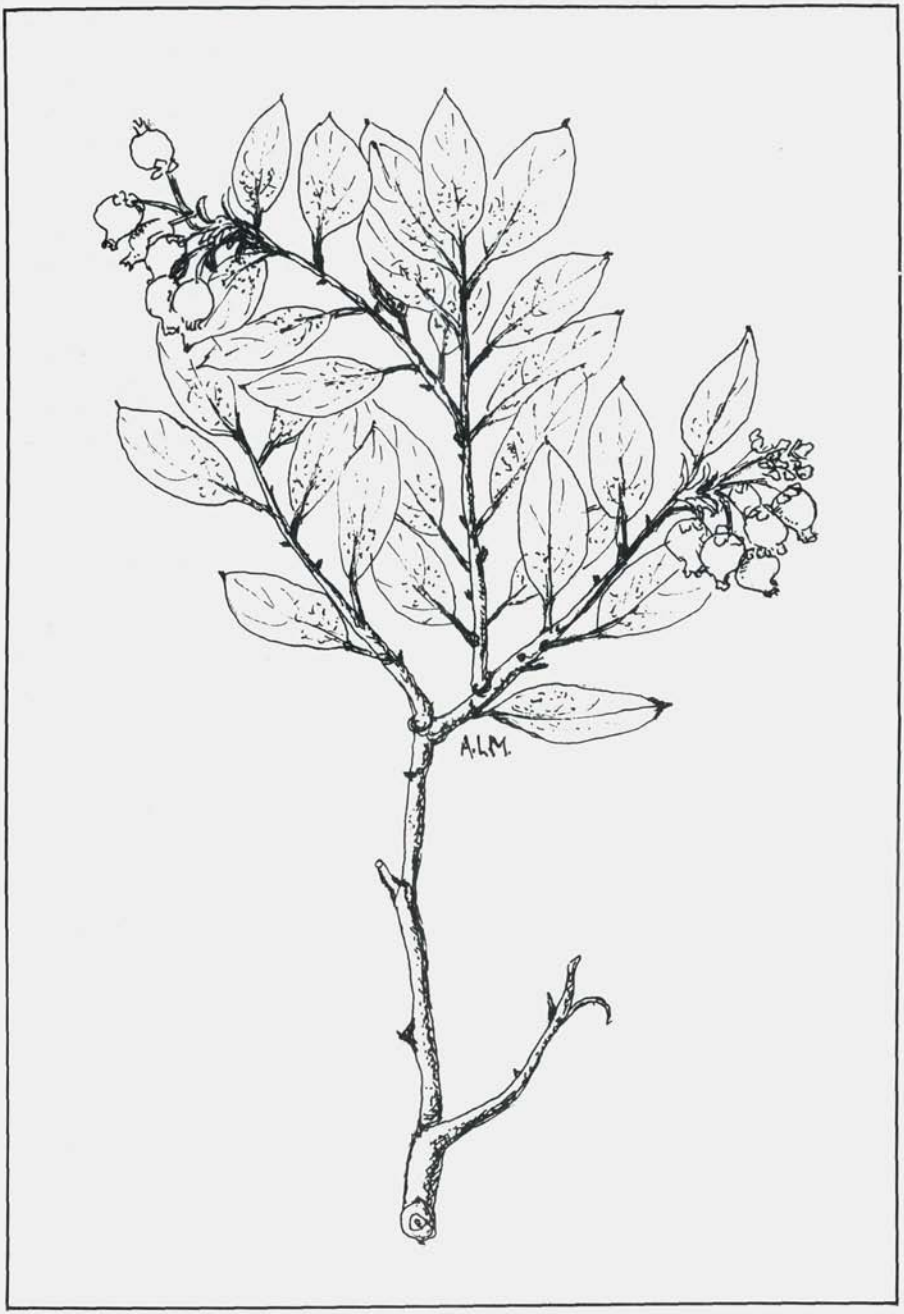
Arctostaphylos nevadensis

in the last few years. It possesses an unusual trait for manzanitas in that it roots quickly and easily from cuttings. Because of its exceptional habit and increasing availability, Allan has suggested that this clone be referred to as *Arctostaphylas patula* 'Chipeta' for the wife of Ouray the 19th century chief of the Southern Ute Indians who lived in the region where this manzanita originated. Plants have been shared with gardeners in many parts of America, and we are eager to see how well it will adapt to other climates.

Arctostaphylos nevadensis var. ***coloradoensis*** (Low Manzanita) — This enigmatic taxon has been the subject of considerable debate among botanists and horticulturists alike. Superficially it resembles the ordinary low manzanita that is so common in ponderosa pine forests at higher elevations on both sides of the Sierra Nevada crest in California and Nevada. It was first described from the summit of the Uncompaghre Plateau where it forms extensive thickets intermingled with the more common *A. patula* and *A. uva-ursi.* Some botanists have speculated that rather than being a disjunct representative of the California taxon, this might be a spontaneous hybrid between *A. patula* and *A. uva-ursi* that has somehow stabilized and perpetuated itself. Indeed, one can find practically every possible permutation from prostrate, typical *A. uva-ursi* to waist-high *A. patula* on this mesa. Some are difficult to assign with assurance to any single taxon. With this nebulous state of affairs it is difficult to speak with certainty about what *A. nevadensis* var. *coloradoensis* typically is. Imagine a kinnikinick that grows almost a foot high and forms such a dense tangle that it can actually keep down weeds and one has a slightly idealized portrait of a typical form of this manzanita.

A form much like this is growing in several localities around Denver Botanic Gardens. These were obtained as cuttings from a large plant in the garden of Allan Taylor in Boulder. Allan in turn obtained his initial layering from Paul and Mary Maslin. The Maslin plant had been collected by Paul in the 1950's not far from the type specimen of the subspecies. Unlike 'Chipeta' this clone doesn't possess any outstanding characteristics to distinguish it from most other representatives of the species. It simply seems to be a good strong-growing form of low manzanita. It has been so firmly established for so long in cultivation and now is available from several nurseries that it may be worthwhile to distinguish this clone from other potentially tender forms of *A. nevadensis.* The clonal name *Arctostaphylos nevadensis* var. *coloradensis* 'Ouray' commemorates that most congenial of Ute Indian chiefs mentioned earlier.

This plant grows less than a foot in height, spreading eventually to cover many square yards. The growth rate is neither rampant nor slow. It compares with most low-growing brooms and hebes in general effect and habit in the rock garden, needing much the same conditions and treatment. The flowers are much smaller than other species of manzanitas and are of a pure white. They never create much of a stir, but the year-around deep green foliage is an asset in any climate.



Arctostaphylos pungens

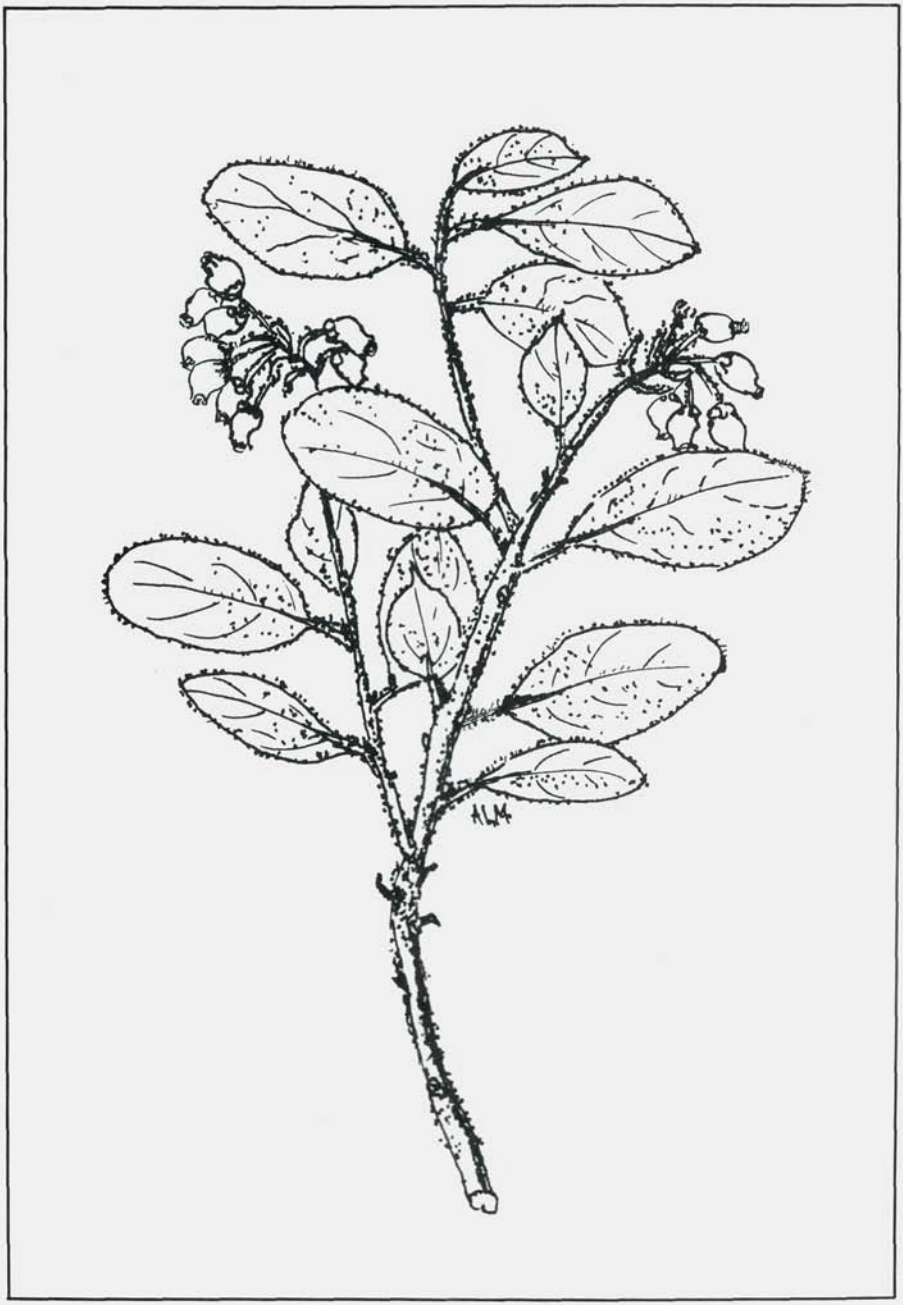
Arctostaphylos pungens (Sharpleaf Manzanita) — *Arctostaphylos pungens* grows far to the south and east of *A. patula.* It is a much smaller-leaved, grayer plant altogether than the manzanitas that prevail in the Navajo Deserts. It tends likewise to grow much taller in nature than these. Throughout the higher portions of the Sonoran and Chihuahuan deserts far into Mexico one can encounter large plants of this manzanita. Most of these are as tender as any California species. The exceptions are found in the higher reaches of the Arizona strip north of the Grand Canyon where a continental climate occurs. Here subzero temperatures are a yearly phenomenon and these tall plants have no way of shielding themselves under snow.

Allan Taylor took cuttings of this manzanita from the vicinity of Flagstaff that were rooted at Denver Botanic Gardens 4 years ago. These were planted out prematurely at the gardens and none survived; but a single plant that Allan pampered at his home has now formed a vigorous bush that survived -20° F temperatures with no damage whatsoever. Obviously this is another distinctive manzanita for the cold climate garden.

Arctostaphylos pringlei (Pringle's Manzanita) — The only other easterly manzanita that could one day provide hardy plants is *A. pringlei.* This is immediately distinguishable from the four other taxa that occur over its eastern range by the large paddle-shaped leaves that are covered with a soft tomentum which gives many plants a ghostly blue-gray sheen. Allan Taylor and I spotted a single plant of this among countless plants of *A. patula* in the Virgin Mountains of Arizona this last winter. We took a number of cuttings that we have rooted and intend to test out-of-doors in Colorado. It is reputed to grow at higher elevations further east in Arizona. Samples from those plants, or the disjunct populations recorded from the summit of the Beaverdam Mountains of Utah, would be more apt to provide hardy plants than our specimen from the Virgin Mountains. This manzanita is so striking in its shining, ghostly blue color that it deserves greater attention.

Much more exploration at higher elevations on both sides of the Sierra might yield a few plants with greater tolerance to cold. The wealth of form and texture available through the species we already know to be hardy is such that these easterly manzanitas are certain one day to become indispensable broadleaf evergreens throughout the colder portions of America. I can imagine no shrub in the rock garden that pays rent in so many ways as the dwarfer manzanitas.

— Drawings by Anna Lisa Moline



Arctostaphylos pringlei

Onward and Upward in the Rock Garden
Rock Alpine Garden, Denver Botanic Gardens: Status Report

Panayoti Kelaidis
Denver, Colorado

The first 14,000-foot peak I ever climbed was Mount Harvard in the Sawatch Range of central Colorado. As with so many of the higher peaks in this part of the state, it is difficult to catch a glimpse of the top of the mountain itself since the climber is situated in the middle of a region where literally thousands of peaks emerge out of a series of converging ranges, and there simply isn't much opportunity to reconnoiter until practically on top of the mountain. Which is easier said than done. I remember leaving from the base camp just below timberline and climbing and climbing and climbing all the while seeing up ahead the lofty, peak standing on the horizon. Scrambling over sharp talus, heaving past one rock, then another, we finally attained the jagged summit only to see another loftier peak looming in the distance. We had only managed to climb a shoulder or false summit of Mount Harvard. Of course, from false summit to false summit an endless tapestry of alpines spread its colors as far as the eye could see. Every time one looked around, the endless vista of receding mountains grew a little bolder. And so the day wore on until I thought the ultimate, actual summit would never appear.

Such is the fate of those who climb tall mountains. A similar fate awaits the person who chooses to grow plants from these same mountain peaks. We quickly learn that the garden and its plants never grow the way we think they will, and especially the way that books say they will. Each year is filled with triumphs and disappointments. More significantly, each year greets the gardener with things never expected. New summits of learning and accomplishment always arise ahead.

When I first came to Denver Botanic Gardens in the spring of 1980, I brought much in the way of plans and expectations with me. The garden had been constructed by Herb Schaal, ASLA, who was the principal of the Rocky Mountain Region of the landscape architectural firm of EDAW. So thorough and careful had been his research into soils, rocks, and arrangement that in the intervening 5 years I have not changed so much as a pebble of the 800 tons of rocks comprising this garden. In meetings with Herb and the directors of the Gardens, it was agreed that rather than attempt to organize this garden along geological lines, we should attempt to take advantage of the many microclimates and ecological niches created within this garden to grow a representative collection of rock garden plants. These would be grown according to their soil and moisture requirements as well as their need for sun and shade. A general planting scheme was drawn up and the search for

plant materials commenced.

In effect, the organizing principle for this garden is ecological; different portions of the Rock Alpine Garden contain collections of plants needing similar ecological niches. There are north-facing peat beds for those plants requiring the coolest and most acid soils such as the alpines from the Himalayas or Japan. There are hot, dry beds for plants from warmer, more continental climates. There are even several areas consisting primarily of clay soil, and many wildflowers actually do best in this environment.

During the first year of the garden we were faced with twin tasks. First of all, we had to clear the beds throughout the garden of the tremendous numbers of weeds that germinated on the newly mixed soils. Weeds also had to be constantly removed as they germinated among freshly planted seedlings during the growing season. This arduous task was lessened in the following years, although weeds are a constant problem in all gardens. Second, sources had to be found for sufficient numbers of alpines to fill practically an acre of ground. Every rare plant nursery in the country was tapped repeatedly during this period. We quickly found, however, that even if we were to operate with an unlimited budget for plant materials, many basic alpines were simply not available as needed. From the inception of the Rock Alpine Garden, the bulk of its plants have been grown by the Propagation Department at the Gardens.

In retrospect, it is difficult to realize that there was a time when many of the principal groups of rock garden plants had not been grown in the Rocky Mountain region except in the gardens of a very few rock gardeners who lived for the most part in the Boulder banana belt. We simply didn't know what plants would survive in this rather exposed, raw, new garden in the heart of Denver. So, it was decided that a typical cross-section of alpines should be tested *in situ*. These included such genera as *Primula, Androsace, Dianthus, Gentiana,* and *Campanula* as well as dwarf conifers. Plants were documented, then planted throughout the various beds of the garden. It may be of interest to note that the summer of 1980 was the third hottest summer in Colorado history with daytime temperatures exceeding 90°F for weeks on end. As armies of seedlings were grown on by the Propagation Department, these too were rushed out to the garden to create room in the greenhouses for still more seedlings. The longest and warmest autumn in memory allowed plantings to continue well into October that year. During the first year of the Rock Alpine Garden, over 15,000 individual plants representing 1,200 kinds of alpines were planted out.

As I surveyed that year's work, I realized that several contradictory phenomena had occurred. The quantity and variety of plant material used was far greater than we had actually planned the previous spring. Reality had far outdistanced everyone's expectations, and yet the summit I had envisioned retreated, practically before my eyes. It was obvious that another year would be needed before the garden would attain the sort of maturity I

saw in my mind's eye. How easily we deceive ourselves into believing that a bare rock bank will mature in no time flat! Unlike annual borders or even conventional perennial borders, rock gardens achieve much of their charm not just from the combination of color, but from the interaction of plant form and texture as with dwarf conifers alongside thick mats of alpines superimposed with sempervivums, bulbs, and even self-sown annuals. Such a successful combination of contrasting elements can be achieved only through time.

Each succeeding year has been a repetition of this paradigm: each winter we anticipate that the garden will somehow attain tremendous maturity, a variety of new plants are grown, and by the succeeding winter we realize that the summit has once again receded and grown far loftier, and more intimidating goals have arisen ahead. It is important to realize that this subtle shift is very exciting, really, because so many unexpected discoveries crop up along the way, so many grand things occur, that one can never regret the path that one pursues.

Now, almost 5 years after the Rock Alpine Garden plantings were commenced, it is perhaps no longer premature to take a look at this garden and see how it has developed. The first thing that strikes one upon walking through is that it is not nearly so stark and empty as it was a few years ago. Plants really do grow. Another feature of the garden immediately apparent to most visitors is that there is an undeniable predominance of hoary-leaved plants which might not be so prevalent in another region. There are more peculiar plants which you are not apt to have seen in other gardens. Astute visitors quickly realize that the Rock Alpine Garden may contain a collection of traditional alpines on its cooler aspects and exposures; nevertheless, most of the garden consists of plants of rather unusual character. Again and again the same names appear on labels: *Acantholimon, Artemisia, Achillea, Campanula, Eriogonum, Genista, Iris, Penstemon, Veronica.* These constitute the larger groups of plants that grow throughout the garden, and yet even if *Campanula* or *Artemisia* are generic names familiar to all gardeners, the species in this garden often are from warmer regions and are not usually grown in wetter climates. Largely because of the exposure to full sun and the lack of any large trees or shrubs to shield the plantings, the only plants that survive are those that can tolerate the tremendous solar radiation that concentrates within this bowl-shaped corner of the Gardens.

The steppe climate that prevails along the eastern base of the Rockies favors plants that come from similar climates all around the world. While dryland plants from the American West are forming an increasingly important component of this collection, relatively few of them are currently in cultivation elsewhere. Those growing in the Rock Alpine Garden are mostly the product of extensive seed and plant explorations carried on by a number of staff members and friends of Denver Botanic Gardens. We are finding that a much greater floral bounty exists on the high plains, Rockies, and plateau

Rock Alpine Garden, Denver Botanic Gardens Photo: Deane Hall

country of the intermountain West than we ever dreamed possible.

Despite several severe winters, a surprising range of Mediterranean plants are proving to be durable, striking additions. Genera such as *Cytisus, Helianthemum, Helichrysum,* a broad range of bulbs, and *Thymus* and *Origanum* among the herbs are typical of this element. This unsuspected hardiness in Mediterranean plants — sometimes plants that were grown from seed collected right on that sea — is perhaps an indicator that that region was once much colder than it presently is. During the first year's planting in the garden, relatively few Mediterranean climate plants were tested since the literature not only indicated that these were often tender in climates milder than our own, but they were reputed to dislike summer watering.

Our summers are apparently warm enough to ripen most warm climate plants sufficiently to endure winter cold. This same heat, combined with our year-round low humidity permits us to irrigate plants such as onocyclus and Juno iris which are reputed to be very sensitive to *any* summer moisture whatsoever. We have found that these can tolerate frequent waterings, provided their soil is perfectly drained and that they are given an open, warm exposure.

In time, we have found that Mediterranean plants possess two qualities that make them valuable in our climate. First, they tolerate summer heat. Since temperatures around the Mediterranean are often hotter than those

they experience in Colorado, these plants continue to look remarkably fresh and vigorous no matter how long a drought or how much heat they are subjected to. Second, since they are accustomed to growing during the winter months, they possess the dividend of having attractive foliage throughout much of the winter. Colorado experiences much open weather in winter, so it is important that the garden be attractive year round. Mediterranean plants such as thymes, germanders, sun roses, and yarrows constitute some of the finest evergreen mats and shrubs available to our gardens.

The third major group of plants represented in the Rock Alpine Garden consists of those that originate from the vast steppes and deserts stretching from Eastern Europe to the borders of the Pacific Ocean. The climate of this huge central Asian region largely approximates the climate of the continental portions of the American West. There are places in Russian Turkestan and Asia Minor that have rainfall and isothermic patterns nearly identical to those of the Denver area. It is hardly surprising that so many species of *Acantholimon, Crocus, Ephedra, Eremurus, Tanacetum,* and *Tulipa* are such long-lived and durable plants here.

Because dryland plants do so well, they naturally spread and grow better than frustrated plants from more maritime climates. Hot climate plants have prospered and reproduced, while their neighbors from cooler, wetter regions have dwindled. As a result, the Rock Alpine Garden has experienced a sort of Darwinian survival of the fittest. The fittest happen to be our western natives, the central Asians, and Mediterranean plants that frequently are silvery in color, hairy or spiny in habit.

And so each winter our vision of the ultimate configuration of the garden shifts and becomes a little bit clearer. There may be exotic Ericaceae and plants from New Zealand or Japan that will grow — and even thrive — in the shadier, peatier portions of the garden. But it appears that the greater part of the garden will consist of a series of beds that derive their plants and inspiration from the vast tundras of the high mountains of the American West, of Tibet and Turkestan, from the immense plains, steppes, and dryland plateaus of the North American and Eurasian continents alike.

From the days of Asa Gray, botanists and horticulturists have been aware of the floristic parallels existing between East Asia and the southeastern portions of the United States. Joseph Dalton Hooker was the first to intimate a parallel between the floras of continental Asia and the high, dry plateaus of western America. Partly by accident, the plantings in the Rock Alpine Garden have become a practical demonstration of that parallel. This will undoubtedly constitute one of the interesting themes played out in this garden.

And yet, strange new anomalies keep occurring. More and more peculiar plants from South Africa are found to flourish. A few species of *Helichrysum* came through last winter's record cold without a scratch.

Several members of Aizoaceae are proving utterly reliable. And there are a number of South Americans that seem to be quite hardy as well. Could there be other summits lurking just beyond our ken?

When visitors come to Colorado for the Second Interim International Rock Garden Plant Conference, the rugged peaks of Colorado will greet each one with different views and new perspectives. You can be sure that the Rock Alpine Garden will also provide many surprises not just for visitors, but for its makers!

[This series of articles has been prepared by Panayoti Kelaidis and The Committee]

An invitation to share in Alpines '86 — Now that we are progressing towards the creation of "Alpines '86" at Boulder (June 28-July 2, 1986), when we expect 600 alpine plant enthusiasts, we would like to extend an invitation to you to participate by helping us exhibit in the Events Center situated near the Kittridge housing complex.

This fine modern center has large attractive display space and we feel that everyone should have the opportunity to show off their own 'thing' to fellow rock gardeners from all over the world. It is a unique opportunity to educate, inform and to be a vital part of our meeting.

We already have space requested for the Plant Show, trough displays, Denver Botanic Gardens Alpine House exhibits, photography displays and botanical illustrators. There will also be a very large Plant Sale and some ten nurseries are busy growing 10,000 alpine plants to sell.

Your creativeness is the only limitation and we would love to fill the area to capacity. The whole exhibit space and plant sale will be set up on Friday afternoon through 9 a.m., Saturday. The exhibits will be open to the public on Sunday, June 29 to further show off what we all can do. Your exhibits must be removed early Thursday morning, July 3.

If you wish to participate please inform us of the topic and approximate space required and then we can design the area to its full potential. We know some of you won't make up your minds until the last minute but if we could have the information by May 1, 1986 it would be very much appreciated. If by chance you are not attending the conference don't be afraid to send your exhibit/display with someone who is!!!

Enthusiasm and anticipation are running very high here in Colorado and we know you are all going to help us make this the best yet. Please address your information to: Joan Schwarz, 26290 Clear View Drive, Golden, CO 80401.

A Trilogy of Harbingers

Winter Aconites

W. J. Hamilton, Jr.
Ithaca, New York

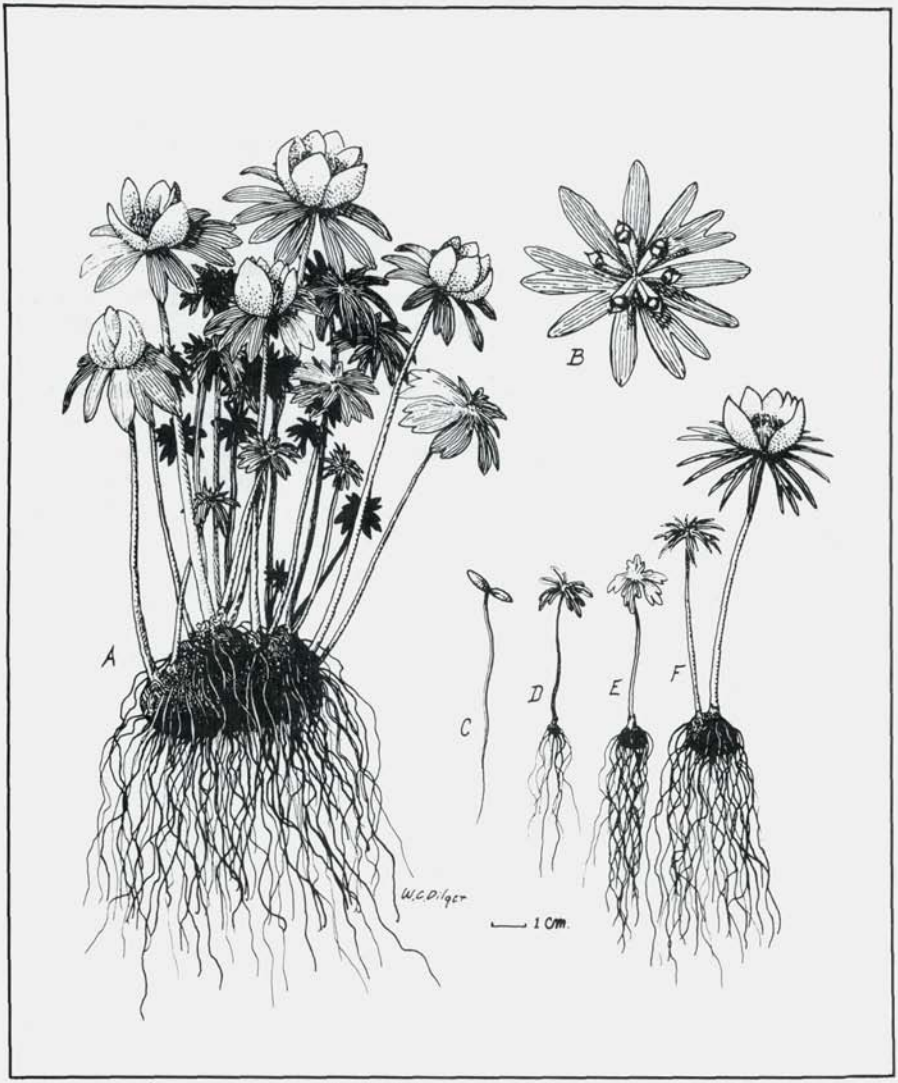
The dying days of the northern winter are brightened by little color in the garden. The Christmas Rose may show its swelling white buds in early February, and Johnny-jump-ups may brave every month of the hibernal season. But to the true gardener, an established border is first splashed with color in the new year when the aconites open their yellow buttercuplike blossoms. As March approaches, the golden heads begin to appear here and there at ground level only to lie dormant for days on end should a cold spell bring a return of winter.

The Winter Aconite, *Eranthis hyemalis,* is a native of Europe and Asia but has found its way into gardens the world over. Its tuberlike root, actually a rhizome (see Figure A), increases in size rapidly. The short stem supports an Elizabethan ruff of leaves, forming a quaint collar for the handsome flower. The deeply slashed leaves somewhat resemble those of the true aconites *(Aconitum),* which early herbalists considered poisonous. This presumably toxic property was used to poison wolves. It is for this reason that our little flower derived the names Wolfsbane and Winter Aconite.

In northern gardens we may find the blossoms opening by mid-February (this happened in Ithaca in 1981), for a mild spell of several days will entice the yellow blossom from its green toby, to flaunt an early splash of color. To dedicated gardeners this little member of the Buttercup Family is of greater import at the dawn of the year than the first Snowdrop. If the tubers are set in a variety of exposures, one may expect bloom to show over a period of six weeks, and fully two months will pass before the last blossom has faded.

Then a canopy of expanding leaves on six- to nine-inch stems, rather attractive in their own right, will shade the ground. The expanding green follicles, usually six in number, will fatten and turn brown, spilling their myriad of golden seeds (Figure B) in profusion. Each flower may produce a hundred seeds.

As the flower matures, a host of little seedlings appears. These must be content with a pair of cotyledons (Figure C) their first year. By the time they have shriveled away, a tiny tuber has formed, to grow and send forth a little ruff the second year (Figure D). A respectable root has formed in the third year (Figure E), which gives promise of bloom the following season.



(A) *Eranthis hyemalis* (B) Seeds (C) First year (D) Second year (E) Third year (F) *Eranthis cilicica*

There is a variety, *cilicica* (Figure F), that flowers a bit later, its yellow a trifle deeper, and its toby frill much more delicate. For me it lacks the hardiness of *hyemalis. Tubergenii* is a giant hybrid, difficult to find and seldom offered by the bulb specialist. It is worth a search, for it is sterile, and its bloom persists for days. A few Asiatic species are of interest only to the connoisseur of eranthophile.

My first glimpse of a profusion of winter aconites was in the winter of 1943-44. An old parsonage near Bath, England, was literally overrun by a mass planting of the lovely little plants. They must have seeded for many years, for the flowers and leaves completely covered the ground for many square yards. I vowed then that in the fullness of time I would indeed have a patch to rival this spectacle. In 1946 I purchased a dozen little tubers, for all the world like black, shriveled peas. The next year — nothing. Again I tried, this time soaking twenty-five of the dried, hard tubers in a cup of water for two days. Spring came, and with it two leaf-bearing stalks but no flowers. From this tiny nucleus, the plants seeded and spread. I have scattered the seed into new beds, given many tubers to friends, and now have great shining patches of early March bloom that are a joy to all who pass by.

The winter aconite is one of many plants that suffer greatly from being out of the ground. It will not tolerate drying, and the tubers offered by the purveyors of bulbs seldom survive. Those who would grow this plant frequently lament their lack of success and give up in despair. If you must by tubers, soak them thoroughly before planting. Better, beg a start of a small clump from a more fortunate gardener. Fresh seed is certain to produce plants. Find a source. Plant *Eranthis* around deciduous trees, in damp spots, in the perennial border. You too will have great beds in forty years.

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Adonis

Dorothea DeVault, Easton, Connecticut
and Laura Louise Foster, Falls Village, Connecticut

Dorothea DeVault writes that she has growing in her garden the perennial adonis of the Ranunculaceae, "that glimpse of sunlight with two inch golden buttercups."

"When and where my husband and I purchased it eludes me. That I covet many more plants is a fact. That it is difficult to find and purchase them is also a fact.

"We never had seed from our plant," she continues, "so one fall we finally had the courage to split our single adonis (after consultation with H. Lincoln Foster) into three sections. The following spring our three plants produced more than thirty glistening yellow flowers. The blooming began in February, earlier than usual due to the mild winter. The flower stems and feathery

leaves gradually elongated for several weeks of bloom and after the flowers faded the leaves remained until late summer. Then as the leaves too faded and collapsed, we marked the area, for this plant disappears until the following spring.

"The plants thrive in half sun in ordinary soil which is probably slightly acid. It does take several years of growing before the plants become truly spectacular.

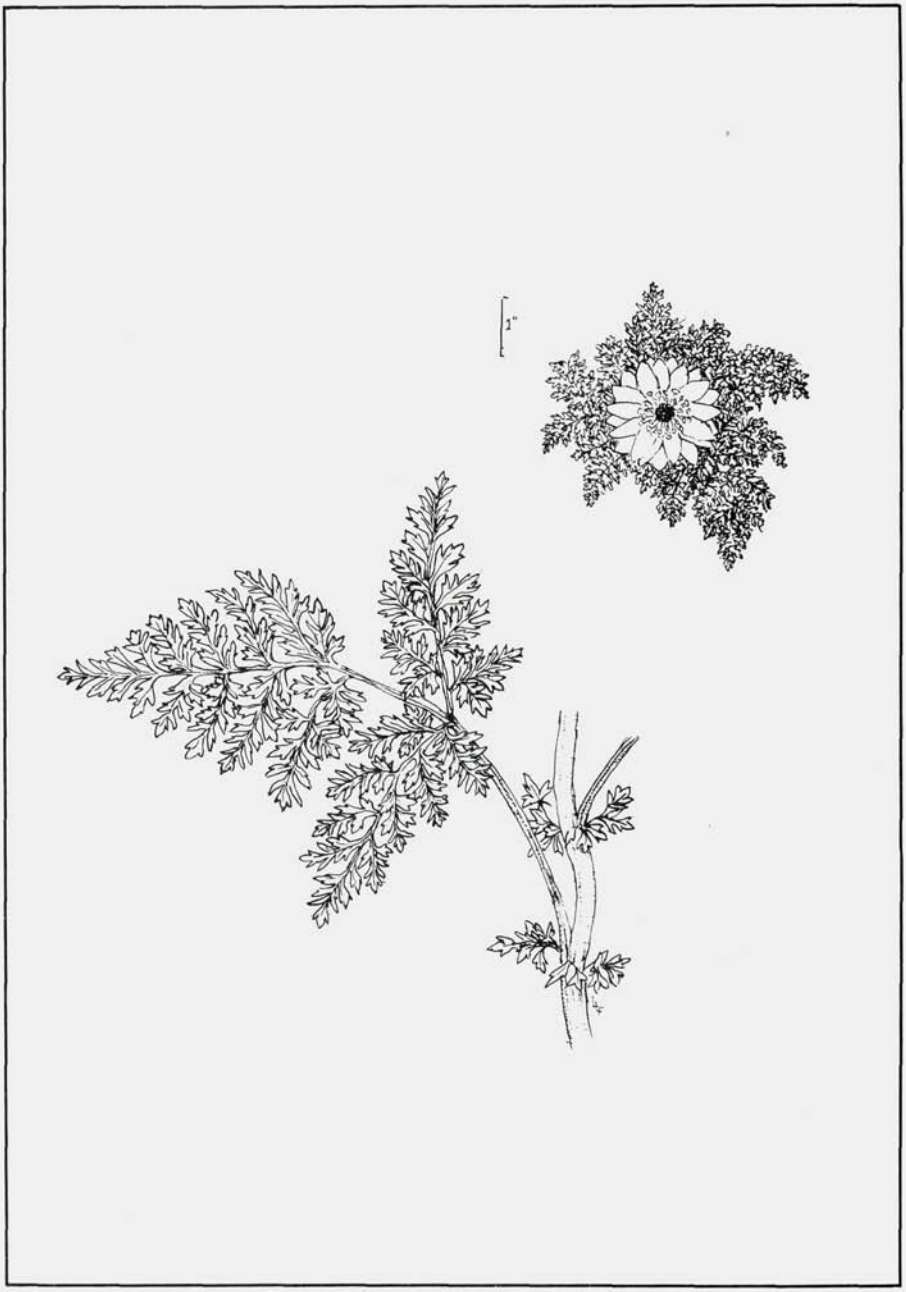
"Whether the plant was *Adonis amurensis* or *A. vernalis* we could not remember at the time, and, of course, the label was gone. So we decided to consult the authorities. First to *Rock Gardening* by H. Lincoln Foster, then to *All About Rock Gardens and Plants* by Walter Kolaga which had a black and white photograph of *A. vernalis,* next on to *Collin's Guide to Alpines* by Anna Griffith which boasted a colored picture of *A. amurensis,* finally to the *Royal Horticultural Society Dictionary of Gardening* which contained a black and white sketch of *A. amurensis* and detailed descriptions of several other adonis. Unfortunately our taxonomic knowledge was sadly limited, but I think our perennial is *A. amurensis.* But don't press me."

Mrs. DeVault is probably right; her plant is almost certainly *A. amurensis* if it bloomed as early as February, even with a mild winter and early spring. Usually this species blooms in March in Connecticut, whereas *A. vernalis,* despite the specific name, generally delays it blossoming until late April or even May in this area.

Both species are long-lived in the garden and develop multiple crowns with numerous long, heavy, ramifying brown roots. They seem to be tolerant of either limy or acid conditions; *A. vernalis* grows in limy soil in nature. Both prefer a deep, fairly light soil. Though both species will grow in light shade, they are at their best in full sun. They will survive some competition, but do better without severe overcrowding.

Unfortunately, the two photographs used by Mrs. DeVault in her attempt to identify her plant are somewhat misleading. The adonis pictured in Walter Kolaga's book is labeled *A. vernalis,* but the photograph, though an excellent one, seems to be *A. amurensis,* while the adonis pictures in *Collin's Guide to Alpines* captioned *A. amurensis* appears to be *A. vernalis,* though it is difficult to be sure as the details of the leafage are not easy to see. The drawing in the *RHS Dictionary of Gardening* is more helpful in that it delineates the foliage of *A. amurensis* more accurately.

Though superficially similar, the two species are quite different in appearance if one observes them closely. Both plants grow from 6 to 18 inches tall, elongating their flowering stems and foliage as they mature. Both are clothed with finely dissected leaves and large, solitary, many petalled buttercup-yellow flowers at the tip of each leafy flowering stem. *Adonis amurensis,* however, has branching stems and its leaves all have stout stalks almost as long as the leaf blades. These spring from little frills of laciniated



Adonis amurensis: fully expanded leaf and overhead view of flower

leafy bracts set along the flowering stem. Each leaf is broadly triangular and is divided into three major divisions which are then further dissected into numerous flat segments, looking quite similar to flat-leaved Italian parsley.

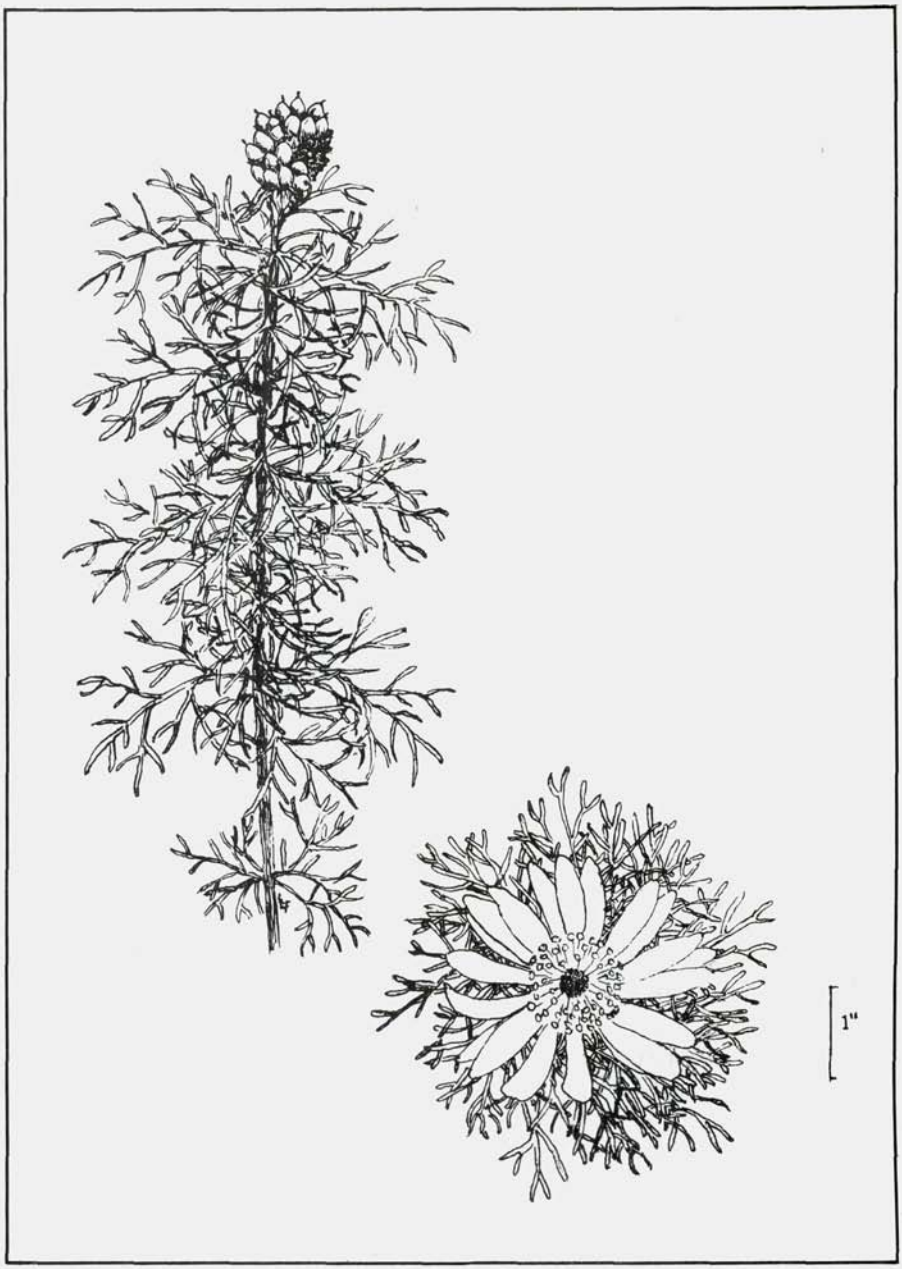
In earliest spring when *A. amurensis* first thrusts through the cold, wet soil, the leaves are deep red and still furled when the first flowers open. Later these leaves become green and the blades bend out at an angle to form a lacy green doily just below the later blossoms which will continue to open for several weeks. Those dilatory blossoms are particularly welcome as the first ones are frequently blasted by frost.

Adonis vernalis, on the other hand, usually has unbranched stems and the leaves have no stalks but are merely fringed clusters of branching threadlike segments springing from the main stem. These give the plant the fluffy appearance of a green form of *Artemesia* 'Silver Hound.' Though more delicate in appearance than *A. amurensis, A. vernalis* does not vanish completely after its flowering season as does the oriental species but lingers through the summer. In fact the old stalks of *A. vernalis* with leaves still attached can be found the following spring spread upon the ground as attenuated. flattened shadows of themselves.

Though the flowers of the two species are very similar, here, too, there is a difference. Both usually have blossoms of shining yellow, but those of *A. amurensis* have a deeper bronzy sheen on the reverse of the petals and in some forms may have white, rose, or red-streaked flowers. Comparing the size of the flowers can be misleading because of individual variations, but on the whole those of *A. vernalis* are the larger, up to 3 inches across, whereas the flowers of *A. amurensis* seldom exceed 2 inches, The flowers of *A. amurensis* make up for their smaller size, however, by carrying many more petals, from twenty to as many as fifty, which overlap in several layers. *A. vernalis* usually has between ten and twenty petals, and though they overlap to some extent when the flower is fresh, they tend to gape as the blossom ages.

Of the two species, *A. amurensis* is the easier to propagate by division. This can be done either in early spring or fall as Mrs. DeVault discovered, but it is perhaps best done in the later summer or fall as the plants start growth so early in the spring, frequently while there is still snow on the ground. *Adonis vernalis,* on the other hand, deeply resents disturbance and often takes several years to recover.

It is usually recommended that adonis be propagated by seed, but there's the rub. Viable seed is very difficult to obtain unless you already have plants. Seed should be absolutely fresh and it may take two, sometimes three seasons of low temperatures before seed dormancy is broken. Even so, germination is chancy and sporadic. We have had *A. vernalis* self-sow around the mother plant where competition is not too heavy. It is possible that fresh seed sown directly into the ground might germinate better than seeds in pots. This can be true of some plants which seem to require some



Adonis vernalis: overhead view of flower; flowering stalk in seed with leaves fully expanded

kind of soil fungus to break seed dormancy. Once you acquire seedlings they are best transplanted into their permanent positions when they have their true leaves but are still quite young.

Adonis vernalis is native to eastern Europe into the Caucasus. After many years of unsuccessfully attempting to grow this plant from exchange seed, we were sent a generous quantity of fresh seed, still moist and quite green in a sealed plastic bag by a friend in Czechoslovakia. We shared the seed with those members of our ARGS chapter who wished to try it. From the fairly substantial number of seeds we retained, we germinated about five plants. These we planted out in various parts of the garden where they are doing well. In Czechoslovakia *A. vernalis* grows in south-facing, sloping, grassy meadows with such plants as pulsatilla, thyme, and anthericum. Our Czech friend reported that the Czechs, too, have difficulty getting germination even of fresh seed, though plants can be purchased from nurseries. Would that they could be here.

Adonis amurensis is found in Japan and the nearby mainland of eastern Asia. In Japan where it is considered a symbol of prosperity and is given to friends on New Year's Day, it has long been cultivated and over 200 different cultivars have been selected. Among these are plants with laciniated petals, various colors, and a double. This last is not really as attractive as the single-flowered plant, at least to most American eyes, as the inner petals are greenish.

Our original plants of *A. amurensis* were divisions given to us by a friend in late summer. Though they have done well, like Mrs. DeVault we have had no seed set. Perhaps they are too widely scattered in the garden to interpollinate though this has not proven to be true with our scattered plants of *A. vernalis* which seem to be self-fertile. We now also have seedlings from fresh seed sent to us by a friend in Korea 3 years ago. They too were very slow, sporadic, and for the most part, unwilling to germinate. Perhaps when they reach maturity they will produce seed which will self-sow. We hope so.

There are other species of adonis, some reputedly very beautiful, which we have not seen. Of these, *A. pyrenaica* may be the best known. A native of the Pyrenees as its specific name indicates, it is considered rare even there. It is said to be a plant very similar to *A. vernalis* but with much-branched stems about a foot tall and with more brilliantly yellow but somewhat smaller blossoms, 1½ to 2½ inches across. It too has very feathery leaves, but the lower ones are stalked rather than being represented only by scales as in *A. vernalis.* It must be a truely handsome plant. As far as we know, it is unavailable in this country.

Other European perennial adonis listed are *AA. sibirica, distorta, cyllenea,* and *volgensis,* the latter from Russia. It is said to be similar to *A. vernalis* but it blooms earlier, is hardier, and has branched stems. There is also listed an *A. chrysocyanthus* which grows in the mountains from India to Japan. It is said to closely resemble *A. pyrenaica* with golden blossoms to 1¾

inches across.

There are also a number of annual adonis. Widespread in Europe from England to the Near East are two species, both called pheasant's eye. Both are somewhat sparingly branched plants from 1 to 2 feet tall with feathery, rather sparse foliage resembling that of dill or love-in-the-mist *(Nigella damascene). Adonis annua (autumnalis)* has small three-quarter-inch flowers of scarlet to crimson with black anthers. Unfortunately, the blossoms open only partially. As we grew *A. annua* from exchange seed, we found it disappointing because of its spindly growth habit and small, partially closed flowers, despite its dramatic blossom color. Perhaps if grown en masse it would prove a more exciting garden plant.

The other pheasant's eye, *A. aestivalis,* blooms in June. We have not grown this plant. Its blossoms are reputedly larger than those of *A. annua* reaching 1 to 1½ inches in diameter. They open fully. They also are usually red but do not have the dark central eye. A citron-yellow form is sometimes found. Two other annual adonis are listed, both sounding better than the above: *A. aleppica* from Syria with 1½ to 2 inch blood-red flowers that open wide and *A. flammea* from central Europe with scarlet blossoms 1½ inches across and blotched black at the base of each petal.

From our somewhat limited knowledge of this genus (named for the legendary handsome young mortal beloved by the goddess Aphrodite who transformed his blood into this flower when he was gored to death by a wild boar) we think the perennial species are well worth seeking out. Though difficult to obtain initially, they are long-lived in the garden. Their glorious shining blossoms, framed in the delicate halo of frilled foliage, make a stunning addition to the early spring rock garden.

— Drawings by L. L. Foster

Variable Snowdrop

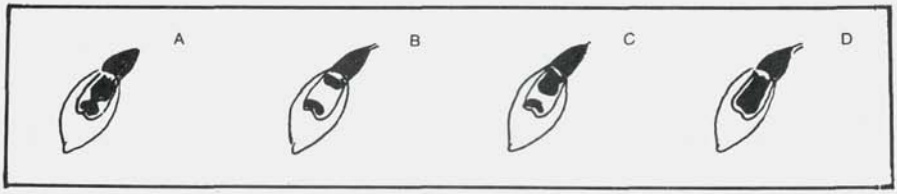
Brian Bixley
Toronto, Ontario, Canada

It was interesting to read Barbara van Achterberg's note on snowdrops in the Spring 1984 *Bulletin.* The markings on snowdrops are so diverse that if we don't get down and peer at them, we miss some real delights.

As Ms. van Achterberg relates, *Galanthus elwesii* is earlier than *G. nivalis,* in fact it is the first flower that we find in the spring, beating even the aconites. The dates of flowering here are variable, depending mostly upon the duration of the snow cover. Last year the snow stayed almost until the end of March so that the sheathing leaves were not observed pushing through until March 24, whereas in the mild winter of 1982-83 *G. elwesii* was flowering

on February 26 and a week or more earlier than that in Toronto, 60 miles to the southeast and about 1300 feet lower. *G. nivalis* is not far behind. The timing can, of course, be varied depending on where the bulbs are planted.

Ms. van Achterberg's criterion for distinguishing *G. nivalis* from *G. elwesii* will, I believe, be foolproof in that *G. nivalis* always has the single horseshoe around the "emarginate apex" (E. A. Bowles), whereas *G. elwesii* ordinarily has something more than that, though Bowles describes a form, *poculiformis,* which has *no* markings on the inner petals. The something more, however, may not be the addition described by Ms. van Achterberg; *G. elwesii* is actually quite variable. We have at least four variants in our garden, including the beautiful one that she describes. They look like this.



Drawings A, B, and C are all illustrated in Rix and Phillips, *The Bulb Book.* Drawing D is not shown, though two other species are portrayed with a solid green inner petal; *G. caucasicus* and a form of *G. ikariae.* I wish we had those, but I don't believe we do.

The authority on all this is presumably Sir Frederick Stern's *Snowdrops and Snowflakes,* RHS monograph, 1956.

An Espousal

A. K. Free
Seattle, Washington

I speak for the spouses of gardeners, be they male or female. They, also, are important in the nature of things. I hope they all fare as well as I do. I am the mate of a dedicated gardener. My wife's garden in its vernal season is very lovely, a pleasure to behold, and I can enjoy it without getting my hands dirty.

Lest you might think I am not cooperative, I know that regardless of the size of the garden, it is not big enough for two people. It can be the creation of only one individual. I once told that to a nice lady who was viewing the garden and had asked me what part I had in it. She said that her husband was interfering in her garden, and she was going to tell him what I said. "All right,"

I told her, "but please do not mention my name. Someday I may have to appear in his court." He is a federal judge.

I don't have the qualifications to be a gardener, although I am a pretty good rhododendron dead-header. However, I think it is a wonderful avocation, a fine therapy for any malaise, a creative occupation that not only refreshes but also produces things of beauty and interest that the rest of us can enjoy. It also provides an alternative presence for venting his or her frustrations.

I encourage my wife; I compliment her on her horticultural accomplishments, applaud her successes with the difficult, and marvel at the occasional impossible.

My wife has made many friends in the garden world, and I have the privilege of sharing these with her. There is something about a closeness to nature that makes people benign, or perhaps it is only this kind of person who is attracted to gardening, or perhaps some of both. Anyway, they are all your kind of people. The reward of being a gardener's spouse is getting to know these wonderful and stimulating people.

The plants themselves are not only beautiful but very intriguing, especially the alpine plants. they can be jewels and their growing habits, their methods of propagation, their places of origin are all interesting as well. Their names, both esoteric and common, have bulged my vocabulary, and I am sometimes guilty of dropping exotic plant names in the hearing of strangers.

Spouses are also an asset to garden organizations. They contribute to the organization's success by offering their special expertise and as silent partners in committee meetings, serving as presiding officers and assisting in the entertainment at the meetings, transporting pots and containers of soil and plants hither and yon, assembling slide programs, and not the least, chauffeuring the active members to and from the evening meetings.

I was going to suggest that everybody stand and hoist a glass to the spouses of gardeners, but it just occurred to me that a better way of memorializing the breed would be to name a newly described species, a dodecatheon, for instance, as *Dodecatheon spousii.*

And shouldn't the plural of spouse be spice?

A Sight Well Worth Seeing — "A short distance north of Helena, at the Gates of the Mountains, you may take a boat trip through the high limestone canyons of the Missouri, and there see, clinging to the cliffs, that strangest of American shrubs, *Kelseya uniflora,* making great and ancient mats and flattened domes of almost microscopic rosettes of grey leaves."

Dr. C. R. Worth
ARGS Bulletin, May-June, 1950

Omnium-Gatherum

Covers — Those of you tired of seeing the same cover on the *Bulletin* for a whole year, take heart; there will be four different covers this year, each one a Rocky Mountain subject. It will be good to have the variety and still retain the color and good also to know which issue is at hand without having the read the fine print.

Printer — We have a new one. That may not mean a whole lot to you now, but it means a great deal to me. There will be some changes throughout the year as we work together to make the *Bulletin* more visually pleasing. Over the past year I have heard from one person highly critical of the inside appearance, from three persons with varying areas of expertise who offered helpful suggestions, and from a large number who seemed to like what they were seeing. Thank you all for your responses.

Sadness — I am most sorry to report the passing of Ed Lohbrunner of Victoria, as wonderful a plantsman and man as ever loved the mountains and their flowers. More will be said of him in the next issue.

Alpines '86 — If your enthusiasm for alpines is the least jaded, if you are ready for new directions in rock gardening, or looking for new horticultural worlds to conquer, come to Colorado this summer. If you aren't through conquering the old worlds but have a thirst for knowledge and ideas, come to Colorado this summer. If you love incredible scenery, exciting plants, and the good company of other plantspersons, come to Colorado this summer. It's going to be a rich unforgettable experience. Come and share it.

Book Review

The Field Guide to U.S. National Forests by Robert H. Mohlenbrock. 1984. Congdon & Weed, Inc., New York. $11.95, paper.[1]

Are you planning a trip to Boulder this year? I am. Usually researching a trip means wading through a lot of muck to glean a few nuggets of substantive information. I've been doing that recently, and I feel like ventilating the cumulative stress some of the material has generated. The product is dichotomous: the magnificent photos and the miserable texts seem to be about separate universes. The Time-Life "American Wilderness Series" books aren't too bad. Except for the one by Edward Abbey. But I suspect him of cultivating the image to move the merchandise.

They generally deliver their moralistic innuendos in the context of palatable anecdotes designed to provide a vicarious experience, and they can be somewhat informative at times. However, many works in the wilderness travel field are by writers who, like the "Wild America" television series, seem intent on erecting themselves as barriers, forbidding you to actually enter these places, or to enjoy them if you do, because you'll carry their preachy presence along with you in your mind. Clearly they would prefer that you experience their domain at home through their mediation.

Specially bothersome are the hiking magazine articles which devote most of their space to inculcating depression about the deplorable state of the environment, much of the remainder to camping equipment and other peripherals, and most disgusting of all, the "inner journey". Those stress producers make you pay dearly for every crumb they throw at you. They say precious little indeed about what they saw when they went on a trip, and show only the vaguest knowledge of the most ubiquitous plants.

For one example of a man with an agenda who grudgingly imparts something useful in spite of himself, see "Somewhere in the San Juans" by David Sumner, *Backpacker* Magazine (presumed defunct) no. 24, vol. 5 no. 6, December 1977, p. 32. The main reason for the citation is to substantiate my point.

Now, there are botanists who write in dialect and garden writers who don't grow the plants they write about, but they don't succeed in annoying me as the Edward Abbey types do. The latter leave me asking myself why I want to get away from it all in the wilderness if the people I'm likely to meet out there are precisely the sort I'd most like to get away from. *In the Throne Room of the Mountain Gods* thoroughly convinced me not to take up mountain climbing.

On the other hand, you might meet a Mohlenbrock. Mohlenbrock stands apart from that pack. It's like the difference between Bach and Wagner, between Alexander Kastalsky and Alban Berg. The reason his books are all nugget and theirs are largely dross is because they translate every object and creature they encounter into a subjective sentimentalist "inner experience", and feel a need to either absorb things into themselves, or to absorb themselves into them, which is actually a roundabout way of accomplishing the former. Things have relative worth: relative to themselves. The reason they don't tell you much about what they saw on their trip is because they didn't see much, they received impressions instead.

Mohlenbrock is good because he's a good observer. He sees what is there and tells you about it. Things have intrinsic worth. He operates on the assumption that things rightfully exist for their own sakes, without lecturing you about it as I do now. Or about anything else; he is even able to tell you that a habitat is fragile and a species is endangered without imposing that depressed feeling. He respects his audience and assumes it is comprised of responsible people. He has a gift of writing clearly and lucidly and refresh-

ingly. A session of reading him leaves you feeling uplifted and exhilirated, your appetite whetted for the adventure that awaits you. You're rarin' to go. He makes no attempt to have your experience for you; he gives you encouragement to do it yourself. He shares with you his knowledge and love and enjoyment of a place, but allows you to feel your own sense of awe the way you are disposed to feel it. He gives balanced coverage to geology, scenery, history, birds, fish and mammals, but his real love clearly shows. He just happens to mention plants at every reasonable opportunity. And the best places to look for plants are in our national forests, aren't they? As a generalization, they have the most thriving plant communities of the several types and jurisdictions of public lands, and you have a freedom of access to them you may or may not have elsewhere.

Dr. Mohlenbrock has personally visited every national forest in the country (p. 196). His material is first hand knowledge. It is concisely organized without showing organizational structure. You see neither skeleton nor fat, but flesh and muscle. It is as organized as the photos on the cover (the only ones in the book): what's up there is at the top and what's down there is at the bottom. I found only two typos: a careful proofreader is a careful researcher, isn't he? One thing the book lacks is maps. Maps are a problem if the book is to be produced in a handy to take along with you format. Maps and books are handled separately in use, and this book was clearly designed for use. So I feel encouraged to assemble a good map collection.

Mohlenbrock's *Field Guide* is the single book that has helped me the most to plan my next journey. It's the only one I'm going to take along with me. But probably not the only one I'll bring home.

— Don Hackenberry

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[1]The list price is $11.95, but it may be purchased for $10 including postage from Southern Illinois Native Plant Society, Director of Book Services, Department of Botany, Carbondale, IL 62901. *Where Have All the Wildflowers Gone?* may also be had for $13 (list $15.95). I would think $3 would be about the right amount to add for overseas shipment (of both).

Treasure — "Yes, if you wish to see the northern alpines at their best, and without exertion, Beartooth Ridge in late July is the place to go.

"After this, anything further that I could suggest in Montana would be bathos, except for the sacred hills where 'Jonesy' and unbelievable *Eritrichium howardii* hold forth. No offer of reward or threat of torture will made me reveal their hiding places."

Dr. C. R. Worth
ARGS Bulletin, May-June, 1950

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