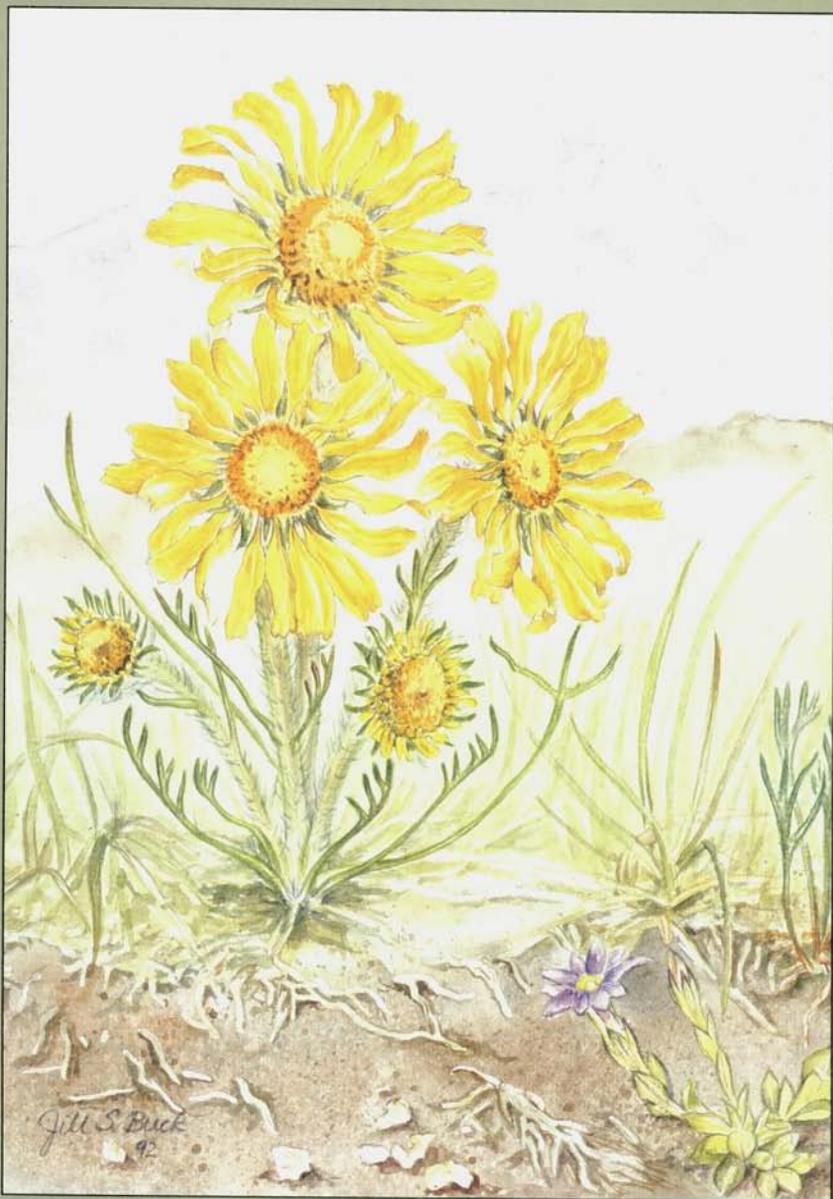


Bulletin of the
American Rock Garden Society



Volume 51 Number 1

Winter 1993

Cover: *Hymenoxys grandiflora* and *Gentiana prostrata* _____

by Jill S. Buck of Westminister, Colorado

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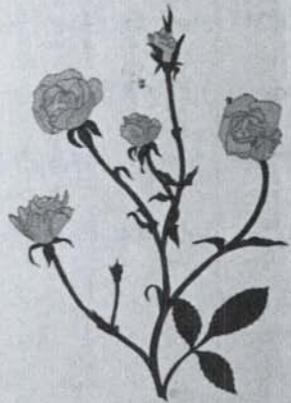
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JUNE, 1936

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OFFICIAL ORGAN NATIONAL ASSOCIATION OF GARDENERS AMERICAN ROCK GARDEN SOCIETY

Fifty Years of the ARGS Bulletin

by Marnie Flook

The American Rock Garden Society was officially organized in New York City on March 21, 1934. Over 200 people attended a meeting planned by a group of eight rock gardening enthusiasts, including Dorothy Hansell, Florens DeBevoise, and Martha Houghton. These three ladies had met several times in 1932 and 1933 to discuss the possibility of starting a rock garden society. The background of rock gardening in the United States and the story of how our society began was thoroughly documented by Frank Cabot in his excellent essay, "As It Was in the Beginning," based on his fine presentation at the 50th Anniversary meeting of ARGS in Asheville, North Carolina in June of 1984. (*ARGS Bulletin*, Vol.42(5):22-48. As Frank Cabot explained, rock gardening was becoming very popular, and the time seemed right for a society devoted to it.

Gardeners' Chronicle of America

In April, 1934, the new society announced that it had selected *The Gardeners' Chronicle of America* as its official organ. Dorothy Ebel Hansell, who had been elected secretary of the ARGS, was the editor of this magazine. *The Gardeners' Chronicle of America* had been founded by Hansell's father in the late 1890s. The monthly publication, somewhat larger than the present day *Fine Gardening*, covered all kinds of gardening activities. Long before the formation of the society, articles of rock gardening interest had been appearing in the magazine, and Thomas Everett had been writing a monthly column, "Rock Gardens," specifically for rock gardeners.

Besides official ARGS business (a directory of officers, regional chairmen, and members of committees, plus meeting reports), the two or three pages assigned to the society contained short rock garden articles, plant notes, or letters contributed by members. Each issue of the magazine also featured two or more major rock gardening articles; many of these would be of interest to members today, and the names of many of the authors would still be recognized.

Every aspect of rock gardening was covered: building a scree, moraine, alpine frame, wall garden, or bog garden; native plants of Idaho, the northern Rockies,

Gaspé, Mt. Washington, and South Dakota among other areas; construction, design and maintenance of rock gardens; plants for sun or shade; plant combinations; plants for steps and pavements; and propagation of alpine seeds. Also included were articles on bulbs, dwarf conifers, rhododendrons, heaths and heathers, and miniature shrubs, plus articles on specific genera, such as *Trillium*, *Androsace*, *Gentiana*, *Lewisia*, *Veronica*, *Primula*, *Phlox*, and *Penstemon*.

Contributors to *The Gardeners' Chronicle of America* included horticultural authors Anderson McCully, Lester Rowntree, James Bissland, Stephen Hamblin, P.J. van Melle, Edgar T. Wherry, Elizabeth Lawrence, Claude Barr, Archie Thornton, Ira Gabrielson, and Montague Free (the first president of ARGS), and owners of rock garden nurseries Kathleen Marriage of Colorado, Else Frye and Frances Roberson of Washington, and Kathleen Cowgill of Maryland. Additional contributors included landscape architects Don Richardson and Zenon Schreiber. Members writing for the magazine included Grace Butcher, Grace Babb, and Betty Jane Hayward of Maine; Bernard Harkness, Carlton Worth, and Walter Blair from New York; Violet Walker from Virginia; Robert Senior from Ohio; C.M. Wood from Michigan; Clara Regan from Montana; and Claire Norton from Colorado. Many of these members also wrote for the *Bulletin* after it was started.

Year Books

In 1937 the first ARGS Year Book was published. It was the size of our present bulletin with a plain cover bearing a woodcut of aquilegias. Its contents consisted of the society's aims, the advantages of membership, the constitution and by-laws, reports from national officers and regional chairmen, and the ARGS definition of a rock garden. Martha Houghton was president, Robert Senior was treasurer, and Dorothy Hansell continued as secretary. Directors included familiar names: Marcel Le Piniec, Montague Free, Louise Beebe Wilder, and Florens DeBevoise.

There were committee reports from the Editorial Advisory Board, whose job was to screen every rock gardening article before it appeared in *The Gardeners' Chronicle*; the Plant Naming Committee, headed by Dr. Wherry; the Seed Exchange; and the Show Committee. Archie Thornton, head of the Seed Exchange, offered seed from a Kingdon Ward expedition, but to receive it "members must state their facilities for handling it." The show schedule was listed along with rules for judging and a description of medals to be awarded. Members' gardens open to other members were listed with short descriptions of each, followed by the complete Membership List.

Each of the next four Year Books (1938, 1939, 1940, 1941) contained all the information given in the 1937 issue plus six to eight major articles. The titles and authors of some of these were:

"Propagation of Rock Plants"	Don Richardson
"Culture of Rocky Mountain Plants"	Carl R. Worth
"Western Drabas"	Edith H. English
"Trilliums"	Nellie C. Knappen
"Native Plants for Our Rock Gardens"	Edgar T. Wherry
"Notes on <i>Calochortus</i> "	B.Y. Morrison
"A Parade of Daphnes"	James Burlingham
"Rock Gardens in the Midwest"	Victor Ries
"In a Southern Rock Garden"	Burnett Ballard & Robert Moncure
"Less Well-Known Campanulas"	Robert Senior

"Notes from a Plant Collector"	Edward K. Balls
"Dwarf Narcissi for the Rock Garden"	David Wilkie
"Primulas of the Section Farinosae"	Betty Jane Hayward
"Alpines from Alaska"	Ada White Sharples
"Lewisia"	Alma Margaret Higgins
"The Thrifts and How to Know Them"	George H. M. Lawrence

Dr. Lawrence was director of the Bailey Hortorium at Cornell University in Ithaca. His article on thrifts is probably one of the longest and most studious treatments of a genus published by the ARGS.

The 1938 Year Book featured five lists of 50 good rock plants for beginners chosen by members from each of five regions (New England, Mid-Atlantic, South Atlantic, North Central and Washington). The list of books pertaining to rock gardens, prepared by Elizabeth Hall, librarian of the New York Botanical Garden, covered many pages of this same Year Book, a very complete list of rock gardening and alpine plant books.

Saxiflora

In 1938 the ARGS published a series of eight leaflets which they called *Saxiflora*. The front page of each leaflet was illustrated with a line drawing of a plant described in detail on the inner two pages. The Editorial Committee in charge of this project, headed by Thomas Everett, described their purpose: "to present a careful study of an individual kind of plant with particular attention to identification, nomenclature, and culture." A loose-leaf form was chosen so that the leaflets could be arranged in any order. A second set of eight was issued in 1940. These sixteen sheets were sent to all members and were also available separately at 10 cents a leaflet.

According to Thomas Everett, the subjects would be plants suitable for cultivation in rock gardens in North America. Leaflet #1 treated *Daboecia cantabrica*, an unusual choice; #2, *Chrysogonum virginianum*, seemed more appropriate. The text for most of these was written by the committee along with Dr. Wherry and Claude Barr.

1942

An announcement appeared in the ARGS column for the May issue of *Gardeners' Chronicle of America* saying that due to the war the decision had been made not to have a 1942 Year Book nor to issue a third series of *Saxiflora* leaflets. In December, two more announcements were made: Dorothy Hansell had resigned as editor of the magazine and as secretary of ARGS, and Harold Epstein had offered to produce the 1942-1943 Year Book at a minimum cost to the society. Members were urged to submit manuscripts for this new Year Book.

The ARGS Bulletin, 1943

When Dorothy Hansell resigned as editor, she also disposed of her family's interest in *The Gardeners' Chronicle of America*. The ARGS decided not to renew their contract, which ended with the March, 1943, issue of the magazine but instead to publish their own bulletin. Dr. Edgar T. Wherry was invited to be the first editor; he accepted the job and became official editor starting with the second issue. The first issue (Vol.1 No.1 January-February, 1943) was edited by Harold Epstein and used material he had collected for the next Year Book.

Editors

The *Bulletin* has had ten editors since it began in 1943. Their names and the dates they served as editor are listed below. They and their contributions to the Society and to the *Bulletin* will be featured in the next two articles in this series.

January 1943—December 1947	Edgar T. Wherry
January 1948—December 1950	Dorothy E. Hansell
January 1951—July 1954	G. Guy Nearing
October 1954—July 1962	Carleton R. Worth
October 1962—July 1975	Albert Merle Sutton
October 1975—October 1977	Howard N. Porter
January 1978—December 1984	Laura L. Foster
January 1985—December 1988	Sharon Sutton
January 1989—December 1989	Ted Marston
January 1990—present	Gwen Kelaidis

Volume 1 Number 1

The first *Bulletin*, the same size as the Year Books, had a green cover printed in black ink: "*Bulletin of the American Rock Garden Society including Saxiflora*. Year Book Number 1942-1943". Below this: "Vol.1 Jan-Feb, 1943 No.1". The table of contents followed. The articles in the first issue are as timely now as they were in 1943. The emphasis was on growing native plants. According to Mary C. Henry, author of the first article, "the time has arrived for a becoming appreciation of our native plants." Mrs. Henry, who established the Henry Foundation in Gladwyn, Pennsylvania, described and praised the native plants she had found and grown in "A Rock Garden of Natives." In "Jewels of the Great Plains," Claude A. Barr wrote about native plants of the prairies and how he grew them in a scree. His fine book with the same title is one of the best on these plants.

Dr. Edgar T. Wherry wrote about one of his favorite group of plants: "Native Ferns in the Rock Garden." His field guide on ferns was published in 1961. "A Transplanted Peat Bog," by Else M. Frye, who started the Northwestern Chapter, described building an artificial bog garden and the plants she grew in it. Two members wrote about plant exploration: Frances K. Roberson, who is still active in the Northwestern Chapter, described plants found along a trail in the Wenatchee Mountains, and Ralph B. Stewart described Kashmir alpine flowers. Charles F. Jenkins, who had established the Hemlock Arboretum in Germantown, Pennsylvania, discussed hemlocks for the rock garden.

The Year Book section of this issue consisted mainly of reports from the president, secretary, and editor. Three other issues contained Year Books: (Vol.2 No.3: 1943-1944; Vol.4 No.3: 1945-1946; and Vol.5 No.3: 1947-1948). Several of these included membership lists and notes about the seed exchange along with the other reports.

1943—1951

Under Dr. Wherry, Dorothy Hansell, and Guy Nearing, six bulletins were published each year; one came out every two months. Each bulletin had sixteen to twenty pages, except for the four issues with Year Books. There were four or five major articles of two to three pages each, often illustrated with one or more black-and-white photographs.

Eleven new plants were added to the *Saxiflora* series, and most of the original

leaflets were reprinted in various issues of the *Bulletin*. (*Saxiflora* was discontinued after 1947, except for one article by Dr. Wherry that appeared in 1950). Besides rock gardening articles, the *Bulletin* contained news of national and regional meetings, officers' reports, seed lists, and letters to the editor.

1952

Starting with Vol.10 No.3, while Guy Nearing was still editor, the *Bulletin* was changed to a quarterly with thirty-two pages per issue. The cover was a lighter green; its design neater, with the entire text outlined. Contents were similar to those of earlier issues, but there were usually six or more major articles of two to six pages each. This same format continued under Carl Worth and Merle Sutton. In 1965 four more pages were added to each issue.

The first eleven volumes of the *Bulletin* had the inside pages punched so that they would fit into a three-ring binder. The covers were not punched, just the interior pages. Starting with Volume 12 No. 1 this was no longer done.

1959

The silver colored cover of Vol.17 No.2 recognized the Twenty-Fifth Anniversary of the founding of the American Rock Garden Society. Dorothy Hansell and Robert Senior wrote about the beginnings and early days of the society. To celebrate the occasion, editor Carl Worth decided to feature native plants from various parts of the country. This issue was devoted to plants of the eastern states; No.3 was on the flowers of Washington; No.4 covered plants of Alaska, Oregon, California, and the Sierra Nevadas; and Vol.18 No.2 was devoted to plants of the Rocky Mountains.

Bulletin Board

In 1965, while Lincoln Foster was president of the ARGS, he started a new publication which he called the Bulletin Board. Members had been concerned that too much space in the *Bulletin* proper was being devoted to national and regional reports, meeting announcements, lists of new members, and similar subjects. All of these were now to be printed in the Bulletin Board so that the pages in the *Bulletin* could be used for articles about rock gardening and rock plants.

Because of a more flexible deadline, announcements and information printed in the Bulletin Board were reported sooner than they could have been in the *Bulletin*. As Timmy Foster wrote in Vol.37 No.4 (1979), "The Bulletin Board has become the newspaper, the telephone exchange and the nerve center of the Society." The original three or four pages of notes have now been expanded to twelve; these are usually the first pages read when a new *Bulletin* arrives.

1968

The cover of Vol.26 No.1 had a different look. Although still on green paper, it had been simplified with the *Dodecatheon* emblem and *American Rock Garden Society Bulletin* printed above the table of contents. Note that this was a change of the official title of the magazine. As a result, some libraries have filed these issues separately on their shelves from issues of the *Bulletin of the American Rock Garden Society*. Besides the new cover, new type was used, and the editor, still Merle Sutton, was authorized to expand the *Bulletin* to 40 pages.

1975

Vol.33 No.4, the first issue with Howard Porter as editor, was very different from previous issues. Not only was the table of contents moved to the inside front cover, but the color of the cover, made from heavier paper, was changed from green to brown. A beautiful drawing by Timmy Foster appeared above the title, which read once more *Bulletin of the American Rock Garden Society*. Each issue contained between 48 and 52 pages. When Timmy Foster became editor, the cover color and design, with a botanical drawing, remained the same, but inside there was a change in format. Instead of the previous full-page-width line of type, a two column set-up was adopted. Color appeared in the *Bulletin* for the first time in 1979 (Vol.37 No.2) when color photographs of *Phlox lutea* and *Phlox purpurea* x *P. lutea* were used to illustrate Paul Maslin's article.

1984

Vol.42 No.5 was a special issue devoted to the celebration of the Fiftieth Anniversary of the ARGS in Asheville, North Carolina in June, 1984. The 50th Anniversary emblem and the words *Bulletin of the American Rock Garden Society* were printed in navy ink on a cream-colored cover. In "The Anniversary Celebration," Timmy Foster wrote about meetings, lectures, and field trips; Judy Glattstein wrote about the pre-conference tour; and Nick Nickou wrote about the post-conference one. And, as mentioned earlier, Frank Cabot's "As It Was in the Beginning—The Origin and Roots of Rock Gardening in North America" completed the report. The text of this article along with its 27 black-and-white photographs filled 28 pages; it was the longest article ever printed in an issue of the *Bulletin*.

1985

Another important change came with Vol.43 No.1 when color was used on the cover for the first time. A photograph of *Dodecatheon alpinum*, taken by Phil Pearson, was printed on glossy stock with a gray border. The editor, Sharon Sutton, explained that this same photograph would be used on the cover of all the 1985 issues, since it was too costly to have four different color photos printed. The back cover, also gray, had no type, whereas all earlier issues had printed advertisements in that position. The full-page-width line of type was again used.

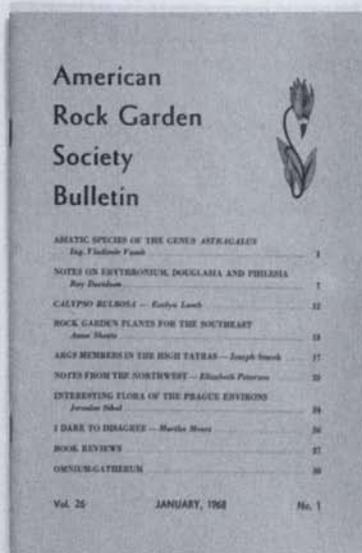
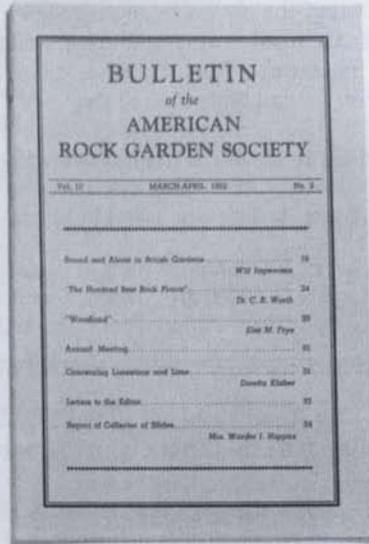
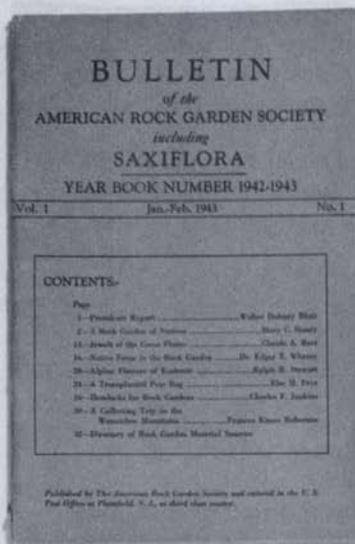
1986

A different color photograph was used for the cover of each issue of Vol.44. The format was changed with the photograph printed on white paper outlined by a heavy black line and a dark gray border. Again because of costs, several issues of Vols.45 and 46 had attractive black and white drawings on the covers rather than color photographs. Most issues had between 52 and 60 pages. Different type was used in Vol.46, No.4.

1989

Many changes were made in the four issues of Vol.47, the most important being the size of the *Bulletin*. Ever since Vol.1 No.1, each *Bulletin* had been approximately 6" wide and 9" long, the same size as the five Year Books. In order to gain more pages at the same cost, Ted Marston reduced the size to 5" x 8" and used a different method of printing. He used the two column format inside and added four

The Changing Face of the
Bulletin of the American Rock Garden Society



pages of color photographs. Each cover was either an old engraving or a copperplate of a plant.

1990

The current editor, Gwen Kelaidis, also made many changes, most noticeably a return to the 6" x 9" size with a colorful painting of a plant on each cover. Each issue consisted of 80 pages, including 16 pages of excellent color photographs illustrating the seven or eight major articles. Credit for the cover painting was on the inside front cover; officers, managers and directors listed inside the back cover; and the outside back cover left blank. Most articles were printed using the two column format with the full-page-width used for book reviews and short articles.

These notes have mainly been about physical changes in the *ARGS Bulletin* since 1943. Other aspects, such as editorials, subject matter, contributors, and advertisers, will be discussed in future articles in this series.

Marnie Flook is archivist for the ARG. She has created a series of artistic gardens in Maryland and Delaware. This is the first of a series of articles about this publication. Photos by William Flook. Photos by W.M. Flook, Jr.

How much do you know about the *ARGS Bulletin*? Try your skill with this trivia quiz! Answers in a later issue.

1. How many *issues* (not volumes) of the *Bulletin* have been published?
2. How many editors have there been since 1943?
3. Who was editor for the longest period?
4. How many editors were professors? How many women?
5. Who wrote the longest article for the *Bulletin*? What subject? How long?
6. When was color first used on the cover, and what plant was pictured?
7. When was color first used inside, and what plant was pictured?
8. When was an emblem for the ARG first discussed?
9. Special issues of the *Bulletin* were devoted to which genera?
10. What other special issues have there been?
11. When was a Seed List first issued as a separate publication?
12. What author has written the most articles for the *Bulletin*?
13. Who wrote the longest series of articles?
14. What have been the most exotic places described?
15. What plants have been written about most often? What genera? What plant families?
16. What were the most humorous articles?
17. What were the most erudite articles?
18. What were the most irritating articles?
19. What was the saddest line in the *Bulletin*, and who wrote it?
20. What horticultural subject was least written about?
21. Who compiled the cumulative index for Volumes 1-32? For 33-45?

Rock Gardening in Denver—It's Different!

by Dick Bartlett

Like a human being, rock gardening in the Denver area has its own character and idiosyncracies. From my biased perspective, it is the *only* way to garden here. Beautiful rocks are readily available, and the alpines in our gardens are half-way up in altitude to their rightful tundra homes. With these advantages, it just seems like rock gardening is the thing to do.

Ann, my wife, and I share in the gardening. (Yes, we are known as the Bartlett pair.) Ann has the front garden, and I try to maintain the back yard. Our site, I like to think, is typical both in size and microclimate for the region. We grow some plants with ease; others survive only a year or two, and a few not at all. Some need special treatment, and some are grown by other local rock gardeners better than by us. Don't let me get away with blaming all our problems on the fickle climate! But it is not at all like the climate of either the Northwest or the East Coast.

We have a standard suburban lot about eight miles west of Denver at 5,610' elevation. The front yard has a

gentle slope with an eastern exposure and much sun. The back is more shaded with a 6' fence on the west, a 4' fence on the north and south, and two tall cottonwood trees (*Populus deltoides*). The back has more shelter from wind, yet also has some unique dry areas shaded by the house. The drainage here is south to north with higher areas towards the perimeter and towards the house.

Now we come to the soil. The developer left the property with about 2.5" of topsoil over the region's natural 18" of adobe clay. The adobe in turn rests on bentonite, a kind of plastic sandstone. Thus, like our rocks, the gardening soil has all been brought in. It is designed for rapid drainage and consists of about one-third each gravel, sand, and a topsoil plus manure and compost mix.

There was not one rock, of the estimated 18 tons now in the yard, before our arrival. I started by constructing steps out of broken concrete slabs found abandoned in a vacant lot. Our supplemental water comes from the lawn sprinkler system, which is being modified as

the lawn is slowly transformed into rock gardens. We water about a third less than the recommended allotment for bluegrass lawns. The government suggests an hour per sprinkler section every third day. We expanded the rock garden to the front yard with what turned out to be unwarranted trepidation—no one has complained. In fact, this expansion into the public eye has been rewarding not only because of more sun in this site, but because of encouraging comments from neighbors and passersby. I recommend that more gardeners "come out" of the back yard and reveal their true horticultural preferences.

Rereading existing literature about the local weather, I came across the phrase "harsh climate." A book of stories could be compiled about this topic, I'm sure. Usually in June we get a series of lightning storms that don't hurt our plants, but just maybe injure a half a dozen horseback riders and golfers. Bad winds may come in midspring or midautumn. I can remember a fellow worker, unable to get back to work from a trip to New Mexico because Colorado roads were closed due to blowing dust. One September we had such a windy downpour that all the leaves were stripped off the west side of the cottonwood trees. Last year an unusual cold snap, wherein the temperature dropped from 70°F to 10° in about 36 hours and then stayed low, killed as many as 10,000 mature Siberian elm trees in the Denver metropolitan area—including my neighbor's. (Chuckle-chuckle.) This gave me more sun in the back yard. Score one for the alpiners, and down with trees! We frequently lose 50°F in half a day. Sometimes you can play volleyball in shorts on a

nice 65° day in January. We can have an East-Coast-style ice storm once in a great while. I even saw my first tornado right in our fair city. I am sure other regions have worse weather. Ours is just typical of any central portion of a continent away from the modifying effects of oceans.

Hail is our worst culprit in garden destruction. We have had various kinds: marbles, golf balls, and baseballs. I just can't wait for the basketball-sized hail. It's no joy having your windshield blown into your lap by hail while you are driving down the freeway. A few years ago when Andrew Pierce was our chapter chairman, he had an open house to show off his garden one Saturday. The most impressive feature was the pebbly white scree constructed by celestial forces a mere five minutes before we all arrived. It contrasted beautifully with the dark green foliage! The petunias were history, but guess what? The hail bounced harmlessly off the alpiners.

Actually, I get the impression alpiners love these "harsh" conditions. Most gardeners in the Denver area do not reside in the mountains but in the vegetative zone classified as foothills at 5,500'-8,000'. Average precipitation is 16"-20", but this gross measurement tells us little. Rain is reasonably frequent in summer, and though we can have thundering downpours, more often our rain showers contain fewer than 100 drops. It is not wise to turn off the sprinklers just because it's raining. In a summer storm the rain may penetrate less than half an inch. Due to low humidity and intense sunlight creating an extremely high rate of evaporation, most of this moisture will evaporate before it does the plants any good. Plants need deep roots to survive.

Rocks are the answer to gardening in Denver. With the mountains close by, rocks are available and affordable. Some communities have an abundance of rocks already in their yards, as does the city of Boulder 30 miles northwest of downtown Denver. Rocks shade the soil and preserve the moisture around the plants' roots. A flat rock set into the soil at a gentle slope can channel available precipitation into a small crevice, concentrating it. Sometimes a shallow depression will form a saucer for a brave rock-crawling plant to drink from. Overhanging rocks or rocks at a rakish angle can form small pockets of shade for tiny plants, especially on a north slope. This is the best place for small hardy primulas or even the more drought-resistant encrusted saxifrages. In the past we have been able to obtain a lovely pale-orange granite gravel from deposits near Pikes Peak. A mulch of its coarse, angular pieces makes a good inhibitor for at least the annual weeds. Many of our rocks are warmly colored, so this gravel looks very natural in our gardens. We prefer this, since its variable size and granitic composition both protect plants from crown rot and enrich the soil. A rock mulch is a must, not only for the above reasons, but to cut down on evaporation of moisture from the soil surface.

Officially, Denver's garden zone is 5. This is not very informative for various reasons. Experienced gardeners can occasionally succeed with zone 6 plants. On the other hand, I have yet to succeed with *Dryas octopetala*, a native of our own tundra, which is a zone-3 plant. The right microclimate makes a very big difference. Another consideration is that from year to year local weather

conditions vary greatly. My New Zealand hebes were massacred two years ago, after many years of successful living, by an unusual spell of cold with no snow cover. We get a peach crop about once every five years; in all the other years late frost knocks off the blossoms. It is marvelous to see what is being grown here as one drives about the city. Magnolias and wisterias can be seen. But the price of success in forcing a plant to grow north of its preferred zone is often a failure to flower. The two most deadly times for our plants are the months of August and February. In February, sometimes early March, we may get a cold snap when snow cover is gone, and this can be the end of a choice plant. The problems in August are harder to explain. Sometimes I wonder if plants placed in the garden in spring or summer have not had sufficient time to prepare for the cooler weather of early autumn. Other times I think we may get too much moisture in late August for plants wanting a summer dormancy period. At any rate, this is a time of high attrition in the garden. Depending on a plant's position on the "wow!" scale, I will try it again after failing once. The plants highest on the scale deserve endless attempts, others receive three chances. Any plant is worth planting at least once.

The climate most closely similar to ours in the world is that of central Turkey. The eminent Soviet botanist Armen Takhtajan characterized similar regions in the world as "Tethyan," a term borrowed from geology. Much of the western United States, including the Denver area, falls under this floristic description. Our climate and the composition and evolutionary history of our flora are very different from the regions in

which our gardening traditions originated. Thus, we read in the much-admired *Rock Gardening* by Lincoln Foster, under *Androsace villosa*, "...there are many years when the promising clumps will grow sodden and moldy in the dog days of summer..." Not here, they wouldn't! Most of our rock gardening resources and references are not based on a "Tethyan" environment. Therefore, we need to interpolate cultural requirements. As they are in Turkey, for me the bulbs are the leading group of plants easiest to grow. I especially like tulips, fritillaries, squills, crocus, grape hyacinths, and daffodils. Fall-blooming bulbs provide nice spots of color. They do not need to be lifted, but given loose, gritty soil and some bone meal, they will multiply effortlessly and happily. The next single most important group is the iris. A wide range of species from many sections of the genus are content here. Besides dwarf and miniature bearded iris, the bulbous *Iris* do very well. We are just beginning to investigate growing *Oncocyclus* species and hybrids, but we already know they do well in the open garden here—to the chagrin of gardeners in other regions who must coddle them under glass. It is also a delight to experiment with species of the related genus *Sisyrinchium*.

Since Denver is in the short-grass prairie zone, it would be logical to think that the cultivation of prairie species would be carefree. Actually, in some cases, prairie species fail to survive when interplanted with species from moister regions. They can't take the extra irrigation of the garden. I suspect many local rock gardeners have lost *Penstemon* 'Claude Barr' for this reason. *Penstemons* are a joy to grow in the Rocky

Mountain region. If one keeps the rule of thumb, placing the broader-leaved, *Dasanthera* penstemons in shadier spots, the needle-leaf shrubbies in the sun, most find a spot where they can be happy. Also, I have found that once they do, many seem to be surprisingly long-lived. Our *P. cardwellii* 'Roseus' is going on eight years old. Knock on wood, of course.

Other natives that are supremely contented in the garden include: *Ipomopsis*, *Townsendia*, *Oenothera*, *Allium* spp., *Aster* spp., *Eriogonum* spp., and many of the native cushion phloxes. These all belong to the group of plant genera called "Tethyan."

For many of us rock gardeners, there is a fascination in collecting plants from all over the world. The challenge is discovering which of them will grow well in our respective environments. Plants from north of Denver are seldom a problem for us here, but plants from Arizona, New Mexico, and old Mexico may be difficult, not just because of the dryness but rather because of the southern latitude. The one beautiful surprise is the lovely Mexican phloxes that do so very well for us. Mediterranean species are quite mixed in their performance. Most coastal Spanish, Italian, or Greek plants need the milder winters of zone 6 or higher. However, *Anacyclus depressus*, from the Atlas Mountains, becomes almost invasive, and if given a sandy soil reseeds readily. Most plants from northern and central Europe are good performers, but my prejudice intervenes, and I try to avoid the pedestrian ones. Of course, the alpines are always appreciated, especially the new and exotic species.

The vast area of central Asia is the world of most interest to me

because of the potential for discovering something which will truly flourish in our region and be unique. Tethyan areas of Turkey, the Caucasus, and the mountains of the Hindu Kush are of great interest. One of our best and most bountiful groups from these areas is the acantholimon. South African dryland plants do very well, but those from damper climates do not. The genus *Delosperma* has given us ice plants that frequently do well in sunny locations. I am now growing about five species, *D. nubigenum*, *D. obtusum*, *D. ashtonii*, *D. lavisii*, and *D. cooperii*, although this latter does not always make it through the winter. One has to think upside down when dealing with plants from the Southern Hemisphere—north is warmer, south is cooler. Plants from New Zealand and Australia can do fine for several years, and then an unusual year wipes them out. A paranoid gardener may get the feeling that some of them just resent having their seasons reversed. This applies to species of *Hebe* and *Raoulia*, but not to *Cotula minor*, which is a slow-growing invasive for me.

South America is the greatest unknown continent for rock garden plants. There must be many cooler and drier environments equivalent to Denver's in which plants suitable for our horticulture have evolved, and yet we have no knowledge of or access to them. Many plants we do know are tricky, but with more experience growing them we may be more successful. Currently we are testing a strange, nettle-like plant with peculiar twisted pods, *Loasa vulcanica*, found from Mexico to South America.

Woodland plants from the American Northwest or the East Coast can usually be grown by making certain

they have sufficient shade, good humus, moisture, and by supplementing the soil with acidifying fertilizer as necessary. Let's not forget the Rocky Mountain region in our inventory of available plants. There are still alpinists to be mastered from both subalpine and tundra areas. Re-creating the natural environment of plants found a mere 50 miles away on the mountain tops is not easy down here in the plains. *Solidago spathulata v. nana* and *Erigeron peregrinus* are two local species now available in the local plant trade, but there are certainly many more choice plants that haven't really made it into cultivation, much less commerce.

Saxifrages, gentians, and hostas need some special attention to grow well in this region, but in some cases just selecting the right species or giving them extra shade does the trick. Such woodland favorites as *Asarum*, *Astilbe*, *Dicentra*, *Erythronium*, *Hepatica*, *Oxalis*, *Sanguinaria*, *Trillium* and *Cyclamen* may need extraordinary measures to grow here. I have been successful with a couple of jack-in-the-pulpits (*Arisaema*), a childhood favorite, for several years. What has been done was to make a shallow water trap of black plastic with just a few drainage holes below the soil. Adding lots of peat moss can also help many of these plants, but it sometimes seems as if the moss hogs more water than it provides! One can go to great lengths caring for woodlanders with drip systems, mist systems, or lots of hosing. My diligence and dedication is not that great. If I can do something simpler, such as finding less fussy woodland species, then I will. Yet, I must admit it is nice to have one small area, somewhere in

the yard, where some choice woodlanders can be shown off. Denverites freely concede we are a bit jealous of regions where woodland plants can be grown magnificently. An interesting counterpoint is that some plants that are invasive in the climate of the East Coast can be easily controlled in our climate. Examples are *Myosotis* and *Lysimachia nummularia*; the very best is blackberry brambles, a pest on the East Coast that will die out here during a dry winter.

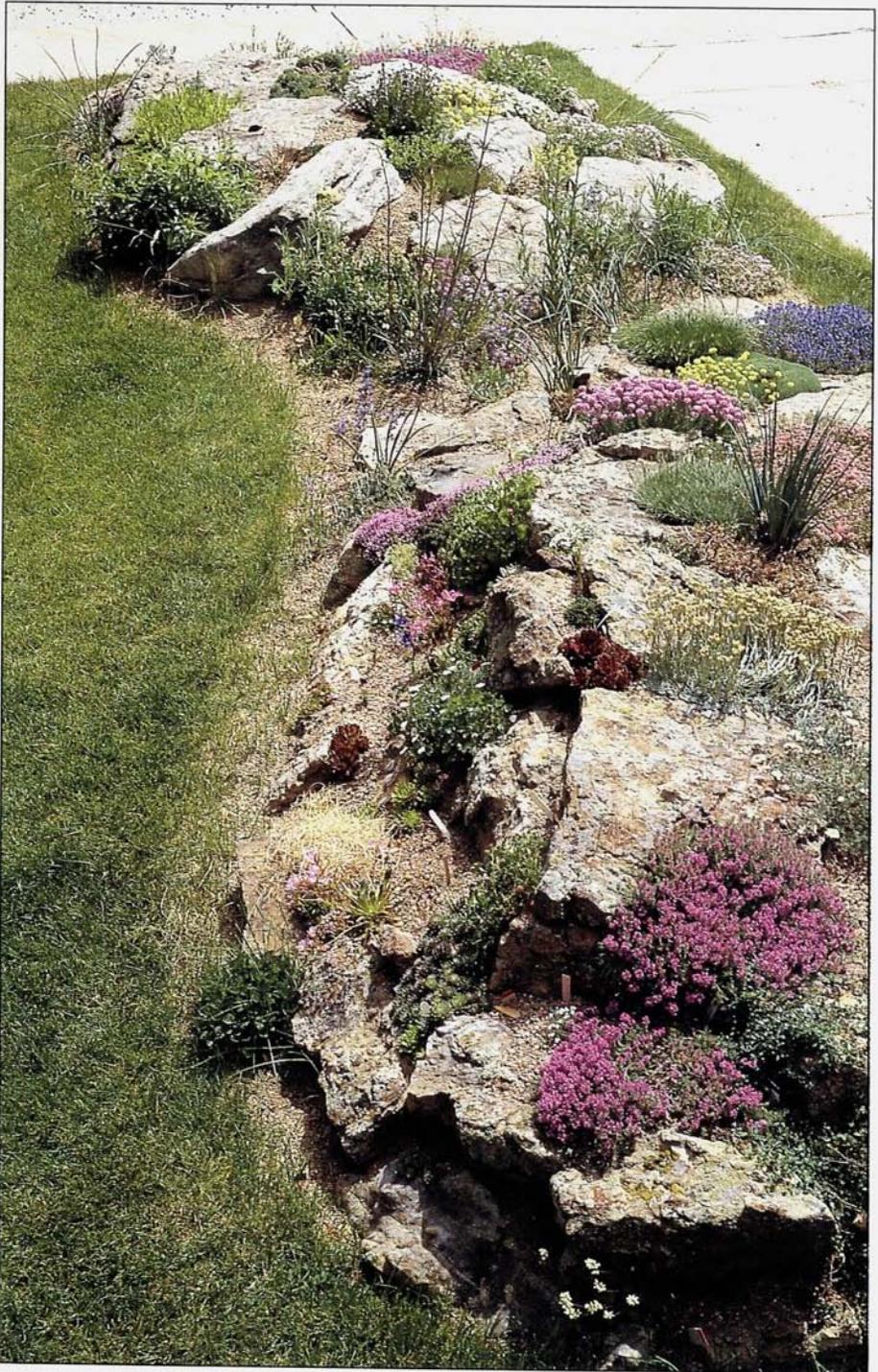
As far up as 9,000', where a few members of the Rocky Mountain Chapter of ARGS reside, several conditions are drastically different than in the foothills. Temperatures year-round are colder, there is a shorter growing season, the soil is often more acidic, there is greater snowfall and moisture—and there are often more rocks. Naturally, some plants do better at the higher elevations than in Denver proper. Forced to mention but one genus, I would have to choose *Lewisia*. We can grow them at lower elevations, and they will blossom nicely. But they are never the "cabbages" they become for Andrew Pierce in Evergreen at 7,500'.

As much as we in the Rocky Mountain Chapter of the ARGS would like to think we have the best location in the country for growing alpiners, it would be a mistake to think this is all we grow. John Cramer, whose garden is more traditional, has had success with rhododendrons. Mary Ellen Tonsing specializes in ferns and plants for shade. Ray Radebaugh, our rock garden engineer, grows many of his favorite Japanese species by the use of an elaborate watering system. Allan Taylor and Rod Haenni are

experts in the southwestern desert regions and are our source of knowledge on cactus and drought-tolerant conifers. Marcia Tatroe is our resource for xeriscape plants and has a lovely garden that uses very little water. Xeriscape gardening, using drought-resistant plants, is an art form that works well here because of our abundance of drought-tolerant natives. The number of people who have excellent perennial borders, many of whom also have rock gardens, is too large to list except to mention Sandy Snyder's and Mike and Marlene Boyle's fantastic gardens. All of these and many more can be visited on your way to Vail, when everybody comes to the ARGS Annual meeting in June 1993.

One kind of garden is missing from the local scene—at least to my knowledge. Its absence is peculiar, and it is a real shame, since some very lovely plants can be grown in this special way. Why don't we have an outstanding alpine house or potted plant grower? Is it because we can grow so many alpiners so well out-of-doors? Or is it because the technology of growing in pots has not reached this area? I feel we are losing out. Plant shows are impractical without potted plants. Also, plants grown in the protection of an alpine house could serve as "mother" plants for propagating new species to test outside. It's a vacant niche that much needs to be filled by some bright, enterprising gardener.

Dick Bartlett gardens in Lakewood, Colorado. In their youthful retirement, Dick and his wife Ann can often be found on high mountains or visiting alpiners around the world.



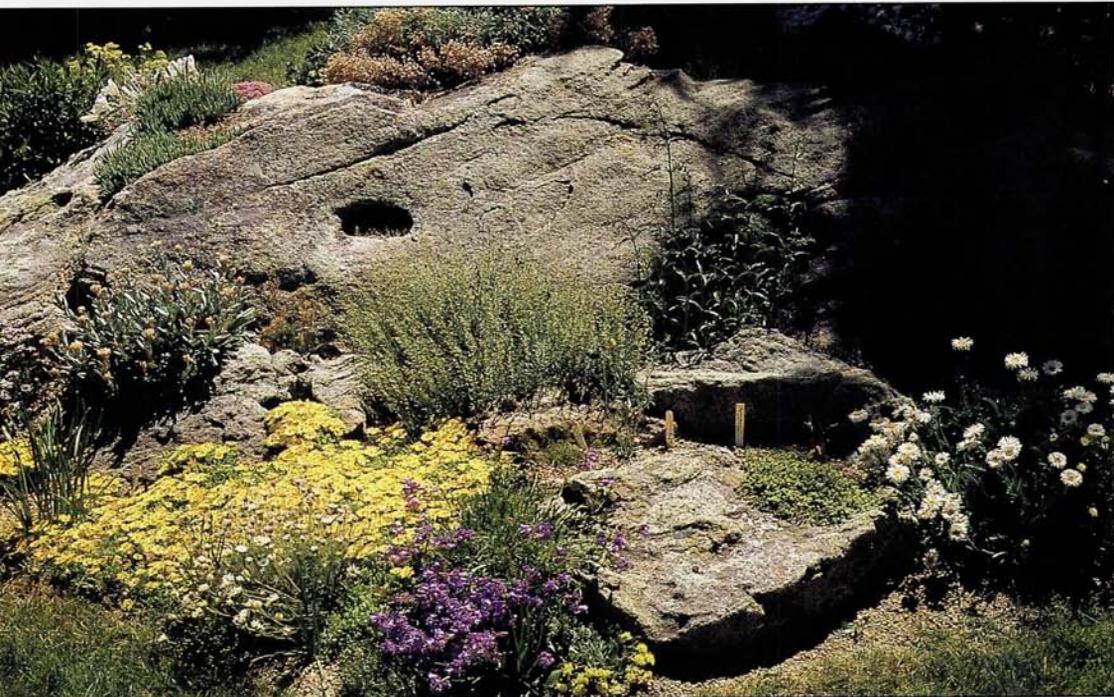
Bartlett Garden, front yard, north of driveway

Dick Bartlett



Bartlett garden, front yard (pp. 11-16)

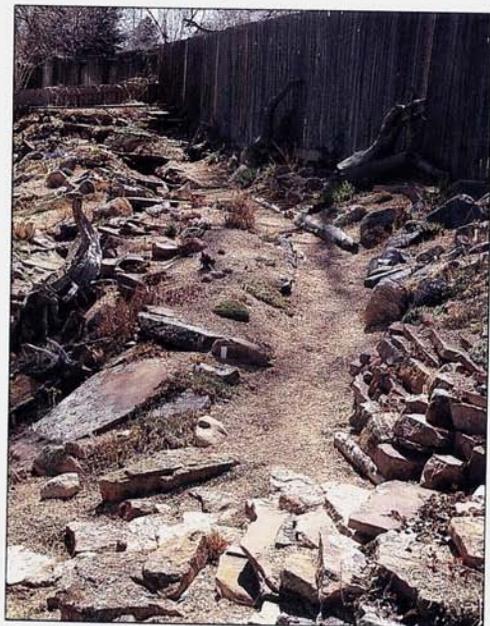
photos by Dick Bartlett



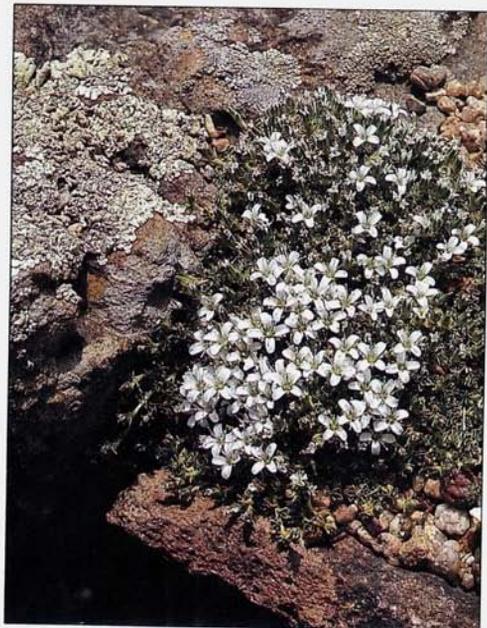


Bartlett garden, back yard

Early spring, back yard



Arenaria tetraquetra





Bartlett garden (pp. 11-16)

photos by Dick Bartlett

Aquilegia elegantula

Penstemon fruticosus



Growing Alpines in the Dirt

by Robert Nold

One of the most daunting aspects of rock gardening, especially for beginners, is the infinite number of formulas for soil composition and preparation. The books are almost uniformly discouraging in their recommendations: equal (or unequal) parts peat, grit, leaf mold, or some similar hermetic concoction. The more unobtainable or non-existent the ingredients, the more the gardener is assured of being set on the True Path to successful cultivation. Nobody ever tells you where to get "horticultural grade" grit, or limestone chips, or spent bracken leaves—or even what these things are.

I concluded some years ago that authors of these books lived in areas where leaf mold and other desirable stuff lay in huge heaps by the roadside, there for the shoveling, and I decided to grow most of my rock plants in ordinary dirt.

In a dry, sunny, windy garden (like mine), the aforementioned soil amendments tend to dry out as fast or faster than plain clay, necessitating a sprinkler system, lots of shade trees, and daily prayers for unusual weather (rain). I don't want a garden that imitates alien

climates, and being more or less a weekend gardener forces on me a practicality verging on laziness. I was dazzled by the idea that I could have a garden where the plants grew, flowered, seeded with abandon, and even died without much interference from me. I was dazzled by the idea that I could be free of the humiliation one feels when plants in the garden suffer and die.

The soil in our yard is mostly a pinkish, alkaline concrete mix—just add water and bake a few days—ideal material for the "rock garden." Yet *Leucocrinum montanum* was growing by the thousands in virtually identical conditions less than twenty minutes' drive away, so why not? A pile of dirt with a little pea gravel on top, and I called it a rock garden. Hardly "traditional" in appearance—the color of the soil elicits a few disparaging comments from people raised on rich, black bottomland soils, but the pervasive pink cast is natural. It does take some getting used to.

Most of the time the soil is very hard, making digging with a trowel an interesting experience; my principal gardening tool for years has been a

1945 US Army entrenching tool, a veteran of both the Korean War and hundreds of square yards of garden bed preparation. To dig a bed, the first few inches of soil have to be drenched. This layer is then scraped away, the next few inches soaked, and so on. During prolonged dry periods, the soil turns to dust on top, making digging a little easier. Then I can use a high quality trowel, such as those sold by Smith and Hawken, to jab and hack a planting hole. Large cracks may sometimes open in the soil; I ignore them—they add to the ambience—unless they threaten roots. We experienced a violent hailstorm last spring (thirty minutes of golf-ball-sized hail) that so compacted the soil that digging was impossible the rest of the year and plant roots were exposed. The plants recovered, and so did I.

Winters in the Denver area are relatively dry, with wide temperature fluctuations (60°F on Monday, -25°F on Wednesday, 60°F again on Saturday) accompanied by endless freezing and thawing. Even though I'd mulched with pea gravel, there I was the first winter out in the mud poking around fretting about crown-rot. The soil was ice-cold slime on top, frozen solid half an inch down. *Lewisia tweedyi*, planted on the north side of a small rock, survived not only the exploratory prodding in the ooze but also the winter, blooming profusely the next spring, visited only occasionally with a watering can.

Since the majority of these rock garden beds are never watered, 12" annual precipitation being quite sufficient, planting out can be something of a problem. Seedlings need close attention and individual watering every day. Soilless mixes common to most potted plants purchased from nurseries need to be removed—I soak the root ball in a dishpan, then carefully tease out as much of the mix as I can—so that roots can come in contact with the native soil

as quickly as possible. Otherwise, for one thing, the porous soil around the roots acts as a blinking neon finger pointing to every ant within a thousand miles to start tunneling here. If the young seedlings don't die from drought, they die an even more horrible death, devoured by ants like some luckless explorer in a grade B jungle movie.

The sheer number of plants that take readily to my harsh, windswept environment made me reel with avaricious delight. Cactus, of course, but the genus best represented is *Penstemon*. Some of my favorites are *P. eriantherus* (pink), *P. cleburnei* (sugar pink and fuzzy), *P. angustifolius* (shades of sky blue), *P. humilis* (very blue). Some good mat formers are *P. caespitosus* and its variety 'Claude Barr', *P. crandallii*, *P. teucroides*, *P. acaulis*, an unidentified species like *P. teucroides* but with much larger flowers, and *P. tusharensis*. All but the last have blue flowers; *P. tusharensis* flowers are more purple.

Eriogonum is represented by the big *E. corymbosum* (huge corymbs of stinking flowers in late summer, pretty white sepals turning to pink, then to a gorgeous rust in fall), and *E. niveum* (white). Among the smaller eriogonums are *E. ovalifolium* (white, pale yellow, and pink), the ravishing *E. umbellatum* ssp. *bahiaeforme* (yellow turning to brick-red), as well as *E. douglasii*, *E. caespitosum*, *E. thymoides* (growing infinitely slowly), *E. shockleyi*, and more.

Acantholimon, a glorious genus for dry western rock gardens—and dirt gardens—do so well they're planted in profusion without regard to their future size. *Dianthus erinaceus* is an acantholimon look-alike (as *Acantholimon dianthifolium* is a dianthus look-alike) with just "so-so" flowers on a rock-hard, prickly dome. This is also a good place for western phlox (*Phlox bryoides*, *P. hoodii*, *P. nana*, *P.*

kelseyi, *P. multiflora*), townsendias (seed sown *in situ*, most of it by the plants themselves), species tulips, the teeny *Erigeron scopulinus* (a flat, tight mat of quarter-inch-long glossy leaves), *Lewisia rediviva*, dwarf aquilegias, such as *Aquilegia barnebyi*, *A. jonesii*, *A. scopulorum*, and much much more.

This may be the place for some of the more intractable hydrophobes, such as *Asclepias cryptoceras* (dwarf and difficult) and certain irritatingly impossible members of the genus *Cryptantha*—even dead specimens of these, when properly labeled, can be a source of some pride for a while.

Obviously, conditions in this garden are pretty hostile to the majority of classical alpine. No primulas or ericaceous plants want to stay in my garden more than a few days. And even though a few gentians can be grown in this dirt—in partial shade: *Gentiana acaulis*, *G. septemfida*, *G. cachemeri-ca*, *G. loderi*—and a few saxifrages, the conditions demand a whole new catalog of alpine and rock plants.

Veronics offer a number of possible species, from tight buns (*Veronica caespitosa*) to aggressive mats (*V. liwanensis*) to the almost hopeless (*V. bombycina*). Campanulas are equally good, but they need a bit of extra water.

Some unusual plants deserve more attention from the dirt gardener. *Chrysanthemum alpinum* ssp. *maritimum* (sold by Siskiyou Rare Plant Nursery as *C. aff. catanache*) is one of my favorites. It forms tight gray domes of filigreed foliage in winter, carries very pretty white daisies with pink centers, catanache-like buds, and seeds itself all over the garden. *Haplopappus glutinosus* is a mat-former with tiny, toothed foliage, beautifully silvered in winter, with hundreds of yellow daisies on 3" stalks in late summer. *Helichrysum tianshanicum* and *H. virgineum* are two low plants apparently demand-

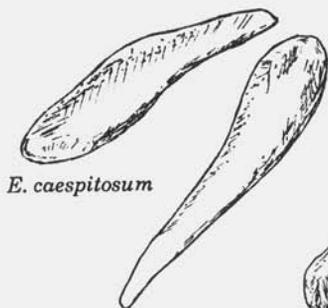
ing perfect drainage in winter. The former flowers for us all season, producing a heavy curry scent; the latter is worth growing for its silver leaves alone. Heronsbills perform equally well in dirt. *Erodium petraeum* is nice, but may be a bit too much like its weedy cousin, *E. cicutarium*. The cultivar 'Crispum' is very attractive, and *E. chrysanthum* is especially beautiful and thankfully dioecious; it has silver-gray leaves and pale yellow flowers for a very long period in summer.

The line between experiment and folly is a thin one. Many plants that I'd supposed to be drought- and sun-tolerant either died immediately or were devoured by hordes of grasshoppers. Some plants, even though they can adapt to clay soil, need regular watering there. The Mexican phloxes are an example. While the pink 'Arroyito' seems perfectly happy being ignored, the other cultivars enjoy relatively huge amounts of water during the growing season. The easy androsaces can be grown in clay also with extra spot watering, as can a number of other alpine typically cultivated in free-draining soil. I think it is impossible to make firm declarations about growing requirements of many alpine. Surely trying them under different conditions is part of the fun.

Despite the enjoyment of growing in dirt, I did in fact decide to make a cool, gritty scree, packed full of plants that receive daily attention. The soil is composed of decomposed turf, grit, and loam, and the drainage is impeccable. I water the plants ever so correctly and whisper to them lovingly in many a mused rhyme. Visitors to the garden ignore them, and now slugs are knocking at the garden gate. I wonder what this means?

Bob Nold and his wife Cindy create innovative gardens in Lakewood, Colorado.

Eriogonum Seeds



E. caespitosum



E. soledium

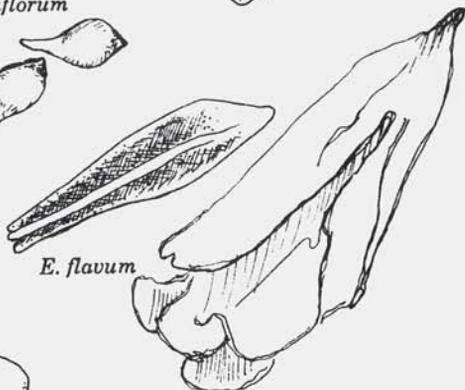


E. rosense

E. pauciflorum



E. ovalifolium



E. flavum



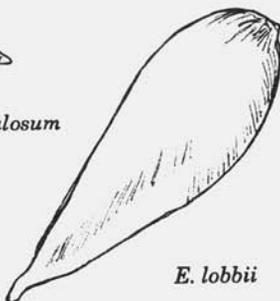
E. tumulosum



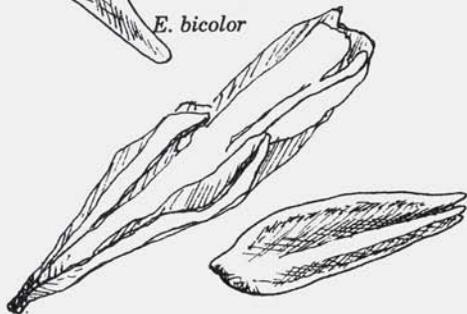
E. acaule



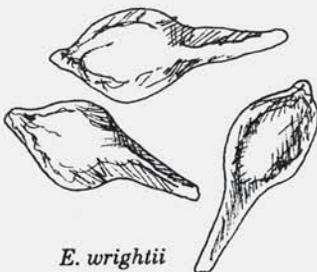
E. bicolor



E. lobbii



E. jamesii



E. wrightii

scale 1 mm=1 cm

Growing Eriogonums in Western Washington

by *Betty Lowry*

Eriogonums typically inhabit rather arid habitats, frequently in continental climates where cold, dry winters and hot, dry summers prevail. In our area of the Pacific Northwest, the considerable precipitation occurs in a Mediterranean pattern, with precipitation heavy in winter (mainly as rain) and light in summer. For growing eriogonums, our usually dry summers are a definite bonus. The wet, mild winter is the foremost problem, though rain and dull cloudy conditions at any time, especially spring, can cause excessive growth and foster fungal disease. Fortunately, many eriogonums are tough and adaptable.

Eriogonums, or wild buckwheats, are very popular nowadays. I think of this not as a fad, but as a surge of interest reflecting the recent boom in availability of species of this decorative genus. Not so many years ago eriogonums were only sparsely represented in seed lists; now good new species are being introduced yearly. I myself started growing eriogonums when I first started rock gardening almost twenty years ago. I started with some of the species from our mountains that I collected as seed, and these have remained valued garden

plants ever since. The current interest could be considered something of an eriogonum renaissance!

What is the great attraction of these plants? First and foremost must be their variety, character, and beauty. There are many compact species with excellent foliage from bright white to dark green. The flowers are commonly arranged in a single, dense, capitate cluster or in compound umbels. The flowers may be held well above the foliage or may be virtually stemless. Many species, though tall in flower, have low, compact foliage.

It is useful to know that the colored part of the flower is the calyx or perianth; no petals are present. This has some important implications. First, the flowers last a long time. Second, the papery perianth can undergo color changes as it ages. The basic flower color is usually white, cream, or yellow, but this scarcely gives an idea of the range of color effects possible. Many species have beautiful red or pink coloration of the buds, which as they open give a progression of color effects. Furthermore, on aging the flowers can assume tints of rose, pink, red

or even orange. Another big plus of this genus is the long season over which the species flower. Some are early, others late; some kind or another will be in flower from April to October.

Some species, such as *E. ovalifolium*, can be seen in nature with red flowers. The horticulturist hopes to see the same in the garden. But color is not constant and changes as the flower ages. In a wild population there will be plants that color well and others that do not. This may indicate individual propensities in the plants, but small differences in microclimate throughout the habitat may also play an effect. I feel that the main factor responsible for ultimate strong coloration is the growing conditions during a given season. I have visited the same plants in different years and have seen bright red flowers sometimes and not others. Sometimes buckwheats in the garden color attractively, but not nearly as frequently as in nature. Aging to a russet color is more usual.

Even if such a rich diversity of plants for the rock garden were not enough, eriogonums have other considerable advantages. One is their resistance to pests. In this garden I have never noted any damage by aphids, spider mites, or any other insect. And they seem to be absolutely immune to slugs! In this slug haven of the Northwest, that is good news indeed. I am afraid that fungal diseases may be another matter, but many species are not affected. From a water conservation standpoint, eriogonums are ideal additions to the xeriscape. To those who associate western Washington with continual rain and clouds, it may come as a surprise that we should talk about xeriscaping for this area. But anyone who has experienced the heat and drought of the past several summers, ever-increasing water shortages and mandatory water restrictions will recognize the value of gardening with drought-resistant plants. The

trick is to find the species that are both drought-resistant and adaptable to our wet winters. There are many eriogonums that fit the bill.

Propagation of eriogonums is mainly by seed, which rarely fails to germinate. In the early years I experimented with various temperatures for germination with mixed results, some species appearing to germinate best under cold conditions, others in warmth. As in most genera, I doubt that there is any absolute rule of thumb. In recent years I have planted most kinds of eriogonum seed in early winter with good results. That is not to say that they need cold. In our mild winters they often germinate quite quickly, whereupon they are removed to a cool greenhouse to grow on. After being transplanted to individual pots they are grown in frames and are ready to plant by September. I have had only limited success with propagation by cuttings. Some difficult xerophytic species brought back in summer from the mountains have failed.

I grow eriogonums for the most part in the open garden without any protection. I have not attempted to contrive any covers for individual plants to keep off the rain. Of course, not all the species I would like to grow succeed under these conditions, so some remain in pots in frames or other covered areas. It seems worthwhile to try to protect susceptible species during their winter dormancy by regular use of fungicides and feeding with non-nitrogenous fertilizer in autumn. Fungicides may well also help prevent collapse of sensitive species during wet periods at other times of the year. Applying these chemicals requires more time and diligence than I've been able to afford of late.

The two most important features of a favorable planting site for eriogonums are sun and faultless drainage. Our often dull spring weather is partly

responsible for looser growth seen on garden plants compared to wild plants, so any shading is to be avoided. Though some eriogonums grow on heavy soils in the wild, this is in low rainfall areas so that stagnation is not a problem. In a seasonally wet climate, extra drainage is needed. I have eriogonums planted throughout the garden in various well-drained sites, mostly on raised beds or slopes. The soils range from rich to meager screes to good sandy soils and even to a deep pumice bed in one case. Most of my eriogonums, however, are grown in what I call the "dry garden," a series of raised tiers built up with slabs of broken concrete. The tiers are mostly modified sand beds of the type described by Norman Deno. They are built with various depths of sand over the well-drained, loamy soil base, and most have some sort of barrier between sand and soil to exclude moles. The sand in combination with the physically raised beds affords splendid drainage. The beds are unshaded and south-facing and become very hot in summer. Many dryland plants are at home in this area (as are all the cats in the neighborhood). Most eriogonums are planted on the flat beds, but a few have also been tucked into crevices in the walls. This area is only a few years old, and so experimentation has really only begun.

I like to plant eriogonums either in early spring or early autumn. Summer is possible, even in a hot location like the hot, dry sand bed, if you can provide a little shade and enough moisture for the plant to become established. Since winter is the period of most stress to these plants, it is well to give them time to adjust before dormancy. Some species are trickier to establish than others. The first time I attempted *Eriogonum ovalifolium* var. *nivale* the plants melted away, and I feared that the species would be difficult

outdoors. That first attempt, however, happened to be made in August during an unusually long period of wet, muggy weather. If there is anything worse than the wet of the dormant season, it is continuing hot, moist, dull conditions in the growing period. I assume collapse of the plants is a result of fungal disease. I sympathize with gardeners in other parts of the country who suffer hot, humid weather regularly in summertime. It is my personal feeling that the most critical time in a plant's life is the period between being planted and becoming thoroughly established. The soft growth of young plants seems rather more vulnerable to disease and stresses than that of older semi-woody ones. I see this over and over again in various plants of the dry garden. Once established, eriogonums are long-lived, and it is best to leave them undisturbed if possible in order to prevent damage to the extensive deep root system. Planting of pot-grown seedlings minimizes transplanting stress.

The only maintenance necessary is removal of dead or unhealthy parts of the plants and removal of flower stems for cosmetic purposes. The plants may be trimmed back if they outgrow their space. Likewise, plants that have become tatty in age or been overgrown by aggressive neighbors can be rejuvenated by pruning.

Next, I would like to describe some of the species that decorate our garden. Some are well worth growing for their foliage alone, which is good, as not all are free-flowering. Nor do all wild populations flower freely. In the garden most do not grow as tightly as in the wild but still retain a very attractive compact stature.

One of the first eriogonums I ever grew and probably the easiest is *Eriogonum umbellatum*, a highly variable species with a number of subspecies and varieties. *Eriogonum umbellatum*

v. *umbellatum* as we have it in the Wenatchee Mts. has low mats of dark green foliage, gray-hairy beneath, and balls of bright greenish-yellow flowers on stems of 3" or so. Its foliage turns to shades of plum in the cold months, an added attraction. Also frequent in our mountains at somewhat higher elevations is *E. umbellatum* v. *subalpinum*. This makes a tighter mat of smaller leaves of lighter green which are decidedly whitish at the edges and beneath. The flowers are cream opening from reddish buds, giving a lovely pink and cream effect. A new introduction that I am excited about is *E. umbellatum* v. *porteri*, a very compact kind with leaves green on both sides. Some forms of *E. umbellatum* have gray-hairy leaves, such as the very handsome mat-forming *E. u. v. covillei*. There are also a number of larger forms that can be added if room permits: *E. umbellatum* var. *nevadense* and *E. u. var. stellatum* with green foliage, and *E. u. ssp. polyanthum* and *E. u. ssp. bahieforme* with gray. Variety *stellatum* and subsp. *bahieforme* have branched inflorescences.

Eriogonum ovalifolium is another variable species of great importance in the garden. Again I will start with the one commonly encountered in the Washington mountains, *E. ovalifolium* var. *nivale*. This is one of the most striking white-foliaged plants in the garden. Its white mats are not the tight doilies seen at alpine heights, but strikingly beautiful nonetheless. Under certain conditions the older leaves of this species can become suffused with pink. The almost circular leaf blades are involute when young, and sometimes this persists in the mature leaves, giving a particularly lacy effect. The tomentose *E. ovalifolium* is one of the species that shows its dislike of our wet winters by the poor condition of its leaves at winter's end. New leaves in

spring restore its beauty. Its flowers are cream opening from pink buds, and once or twice the conditions have been right to give salmon to red tones in the aging flowers. Plants in the wild with bright red flowers over white cushions are a sight never to be forgotten. The tiny, gray-leaved *E. ovalifolium* var. *depressum* from alpine heights in Idaho has thus far resisted introduction into the garden. From Nevada we have *E. ovalifolium* v. *eximium*, which vies with var. *nivale* for title of the whitest. It is a bit more upright than var. *nivale*, with larger leaves. Several other unnamed forms of *E. ovalifolium* are splendid plants: a very dwarf one from the Steens Mts. whose flowers tend toward a good pink color and a superb mat-forming, gray-white desert form whose heads of creamy-white flowers rest on the foliage.

One of the earliest eriogonums to flower is *E. flavum*. This, too, has several varieties. One of these makes very fine, firm, green cushions and bears large balls of deep yellow flowers in April. It is one of the most showy and prolific in flower that I grow. The plant in flower is less than 4" tall. In the mountains I have seen it suffused with red to give a bright orange effect. Very different are the handsome gray cushions of *E. flavum* v. *xanthum*, which have greenish-yellow flowers.

Eriogonum douglasii var. *douglasii* is another species that like *E. ovalifolium* can give breathtaking red heads in nature but so far has failed to do so in the garden. Its cushions are of a darker gray, topped by creamy puffs on short stems.

One of the most exciting species on the east side of the Cascade Mts. is *E. thymoides*. It is a perfect miniature shrub with tiny, narrow, gray, revolute leaves and heads of small, bright yellow or cream flowers, all in perfect scale. This species has a characteristic whorl

of leaves midway up the flowering stem. The two color phases choose somewhat different habitats, the cream form being found near the Columbia River in the area with the lowest rainfall in the state (annual precipitation 5"). The flowers open from full, bright red buds that are very striking themselves and progress through a mixture of reds, pinks, and cream. The yellow form from higher elevations may have suffusions of red in the buds and sometimes ages to shades of bright orange or red. So far the yellow form of this fantastic little species is established in the sand bed and has flowered a little, and I hope flowering will increase as it matures. It is slow-growing, and the large woody plants seen in nature must be of great age. Eriogonums may have perfect or imperfect flowers, and *E. thymoides* is one that is dioecious.

Call it a bun or a cushion, *Eriogonum caespitosum* is one of the nicest small species of those introduced into the open garden so far. True, it does not retain the hard character of wild plants, but its very compact, small-leaved cushions of greenish-gray are a joy to behold. The light yellow balls of bloom are held on short stems. This grows well on flat sand beds and also looks very attractive in the wall. It is an ideal trough species.

Now we come to some late species. The various forms of *E. brevicaulis* give invaluable late season color. They form loose mats of mostly elliptic leaves of green to gray and carry their bright yellow heads on 4" to 5" stems in September. Another late eriogonum of very different character is *E. wrightii* v. *subscaposum*. This forms fine, flat, silver mats with an unusual inflorescence of pinkish-white flowers. The flowering stems branched, the main branches each with interrupted flower clusters in a rather spike-like arrangement. The billowy effect is somewhat

reminiscent of the fleece vine, *Polygonum aubertii*. Though the flowering stems are up to 8" in length, they recline so that the overall height of the plant is only about 4". The pinkish color in the fresh flower comes from a red midrib on the whitish perianth, but intensifies to rosy pink with age. I first grew this species in a wall plant, where its handsome silver mat looked lovely. However, on flowering, its drooping, longish stems looked very awkward. It looks much better on flat ground in my estimation. This flowers on into October. Obviously related to it is the newly introduced gem *E. kennedyi*. It has flat, tight mats of minute silver leaves. Its flowers are also white with a red midrib, appearing pale pink, but the small flower heads are on such short stems that they appear to rest on the foliage. The entire plant is certainly less than an inch in height, a treasure for a trough.

There are a number of other eriogonums in the garden as well. One very willing grower is *E. strictum* ssp. *proliferum*. The white form of this subspecies, variety *proliferum*, is rather along the lines of *E. ovalifolium*, with white round-bladed leaves, but the creamy white flower head is not tightly capitate, and the plant is bigger. Variety *anserinum* has light yellow flowers and gray-green foliage. *Eriogonum pauciflorum* v. *nebraskense* (once known as *E. multiceps*) grows here not in tight mounds but as rather loose mats of gray. It is generous with its many dense heads of tiny pinkish flowers. *Eriogonum rosense* is a white, densely tomentose, loose mound with small, yellow flower heads. *Eriogonum lobbii* is typically a loose, ashy-white plant. One plant under this name is quite distinct from the others. Its rather large, round, gray-green leaves are felted beneath and are arranged in flat rosettes 4" across. The whole plant is only 1" tall as its heads of dusty rose rest on the

soil. It is different and delightful. The new introduction *E. siskiyouense* looks very promising with its tightly rosetted gray-green mats, and *E. ursinum* var. *nervulosum* is another dwarf cushion of greenish leaves backed with white. I have not yet seen these two in flower.

One of the showiest eriogonums in eastern Washington is *E. sphaerocephalum* var. *sphaerocephalum*, which has densely flowered yellow mounds. Both this and the paler var. *halimifolium* are growing in the garden but so far refuse to flower. Another shy-flowering species and the largest in the garden is *E. compositum*. Its large compound heads are so showy in the bright yellow form that I persist with it.

There are some very choice kinds that are quite difficult here because of

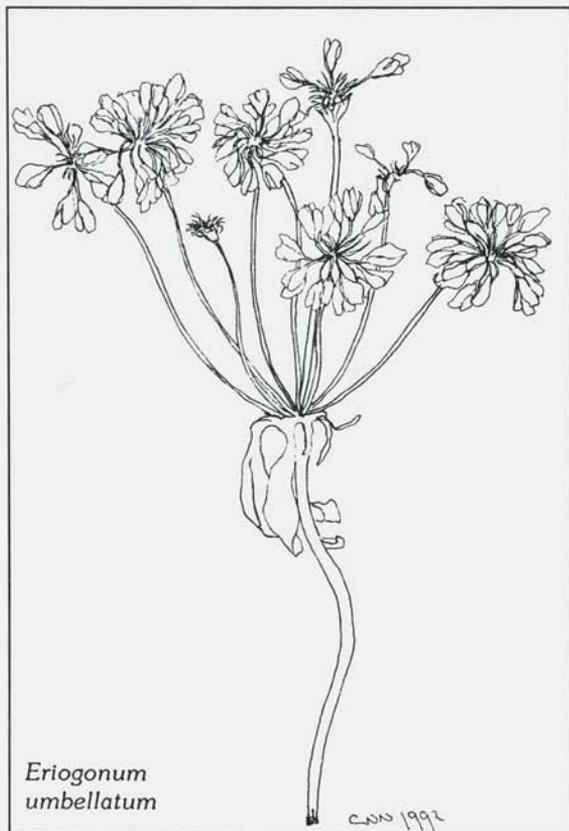
their intense dislike of moist conditions. These extreme xerophytes include *E. bicolor*, *E. shockleyi*, the even more extremely condensed *E. soredium*, and *E. tumulosum*, all Utah natives. The first three are white-tomentose species, and *E. tumulosum* is a tight, softy sericeous kind, one of the most fabulous buns I have ever seen. These species are very moisture sensitive any time of the year, so I have not been able to introduce them into the garden. I am not averse to growing such species under cover if all else fails. On the whole I am very pleased that so many of the genus are adaptable to garden conditions. How many of some other dryland genera, such as *Astragalus* and *Cryptantha*, succeed in gardens? I guess we can thank the family heritage

of Polygonaceae, which contains so many tough weeds, for this lack of miffiness.

For me, growing eriogonums is a continuing adventure. New kinds are in seed pots or ready to plant. The genus is a large one, and thanks to the efforts of avid seed collectors desirable species continue to become available. Thank you, Margaret Williams, John Andrews, Gwen and Panayoti Kelaidis, Jim and Jenny Archibald, and all those others who have contributed. The fun has just begun!

Drawings by Cindy Nelson-Nold

Ned Lowry has taken thousands of stunning pictures of the loveliest, largest, and healthiest choice alpine plants imaginable. Most of these were grown by his wife, Betty, in their garden in Renton, Washington.



*Eriogonum
umbellatum*

Eriogonums: Some Botanical Notes

by Gwen Kelaidis

The genus *Eriogonum* has become one of my passions. Why? It is a large and diverse genus with a great deal of variation in form and flower. The adventure of getting to know a large group of related plants appeals to my botanical senses and challenges my horticultural abilities. The species bloom at different times, offering color from early spring until the snow flies, making them a most welcome addition to the garden. There are many cushions, a ground cover or two, shrubby perennials and the choicest of tight buns for the collector and expert grower in pots and alpine house. Most of the some 60 we have tried have germinated easily using our low-labor methods. For sunny, semi-arid climates this genus has all the potential and fascination for the gardener that *Primula* and *Saxifraga* have had for gardeners in cool maritime climates.

Eriogonum belongs to the Polygonaceae, the family of cultivated buckwheat (*Fagopyron esculentum*), the knotweeds and smartweeds (*Polygonum*), rhubarb (*Rheum*), dock and sorrel (*Rumex*), and of the tropi-

cal sea grape (*Coccoloba*). The family is chiefly from the northern temperate zones with 40 genera and about 800 species worldwide; in North America there are 15 genera, most in the western states. The three genera *Rumex*, *Polygonum*, and *Eriogonum* contain about three-quarters of all the species in the family.

The Polygonaceae are mainly herbaceous plants, often with stems swollen at the nodes. Leaves are generally alternate. Fruits are 1-seeded, and the "seeds" themselves are achenes, lens-shaped or triangular, often black. It is a family typified by its unprepossessing flowers, mostly small with no petals but rather a calyx of petaloid sepals or tepals. Were the flowers more striking, possibly two families would have been created, since there are two distinct groups of genera with different floral formulas: the *Polygonum* group with five tepals in the calyx, and the *Eriogonum-Rheum-Rumex* side with a calyx of six tepals arranged in two cycles, three inside of three.

The genus *Eriogonum* is North American with some 220-250 species found mainly in the western United States; only one species grows as far south as South America. *Eriogonum* contains annuals, perennials, and a few shrubs with alternate leaves and often with alternate or whorled, scalelike to foliaceous bracts. Each flower has nine stamens. The achenes are mostly three-angled or three-winged.

James L. Reveal is the chief botanical researcher and expert in the genus. In his PhD thesis in 1969 he attempted a complete classification of the species then known into subgenera, sections, and subsections. There was, however, no key to these subdivisions, no descriptions nor discussions of the criteria on which they were based. Later papers by Reveal have expanded this graduate work greatly, but no complete monograph has been produced yet to my knowledge. The species of Arizona and New Mexico were treated in the 1970s, those of California in the revised edition of Munz, *A Supplement to A California Flora*, in 1968. Reveal has tackled some of the knottier groups—*Eriogonum pauciflorum* in 1967, *E. microthecum* in 1971, *E. corymbosum* in 1967. In 1973 he revised the species of Utah. Eagerly awaited works include his treatment of the genus in the soon-to-appear revision of the *Jepson Manual* of Californian plants and in the *Intermountain Flora*. These two treatments will cover a great percentage of the species, and perhaps we will be able to discover from the keys published therein the characters that have been used to separate the sections and subsections.

Stanley Welsh in his own treatment of 55 species of *Eriogonum* in *A Utah Flora* wrote, "This is a dual

genus, consisting of annual species distinguished by minute diagnostic characteristics, and of perennial herbs, subshrubs, and shrubs that are connected through series of intermediates that defy segregation and construction of keys based on characters similar to those used in the annual species. Taxonomic problems are not easily resolved, and the approach represented below is only tentative."

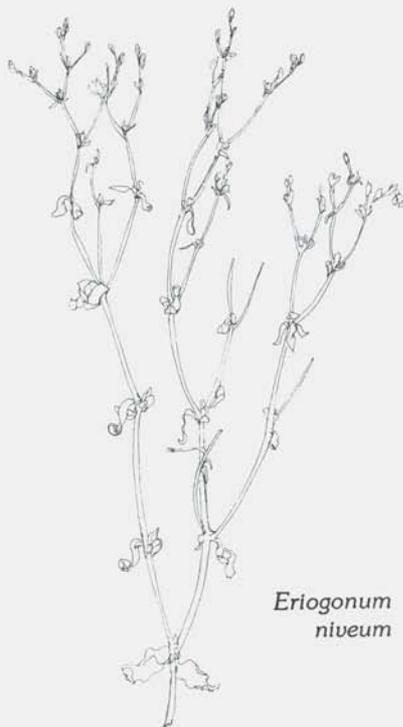
The first, most obvious way to divide the genus into understandable parts is to first separate out the 80 species of annuals, which are of lesser interest for horticultural purposes. There remain then about 140 species of perennials. Of these, about 100 belong to subgenus *Eucycla* and 29 species belong in the subgenus *Oligogonum*.

In most keys, these two subgenera are separated by the shape of the base of the flowers. "Flowers with attenuated, stipelike bases" versus "flowers not with stipelike bases" is a choice that you will face in *A Utah Flora*. In *Vascular Plants of Wyoming*, the choice reads, "Perianth narrowed to a slender stipe-like base 0.5-3 mm long which is jointed to and about the same thickness as the pedicel" versus "Perianth narrowed directly to the attachment with the pedicel, without a stipe at base." See drawing for clarification that is a long time coming from words.

Oligogonum, the subgenus with the stipelike bases, contains many of the horticulturally best known plants, including *Eriogonum umbellatum*, *E. jamesii*, *E. flavum*, and *E. caespitosum*. *Eriogonum umbellatum* is perhaps the best known species, and its many forms and close relatives *E. siskiyouense* and *E. ursinum* are the only true ground covers, spreading across the surface

of the ground by rosette formation and thus very useful in home landscapes. *Eriogonum jamesii*, *E. flavum*, and the lesser known *E. androsaceum* all form domed cushions of considerable year-round interest; they share section Flava. Shrubber, on a wonderfully diminutive scale, are *E. caespitosum*, *E. douglasii* and *E. sphaerocephalum*, in section Caespitosa. *Eriogonum thymoides* is also a miniature shrub, but in a different section along with *E. kelloggii*. All of the Oligogonum that we have grown have capitate inflorescences, i.e., the little flowers are borne in ball-like clusters. Important questions in sorting these out using botanical keys are whether the perianth (sepals composing the external portion of the flowers) is hairy and how many whorls of bracts are on the flowering stem. The species of Oligogonum have the largest seeds we have seen in the genus, those of *Eriogonum lobbii* our largest so far, measuring up to 6 mm long.

It's fun to get to know eriogonums in Nature. Since we travel many miles around the West in summer, we have seen many interesting species—not all of which we could identify easily. If you want to learn the names of plants you're seeing, why not try using some of the floras to key them out? Terms you'll need to understand to get through the keys include: "perianth segmented to base," which means there are six tepals that are not at all united but are separate for their entire length, as opposed to "perianth segmented for part of its length," which means the tepals are united to each other at their bases. In some species the outer (lower) 3 tepals are wider than the inner, or vice-versa, or all the tepals may be approximately the



*Eriogonum
niveum*

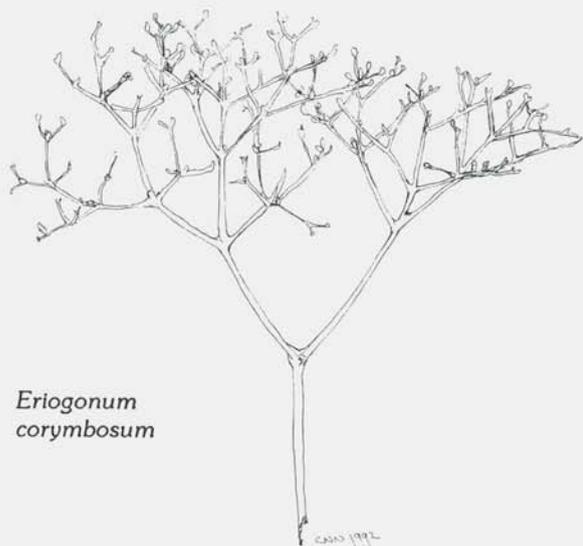
same size. Involucres in the genus *Eriogonum* are the leaflike bracts immediately under the inflorescence where all the little stems that bear the flowers arise. These involucres may be reflexed, toothed, hairy, etc., and these characters play a role in distinguishing the species. Stan Welsh in *A Utah Flora* asks mostly easier questions for the layperson to answer: flowers hairy or not?, flower color?, leaf shape?, what percentage of height of the plant in bloom is the inflorescence? are the leaves mostly basal?—than the more technical questions in *Vascular Plants of the Pacific Northwest*. *Vascular Plants of Wyoming* is somewhere in between. Not that you have a choice of which key to use; you must use the one that covers plants of the area you are exploring.

Botanical terms are easier to decipher if you can look at a plant that is surely being described or at least at a drawing of it. Try keying out a species whose identity is already known to you if you want to get comfortable with the key. Looking at the drawings on p. 33 and p. 34, check the description of *Eriogonum niveum* in the *Vascular Flora of the Pacific Northwest* "Inflorescence leafy-bracteate at the lower forks, usually (5) 10-20 cm long, the branches strongly ascending, usually trichotomous at the lowest nodes, but becoming dichotomous above, the involucre all borne singly (none clustered,...)" and those for *E. corymbosum* in *A Utah Flora* "involucre clustered on inflorescence branch tips;..." and "Inflorescences cymose, the branches ascending to spreading, or divaricate." From the drawings it is obvious that these are very different

plants. Yet they look superficially similar in the garden: they both form magnificent balls of flowers, *E. niveum* white turning rust, *E. corymbosum* buff turning rose-pink in its better forms.

Despite the indubitable truth that this is a complex group, and it's not easy to absorb which are related to which, there are a few botanical groups recognizable to horticulturalists. In subgenus *Oligogonum*, I've mentioned some uniting characteristics of section *Flava* and section *Caespitosa*. In subgenus *Eucycla*, there are a few observations to be made. Section *Capitata* contains many species with very hairy, silvery leaves and little balls of flowers on short stems, very desirable in the rock garden. Representatives are *E. gracilipes*, *E. kennedyi*, *E. kingii*, *E. mancum*, *E. ochrocephalum*, *E. pauciflorum*, *E. rosense*. There are another 11 species here that we haven't grown. What convinces me that they are a valid botanical group, without consulting any keys, is that they all look terrible in late winter. They are soggy gray masses, and I always think they are dead. Of course, a few are, but most are not, and two weeks after the weather warms up, the mats are beautiful gray-green again. I would call them the *Deciduata* or the *Revivata*.

Section *Ochthoedolon* contains the very choicest, tiniest buns: *E. aretioides*, *E. tumulosum*, *E. villiflorum*, and I assume *E. sore-*



*Eriogonum
corymbosum*

Eriogonums we have grown or know pretty well

Subgenus Eucycla

Section Alocogonum	<i>heermannii</i>
Section Aphlegonum	
Subsection Aphelogonum	<i>acaule, brevicaule</i>
Section Capitata	
Subsection Capitata	<i>pauciflorum</i>
Subsection Epochthidia	<i>chrysops, chrysocephalum, gracilipes, kennedyi, kingii, mancum, ochrocephalum, rosense</i>
Section Corymbosa	
Subsection Corymbosa	<i>bicolor, clavellatum, effusum, ericifolium, microthecum</i>
Section Eucycla	<i>niveum, ovalifolium, strictum</i>
Section Lachnogyna	<i>lachnogynum</i>
Section Ochthoedolon	<i>aretioides</i>
Subsection Cunicularia	<i>shockleyi, tumulosum, villiflorum</i>
Section Racemosa	
Subsection Intervalla	<i>kennedyi, wrightii</i>

Subgenus Oligogonum

Section Binaridoma	<i>incanum</i>
Section Caespitosa	<i>caespitosum, douglasii, sphaerocephalum</i>
Section Flava	<i>androsaceum, flavum, jamesii</i>
Section Mataxophyton	<i>kelloggii, thymoides</i>
Section Oligogonum	<i>compositum, congdonii, heracleoides, siskiyouense, umbellatum, ursinum</i>
Section Pseudoumbellata	<i>lobbii, pyroliifolium</i>

dium (named after the classification of 1969). All have inflorescences less than 5 cm tall and leaves less than 1 cm long and form pulvinate caespitose mounds. The seeds of this group are only 2-3 mm long, and, in our experience, are very difficult to separate from the perianth without destroying them. Interestingly, Norman Deno has found that *E. shockleyi* and *E. tumulosum* germinate 100% in 3-60 days at 70°F, a strikingly higher percentage germination at this temperature than other species that have been tested. Many of the species from other botanical groups germinated better when started at 40°F.

Eriogonum ovalifolium of Section Eucycla I think of as practically

constituting its own section. It is apparently closely related to *E. strictum*, but *E. ovalifolium* is so variable in and of itself that horticulturally I think it should be treated separately. There are tall and short flower stems, even the prostrate held flower stems of var. *depressum*. There are more and less silver leaves, large flower heads and small, white, yellow, red, pink flowers, and the plants come from every elevation and ecosystem from hot desert to alpine tundra. Sure, maybe they intergrade and are indistinguishable botanically, but horticulturally never assume that when you have grown *Eriogonum ovalifolium* you have known *Eriogonum ovali-*

folium. We have grown seed from about 12 different localities, and if anything we are more confused—and more delighted—as we go on with this species. *Eriogonum niveum* has its tepals separate the whole length of the flower, like those of *E. ovalifolium*, and it has silvery leaves, but otherwise it's hard to relate the bushy 15" inflorescence of the former to the tight little capitata balls of the latter. Horticulturally, they are not alike. Also, most forms of *E. ovalifolium* bloom early in the season, and *E. niveum* blooms late, starting in August here.

I haven't formed any clarifying generalizations about the larger, bushier perennials of subgenus *Eucycla* after seeing their botanical classification. Growing more species of these will undoubtedly provide more insight. There are many lovely species and they hold great potential for xeric landscaping in the home gardens of the Southwest.

Once you form a concept of a botanical group of species and find you are interested in that group, you can be on the lookout for more species as they come into cultivation. Or you can even go out and try to collect seed of the plants you would like to try. I'm looking for the members of subgenus *Eucycla* section *Capitata* I haven't tried yet: *E. grayi*, *E. desertorum*, *E. anemopilum*, *E. procidium*, *E. panguicense*, *E. novonudum*, *E. coloradense*, *E. exilifolium*, *E. cusickii*, *E. breedlovei*, *E. holmgrenii*. And it seems only reasonable to try growing all of the species of subgenus *Oligogonum*. Getting to know a group of plants can be extremely rewarding. After pawing through the keys, moaning in frustration, at last you are bound to come to a clearer understanding of the plants and to look forever more closely at the plants you have invited into your garden and your life.

References

- Dorn, R.D. 1988. *Vascular Plants of Wyoming*. Mountain West Publishing: Cheyenne.
- Hitchcock, C.L., et al. 1964. *Vascular Plants of the Pacific Northwest*. University of Washington Press: Seattle.
- Reveal, James L. 1969. Unpublished Doctoral Dissertation. Brigham Young University. Provo, Utah.
- and P.A. Munz. 1968. "*Eriogonum*," in *Supplement to A California Flora*, by P. A. Munz, pp. 33-72. University of California Press: Berkeley.
- "*Eriogonum* (Polygonaceae) of Arizona and New Mexico." *Phytologia* Vol. 34(5):pp. 409-484.
- Smith, James P. 1977. *Vascular Plant Families*. Mad River Press: Eureka, California.
- Welsh, Stanley, et al. 1987. *A Utah Flora. Great Basin Naturalist Memoirs*. Number 9. Brigham Young University: Provo, Utah.

Drawings by Cindy Nelson-Nold

Gwen Kelaidis is an amateur botanist as well as a rock gardener. She spends much of her summer in the field in the western states, collecting seed for her mail-order business, Rocky Mountain Rare Plants.



Eriogonum tumulosum (pp. 30, 34, 35)

Ned Lowry

Eriogonum soredium (p. 34)

Gwen Kelaidis





Eriogonum flavum
var. *piperi*

Ned Lowry



Eriogonum thymoides
(pp. 28, 29, 33, 35)

Ned Lowry

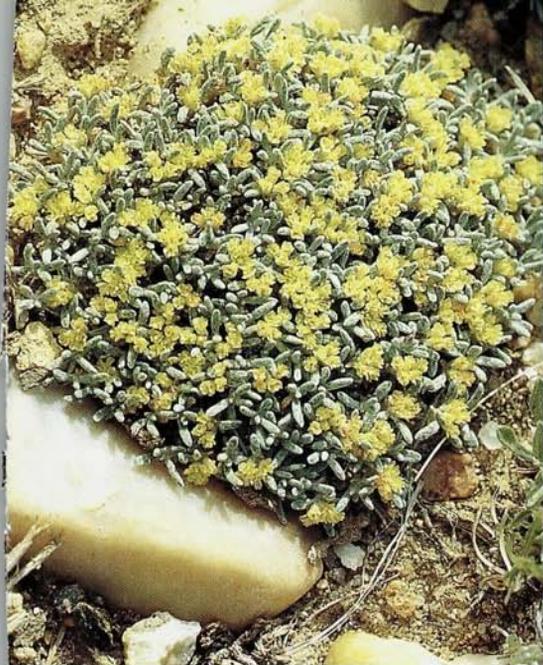
Eriogonum ovalifolium
(pp. 26, 27, 28, 35, 36)

Panayoti Kelaidis

Eriogonum sphaerocephalum
(pp. 30, 33, 35)

Ned Lowry





Eriogonum acaule (p. 35)

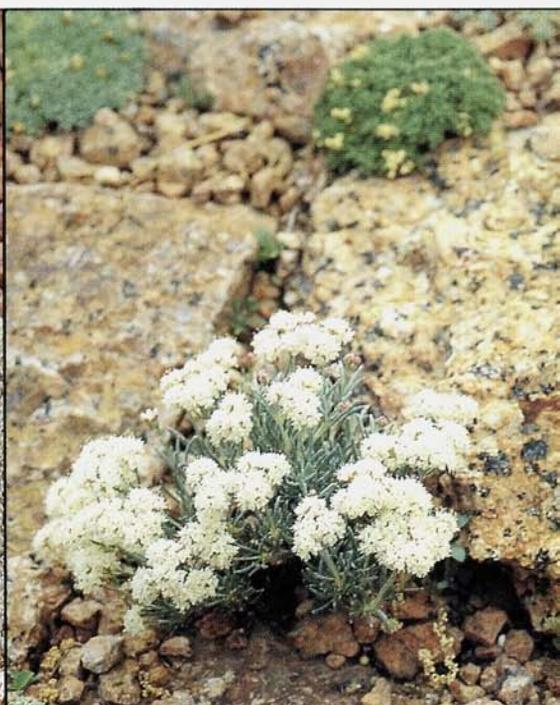
Eriogonum kennedyi (pp. 29, 34, 35)



Eriogonum chrysocephalum (p. 35)

photos by Panayoti and Gwen Kelaidis

Eriogonum bicolor (pp. 30, 35)





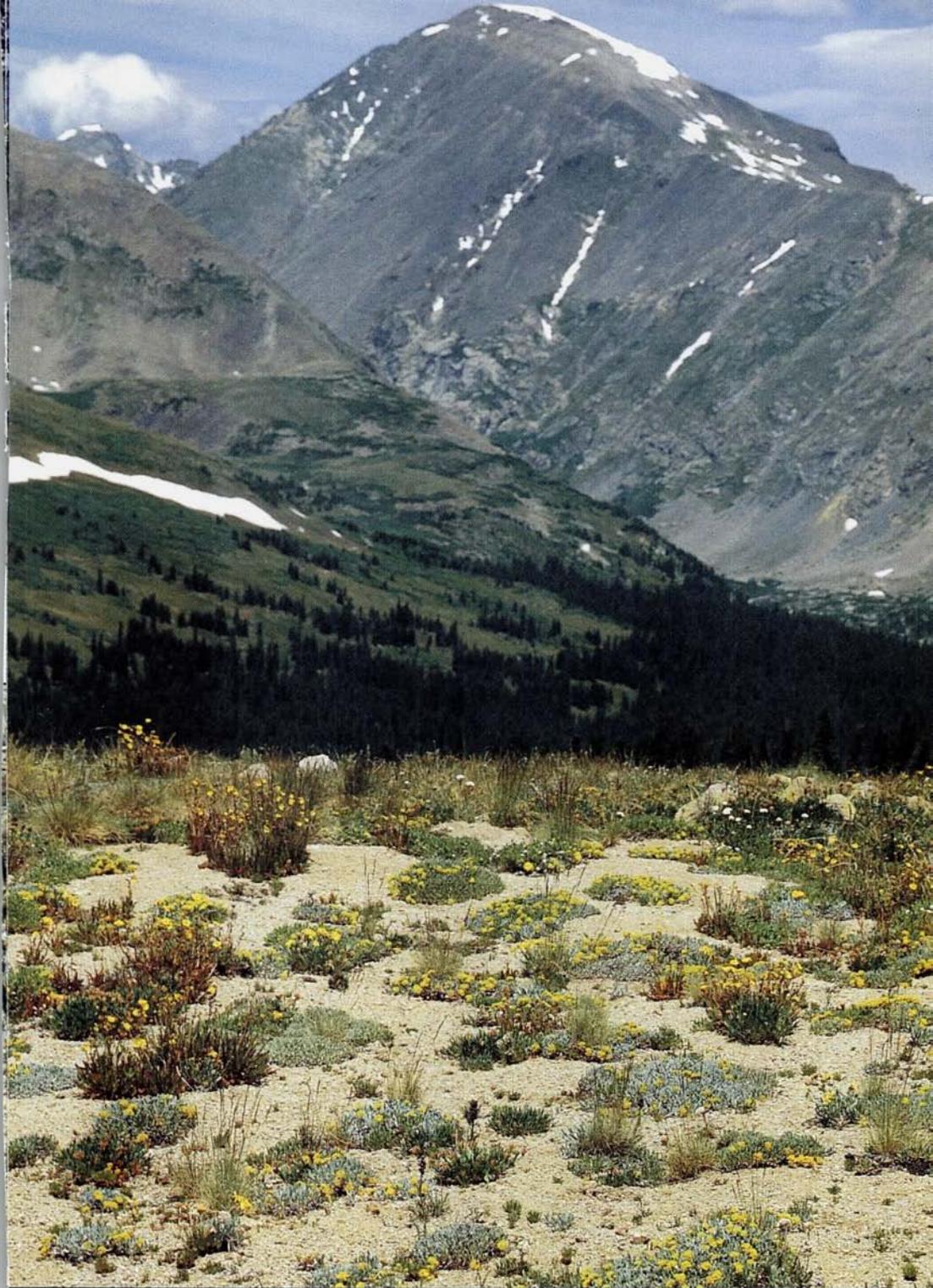
Eriogonum caespitosum (pp. 29, 32, 33, 35)

Ned Lowry

Eriogonum flavum (pp. 28, 32, 33, 35) with *Eriogonum ovalifolium*

Ned Lowry





Eriogonum flavum var. *xanthum* (p. 28) on Hoosier Ridge

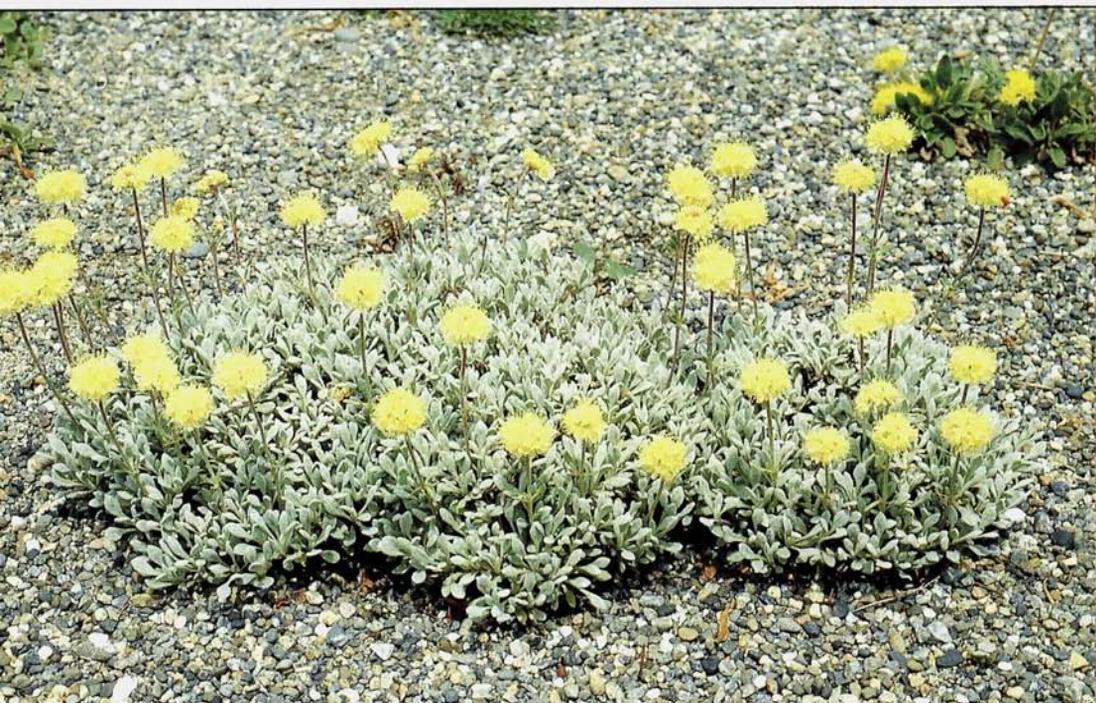
Panayoti Kelaidis



Eriogonum thymoides, cream form (pp. 28,29, 33, 35)

Eriogonum douglasii var. *douglasii* (pp. 28, 33, 35)

photos by Ned Lowry





Nold garden, front yard (pp. 21-23)

Nold garden, back yard (pp. 21-23)

photos by Dick Bartlett



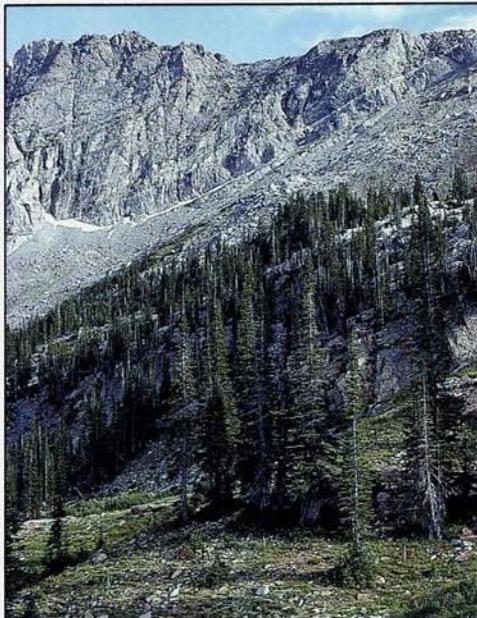
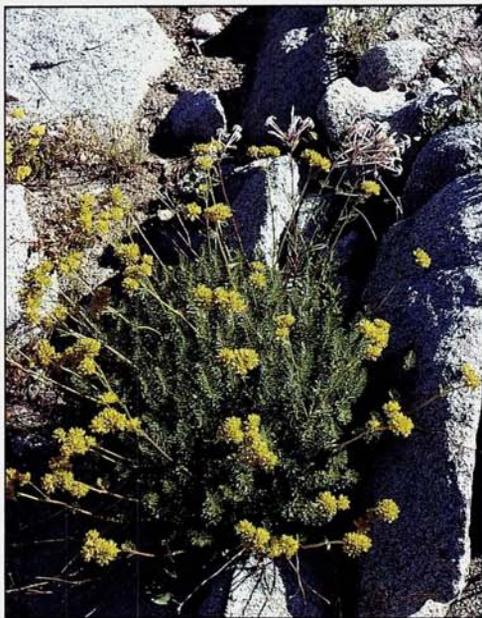


Meadow in Alta Mountains, Utah (pp. 45-48)

photos by David Joyner

Ivesia gordonii (pp. 47, 48)

Alta Mountains



Alta, Utah: A Floral Goldmine

by *David E. Joyner*

To alpine skiers Alta, Utah, symbolizes "the greatest powder skiing on earth!" The claim may be justified, for Alta receives an average annual snowfall of 500 inches, much of it a dry, fluffy powder. Mention Alta to a rock gardener, and the response is most likely one of uncertainty or even indifference. However, to those who know, the Alta Basin (elevation 8,585') is a virtual goldmine of plants, a readily accessible floral treasure nestled among the 10,000'-11,000' peaks of Little Cottonwood Canyon, a mere 25 miles from downtown Salt Lake City.

Alta, 10 miles up Little Cottonwood Canyon, can be reached via State Highway 210. Its history rivals that of any gunfighter town of the 1800s. Silver was discovered in the Alta Basin in 1864. By 1873, the town supported 8,000 miners and businessmen. To accommodate the influx, the residents built 200 new buildings, including four hotels, seven restaurants, six saw mills, a newspaper press, a courthouse, six breweries, and 26 saloons! By 1885 avalanches, fires, and a depressed silver market forced Alta out of the mining business. All that remains of the mining

camp are the tunnels, shafts, tailings and the "died-with-their-boots-on" cemetery at the base of Rustler Mountain. One hundred and fifteen bodies were laid to rest there, 110 of the men murdered in barroom disputes. The town of Alta now services the Alta Ski Resort.

Little Cottonwood is one of several canyons leading from the arid Salt Lake Valley to the alpine peaks of the Wasatch Range. The Wasatch forms the abrupt eastern boundary of Salt Lake Valley and is physiographically part of the Middle Rocky Mountain Range. Although the Rockies date to the late Cretaceous Period, the distinctive "U" shape of Little Cottonwood Canyon plus the lateral and terminal moraines at the mouth of the canyon reflect more recent glaciation.

At the mouth of the canyon (elevation 5,000') is a stark reminder of the overwhelming influence of slope orientation on plant community structure. The sheer cliffs and massive rock formations of the north-facing slope are dominated by white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), and blue spruce (*Picea pungens*); trees more typically associat-

ed with the 7,000'-9,000' Canadian Life Zone. Among the rocky pinnacles on the opposite, south-facing slope are dense stands of the more drought-tolerant Gambel oak (*Quercus gambelii*) interwoven through a sea of cheatgrass (*Bromus tectorum*). This association, coupled with an occasional *Juniperus osteosperma*, is typical of the hot, dry foothills along the Wasatch Front and exemplifies the Upper Sonoran Life Zone. Beyond the mouth of the canyon, stands of oak are mixed with bitterbrush (*Purshia tridentata*), smooth sumac (*Rhus glabra*), serviceberry (*Amelanchier alnifolia*), elderberry (*Sambucus caerulea*) and big sagebrush (*Artemisia tridentata*). This shrub-dominated community is replaced at higher elevations by aspen (*Populus tremuloides*) and conifers. Evergreens continue to dominate the scene on the north-facing slope, with subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*) above 8,000'. Stream-side vegetation near the mouth of the canyon consists of cottonwoods, big-tooth maple (*Acer grandidentatum*), willows (*Salix*), water birch (*Betula occidentalis*), and alder (*Alnus incana*). At higher elevations these are replaced by willows, currants (*Ribes*), and elder (*Sambucus racemosa*).

Although the dry foothills at the mouth of Little Cottonwood Canyon and along the Wasatch Front appear devoid of any vegetation of interest to a rock gardener, there are species occurring there that warrant inspection. One gem is *Astragalus utahensis*, a plant mentioned by Elizabeth Neese in *Rocky Mountain Alpines*. This is one of ten *Astragalus* species found along the Wasatch Range and of 34 in northern Utah. During spring and early summer the foothills are saturated with the yellow blossoms of mulesear (*Wyethia amplexicaulis*) and arrowleaf balsamroot (*Balsamorhiza sagittata*).

This display is perhaps the most noticeable of the wildflower blooms along the foothills, even though fall-flowering fleabanes (*Erigeron*) are equally abundant. Utah's state flower, the sego lily (*Calochortus nuttallii*), also was once numerous along the foothills of the Wasatch. Unfortunately most have been harvested for food or collected for other reasons and now are relatively uncommon.

The alpine treasure of Little Cottonwood Canyon is just above Alta Basin. At an elevation of 9,700', Albion Basin is cradled beneath the towering peaks of Point Supreme (10,595'), Devils Castle (10,920'), and the 11,051' Sugarloaf. Many visitors prefer to drive the extra few miles from the Albion parking lot of the Alta Ski Resort (in Alta Basin) to the Forest Service Secret campground, situated in the heart of Albion Basin. In doing so, they miss much of the show. The gravel road should be walked to fully appreciate the splendor of the floral display. From June through September this display will rival any in the Rocky Mountains or the Sierra Nevadas.

Along the exposed hillside adjacent to the Albion parking lot yellow-flowered *Linum kingii* is abundant along with the blue *Penstemon cyananthus*, the lavender form of *Penstemon whippleanus*, *Castilleja rhexifolia*, *Phacelia hastata*, yellow *Erysimum asperum*, and the stately green *Frasera speciosa*. Scattered throughout this assemblage is a collection of early summer-blooming *Erigeron* and *Senecio* species that are well adapted to the exposed and altered terrain resulting from the construction of the parking lot. Farther up the hillside, in mixed stands of aspen and fir, grow *Viola purpurea*, the perennial herb *Clematis hirsutissima* with its nodding, brownish-purple flowers, numerous

clumps of bluebells (probably *Mertensia arizonica* and *M. ciliata*), and *Rudbeckia occidentalis*.

For the first quarter-mile beyond the Albion parking lot, the gravel road bisects a wooded hillside, only to cut back through a large montane meadow. Paralleling the roadway through the forested stretch is a small perennial stream that supplies a permanent source of moisture to a variety of shade-tolerant wildflowers. *Saxifraga odontoloma* is abundant here, as are *Aquilegia caerulea* and *A. flavescens*, *Aconitum columbianum*, *Geranium richardsonii*, and *mertensias*. Willows and a variety of other moist-soil flowers and shrubs are equally common.

Plant densities and stature appear to reach a maximum in the lush meadow located beyond the aspen and conifer grove. The hillside through which the road passes is so densely populated with wildflowers that it defies penetration. It is along this stretch of the roadway beside the exposed edge of an ephemeral streambed separating the road from the hillside that you will find the spectacular *Mimulus lewisii*. These plants simply tower over the more petite *Mimulus guttatus* which are confined to the wet, mossy banks of the streambed. Also confined to the damp mud, but apparently growing in complete harmony, are the hemiparasitic elephanthead (*Pedicularis groenlandica*) and the beautiful and delicate-flowered *Habenaria dilatata*. This is the only location along the gravel road where *H. dilatata* is abundant. Hanging over the streambed in an almost intimidating manner are luxuriant growths of *Castilleja rhexifolia*, both the reddish-purple and yellow forms, *Aconitum*, *Geranium viscosissimum*, *Lupinus* spp., *Rudbeckia*, *Potentilla*, *Thalictrum fendleri*, *Veratrum californicum*, and a vast array of other montane wildflowers, grasses,

sedges, and shrubs. These, plus a variety of *Aster* and *Erigeron* species, form the backbone of this meadow community.

The roadway, climbing, bends back on itself once again and continues up the mountainside until it bypasses the off-ramp for the Sunnyside ski lift. At this vantage point, one can scan the entire Albion Basin. To the north, down the mountain, is the Alta Basin. To the southeast is Point Supreme, and to the southwest are Devils Castle and Sugarloaf. Immediately to the west are the precipitous deep powder ski runs known as East Greeley and the Greeley Bowl.

Within this transition zone from upper montane to subalpine severe winters truly leave their mark on the composition and stature of the vegetation. On exposed hillsides, tall vegetation is the exception rather than the rule. Those species encountered in the Basin are present here but are generally confined to gullies and sheltered hillsides or are reduced in stature. Dwarfed montane species co-mingle with or are replaced by subalpine and alpine species.

During July, *Castilleja applegatei* dominates the rocky exposed hillsides, its bright reddish-orange display stealing the floral show. Higher on the rocky slopes of Devils Castle and Sugarloaf the less dramatic but equally appealing *Castilleja sulphurea* can be found. This yellow-flowered paintbrush, often localized around rocky outcrops, is rather inconspicuous due to its short stature and pale color. Additional prized taxa found growing in profusion on these exposed rocky hillsides include *Ivesia gordonii*, *Eriogonum ovalifolium* and *E. umbellatum*, at least one form of *Antennaria*, *Sedum lanceolatum* and *S. debile*, *Silene drummondii*, and a myriad of unbelievably petite plants that in cultivation should be confined to troughs. Judging from

their flowers and fruit, the majority of these diminutive species are probably in the Brassicaceae. *Penstemon procerus* is also present, although not very abundant. It appears to be confined to the crevices of granite outcrops.

With the final leg of the journey, the gravel road dips down several hundred feet into the basin proper and ends at the forested Cecret campground. The slight drop in elevation and the protection afforded by conifers are sufficient to provide an environment suitable for many montane flowers encountered in the Alta Basin. Most notable are the ubiquitous fireweed (*Epilobium angustifolium*) and the beautiful but annoying meadow forget-me-not (*Hackelia micrantha*). Also present, generally close to the road, is a variant of the biennial *Ipomopsis (Gilia) aggregata*. The corolla is cream-colored rather than bright red. The more typical red form is common in the Alta Basin and farther down the canyon. During August and September, asters and other late-season bloomers are also abundant along the road and within the protected ravines.

The forested campground is home to a variety of exciting species, including *Dodecatheon pulchellum*, *Ranunculus adoneus* and *R. eschscholtzii*, *Claytonia lanceolata*, and *Caltha leptosepala*.

For those individuals anxious to climb to alpine vistas, a number of trails lead from the campground to the tops

of the surrounding peaks. Undoubtedly, alpine beauties should be found, for Arnow, Alabee, and Wyckoff state: "Among approximately 175 species capable of growing at alpine in our range, the following are low shrubs or subshrubs: *Salix* spp., *Ribes cereum*, *Petrophytum caespitosum*, *Kalmia polifolia*, and *Vaccinium caespitosum*. Of the remaining herbaceous species, ...possibly the most frequently encountered: *Senecio*, *Mertensia*, *Arabis lemmonii* and *Arabis lyallii*, *Draba*, *Erysimum asperum*, *Thlaspi montanum*, *Ivesia gordonii*, *Arenaria*, *Stellaria*, *Gentianella amarella*, *Epilobium*, *Agrostis hyemalis*, *Poa*, *Phlox*, *Androsace septentrionalis*, *Potentilla*, *Valeriana*, *Antennaria*, *Erigeron*, and *Carex*."

Don't let the skiers fool you; winter is not the only time to visit the Wasatch Range. The Alta and Albion Basins are snow-free from May through October. June, July, and August are probably the best months for floral displays. Prior to late May, the Cecret road may be impassible to vehicles, but it is always open to those willing to walk. However, only a few species will be in flower. September is great for composites, but most montane and subalpine species will have set seed. By October, plants are entering dormancy, fall colors are subsiding, and you may even encounter an early snowstorm. Delay your visit until November, and you can marvel at "the greatest powder skiing in the world!"

References

- Arnow, L., B. Albee, and A. Wyckoff. 1980. *Flora of the Central Wasatch Front, Utah*. University of Utah Printing Service: Salt Lake City.
- Gilson, D., ed. 1977. *Alta Canyon Guide*. Redwood Coast Printers: Fort Bragg, CA.
- Shaw, R.J. 1989. *Vascular Plants of Northern Utah*. Utah State University Press: Logan.
- Williams, J., ed. 1986. *Rocky Mountain Alpines*. Timber Press: Portland, OR.

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A Persian Carpet Rock Garden

by *Gwen Kelaidis*

Garden design has never been my strong point. Design is an artistic endeavor, and I never have thought of myself as artistic. I am the "doer" sort of person. I can sow seed, transplant, dig, mix soil, move rocks, shovel manure, gravel, or sand, and plant plants—but design has always given me pause. Oh, I know what I like after I get it—or don't—but I lack confidence when planning a new rock garden.

I came to rock gardening through the vegetable patch, like so many others. Vegetable gardens are easy to design, with their neat rows. The corn is planted north of the tomatoes, the squash where it can ramble onto the compost pile. Even when companion plants are considered, design is a snap, success easy and delicious.

Then one year the annuals start. Still not too hard—just plant pretty colors together and put the tall ones in the back. It was only one season later that I discovered perennials and there design consternation was in full swing. Pouring over Gertrude Jekyll and her modern counterparts, I drew plans on graph paper with colored pencil, different plans for each month or summer. It

took several delightful years to absorb all the new names, the new plants, the idea that I was supposed to be an impressionist with a shovel. Each year the perennial border was rearranged as my mistakes surfaced. On to better color combinations, more exact and striking juxtapositions. The effects were satisfying. My gardens brought me joy. I did have a half an idea, though, that I was no Monet, that I still hadn't mastered the Jekyll Way.

But perennial gardens alone could not satisfy me. Plain, unadulterated plant greed led me to rock gardening. New beds, new plants arriving in little cardboard boxes, hundreds of new plants germinating in tray after tray of seedpots. It was thrilling, it was glorious, it was heaven! But what about design?

Clearly, the traditional perennial border color-coordination thing couldn't apply to rock gardening. It just isn't practical to plant sweeps of *Gentiana verna* or bunches of *Draba rigida*. Except in the largest rock garden, there will usually be fewer than five individuals of a given plant. Had I been miraculously released from the graph paper plans? Surely there was

no practical way to even *worry* about design. It was enough to think of special soil preparation, siting the plants in the perfect microclimate. But there must be some guidelines for design in this horticultural art form.

I went to talks on rock placement. Yes, the rocks should look natural, like some attractive outcrop in nature. Or you should place the rocks to create pockets, pockets for the plants, sort of fancy, custom-made pots, where rocks surrounded the plant for its own good health. And if the rocks weren't quite pleasing, well, you could use the plants to cover them.

I went to hear garden designers, landscape architects. They said no more than ten, at the most twenty species of plants in a garden, if the design was to be unified. Or maybe there could be one bright, noisy patch of annuals or perennials—or rock garden plants—in a quiet sea of green. Obviously, these people were to be ignored. Obviously, they were thinking about something other than plants. Were they some monstrous form of interior decorators who got out of the house by mistake? I had far too little space in my yard to give over any to a quiet sea of green. And then I went to the mountains.

I went to the mountains. The meadows of the subalpine zone are not quiet. They are rowdy with color—paintbrushes, lupines, balsamroot—they are dancing, rioting with color. The plants are not in neat sweeps either. I wouldn't like to try mapping out a gay meadow in full bloom on graph paper. The tundra was not quiet. Bright yellow daisies, bright white daisies, glorious egg-yolk physarias, everywhere the bright purple of *Astragalus* and *Penstemon*, green cushions, blue phloxes, pink silenes. The rocks were not regular, the rocks were not covered with plants. The plants nestled

next to the rocks, perched above and below them, danced with the rocks. It was wonderful, it was colorful, it was wild and free—and I wanted it in my garden.

Maybe Gertrude Jekyll liked plants in fat sweeps because she was used to plants of less rigorous climates than those of our mountains. In the Eastern woodlands and meadows of the US, many plants spread into clumps from rhizomatous roots: wood anemones, dogtooth violets, jack-in-the-pulpit, *Phlox divaricata*, monardas, rudbeckias. The perennial border echoes the large clumps of such plants from woodland and wet meadow and seems based on the way that they grow together. But in my rock garden I wanted the look of the land above the trees, the look of the windswept rocky breaks and outcrops in the short-grass prairie, the look of the wild, open West.

The science of plant ecology has named different types of plant distribution. Plants that grow with even spacing, such as lodgepole pines in a burned over forest, or sagebrush, have *uniform* distribution. Where a species grows with several or many individual plants in a clump or sweep, it has *aggregate* distribution. When the individuals of the component species of a plant community are spaced with no apparent spatial pattern, the distribution is termed *random*. In horticulture, a cornfield or a pine plantation mimics the uniform distribution of some natural species. The perennial border seems based on aggregate distribution, and borders seem to contain many plants that have aggregate distributions in Nature. The tundra, on the other hand, is comprised primarily of plants with random distribution. Therefore, is there not a logical reason for rock garden design to reflect this natural plant placement? Wildflower meadows, especially in xeric regions, also appear to have

many randomly distributed plant species. Of course, there may actually be underlying soil or moisture pockets that determine this distribution, or the history of the local area (which way the wind was blowing when the seed was ripe, whether an animal carried a seed-pod towards its burrow) has had a non-random influence. But the general effect is of a random distribution of individual plant species.

I planted many rock gardens before I got to this justification for what I was doing. I hadn't read any ecology books, I only knew that I wanted the feel of the tundra re-created. I didn't want big drifts of things, I wanted a scattering of each species across the garden, mixed in with other species, creating the interaction of color and plant form I'd seen in the mountains. The garden that came into being in my front yard was a result of this desire—and of plant availability and the sweeping slope of the site.

I started with the idea that a few genera would dominate: *Physaria*, *Astragalus*, *Acantholimon*, *Eriogonum*, *Townsendia*, *Penstemon*, *Tulipa*, and *Iris*. Each genus is represented by from four to ten species. Each genus had a certain uniformity of plant form within it: rosettes of gray leaves for *Physaria*, prickly buns with airy flowers for *Acantholimon*, low mats of *Astragalus*, buns of rosetted leaves for *Townsendia*, flat leaves of *Penstemon* suddenly overtopped by spikes of flowers, etc. At least five plants of each species were used whenever possible, in small groups arranged as I thought seed might fall. The physarias are spatially separated from each other, as are species of other genera. The acantholimons form mounds distributed across the slopes of the garden.

There are two added benefits of using genera to unite the garden's design. Many species of the same genus share the same general cultural

requirements. Those of my xeric garden come from arid to semi-arid climates, and they are willing to adapt to a scarcely-watered growing regime in average clay loam, on slopes, with gravel mulch. The collection has great botanical interest for those who like to compare similar plants, since one can see many species bloom and study their differences. A design benefit is that the species often bloom at slightly different times, so that as a group they bloom over a very long period. Thus the physarias started to bloom in early April and will be giving yellow brightness to the garden until late May. Had I used only one species, the display would have been a scant two weeks long. The eriogonums provide a show from early May until October. Where *Penstemon nitidus* was blooming in bright, light blue in early April, the *P. caryi* started in late May. This is a great way to sustain color combinations! The only disadvantage is the possible cross-pollination of closely related species. To have a pure-breeding population, the garden would have to have larger areas with a single species, separated by greater distance, so that insects are less likely to fly that far to cross-pollinate. In other words, the garden would have to be much larger than a city lot.

After four seasons, as I looked out at the garden last April, I realized that I had achieved my goal. There was the wild, diverse, random-based look of the tundra.

Then I suddenly thought of a parallel in art to the design of the garden. I had used a Persian carpet concept. There are about ten colors in the carpet in our home, colors from all areas of the palette. These colors are not arranged in drifts but in small patches, more like the pieces of a mosaic placed individually or in small groups. Turns out, or so my historically and Middle-Eastern-

Plants in Xeric Mosaic Garden

Physaria eburniflora, *P. saximontana*, *P. bellii*, *P. acutifolia*, *P. didymocarpa*, *P. floribunda*, *P. vitulifera*, *P. grahamii*
Astragalus spatulatus, *A. sericoleucus*, *A. angustifolius*, *A. simplicifolius*,
A. davisii
Acantholimon hohenackeri, *A. armenum*, *A. venustum*, *A. ulicinum*, *A. araxanum*
Eriogonum ovalifolium, *E. douglasii*, *E. ochroleucum*, *E. sphaerocephalum*,
E. niveum, *E. caespitosum*, *E. pauciflorum* ssp. *nebraskense*, *E. jamesii*,
E. flavum, *E. umbellatum*, *E. corymbosum*
Townsendia parryi, *T. incana*, *T. spathulata*, *T. leptotes*, *T. exscapa*
Penstemon caryi, *P. speciosus*, *P. eriantherus*, *P. caespitosus*, *P. crandallii*,
P. grahamii, *P. janishiae*, *P. utahensis*, *P. arenicola*, *P. nitidus*, *P. auriberbis*,
P. jamesii, *P. pachyphyllus*, *P. albidus*
Tulipa wilsonii, *T. batalinii*, *T. bakeri*, *T. humilis*, *T. linifolia*, *T. kaufmanniana*
Iris paradoxa, *I. chamaeiris*, *I. pumila*, *I. iberica* ssp. *elegantissima*, *I. bucharica*, *Oncocyclus* hybrids

oriented husband tells me, that Persian carpets were originally designed to represent the steppes of Asia in flower. The carpet makers followed the model of the mosaic, using small blocks of color to create overall designs. Although the geometry of Persian carpets is stylized, certainly the colors and the arrangement of colors are more true to the prairies of central Asia than is the British perennial border. Why, even the background color of the carpet could be likened to grass or to the open, mineral soils of the steppe climate—or to my gravel mulch. What would a landscape architect say to that?

The Persian carpet garden achieves its unity through the similar plant and flower form represented in a single genus. I really have variations on only eight plant genera. These provide the continuity so desired by those people who pass judgement on the artistic impact of our gardens. The gravel mulch of the rock garden itself (and in

most cases also the rocks) adds to the unity of the design. The intermixing of color moves the eye across the composition, the varied pattern as fascinating as a complex carpet.

I have been knocking about rock garden circles for about 15 years now, and at last I have an explanation, a concept for design that I can talk about. Now I can view the composition of my garden picture as I would the construction of a mosaic. I drop in each plant as one might fit in a colored ceramic square. Where the repeating elements of my front xeric garden are those genera mentioned above, the more mesic garden behind the house features the more classic rock garden genera *Phlox*, *Dianthus*, *Saxifraga*, *Draba*, *Veronica*, *Sempervivum*, *Corydalis*, the shrubby penstemons, and *Daphne*.

Of course, I must admit that into these gardens of repeating species within a few genera other species from

other genera are introduced. If challenged by some officially artistic person, I might just say that these intruders simply aren't numerous enough to break the pattern set by the dominant genera. Or perhaps they blend in because they are similar in form—in my garden, usually cushions, mats, or succulent rosettes. Interestingly, the flower colors of these additional plants have turned out to be very similar to those of the backbone plants when plants from similar ecological communities are chosen.

Unquestionably, the gravel and rock background of the rock garden are important as an element of the garden design. I still flinch when I hear that common remark, "If the rocks aren't quite right, just use plants to cover them." I love the tundra look, the rocky meadow where plants and rocks interact as equals. I don't want the plants to grow over everything and cover it with green. If I wanted a green blanket, I could have stuck to grass.

My rock gardens have another element in common with Persian carpets. They are flat! Or at least much flatter than perennial borders or vegetable gardens. Plants in the front garden have a maximum height of about 12" with most plants under 8" and perhaps fifty percent under 6". The carpet surface—the hills of the rock garden—has more change of elevation than the vegetation which covers it. The highest berm is about 3' above the level of the yard and 4' above the sidewalk. In the backyard garden the plants are even shorter, the hills 3-5' tall.

Also like a carpet, the rock garden is generally viewed from above, with all parts of the plants visible from any given vantage point. There is no front or back to the garden, as exists in a border, with shorter plants masking the feet of the taller ones behind. In a significant way, more of the garden is

visible at once. And the garden is meant to be viewed from many different angles. Naturally the design objectives must be different!

Here in Colorado, where we are so near the mountains and the opportunity to study nature is so close at hand, it seems natural that our gardens should resemble our local model. If we have less of the medieval element of water in our gardens, we are more than compensated by a larger share of the other elements of earth, fire, and air. The rocks and gravels available to us surpass in variety and beauty those of any place we know, and they reveal the primitive connection of our gardens with the earth. A fiery-bright sun keeps our plants compact and the heat of summer days ripens our tulips and Mediterranean plants into a healthy state that defies the standard understanding of winter hardiness. Air sweeps over the garden—poor circulation is never a problem with our wind and low humidity.

I am still primarily a grower of plants and not an artist. But it is comforting to know that my instincts have led me along a traditional path. Those who have lived in climates similar to ours created an art form different from that of Northern Europe. Never again will I apologize for the design of the rock garden. I'm proud to have created a mosaic around me, to gaze out on my living, changing Persian carpet, to be part of a tradition based on sunny, bright, multicolored wildflower meadows.

Gwen Kelaidis gardens in Denver, Colorado, on a small urban lot. She is assisted by her husband and two small children. Special interests include native plants, gardening without supplemental water, and cushion plants.



The Little Rocky Mountain Clematis

by Joan Means

Of all the desirable plants of the Rocky Mountains, perhaps none excites more interest and frustration than the tiny clematis often found flaunting spectacular flowers above limestone rubble in alpine and subalpine regions. It looks for all the world like *Clematis alpina* turned herbaceous; naturally, to see this plant is to want it. The first frustration is that nurseries don't seem to offer plants, and seed has a history of sporadic germination. Another frustration is that we aren't even sure what to call the plant! The nomenclature of Rocky Mountain clematis "has evidently been as mixed up as the babies in a Gilbert and Sullivan operetta," Dr. William Weber comments in *Rocky Mountain Flora*. Weber is the same iconoclast who, to the agonized curses of rock gardeners everywhere, returned *Boykinia jamesii*, a saxifrage cousin with cherry-red flowers, to the genus *Telesonix*. But when it comes to clematis, we would have to agree with him wholeheartedly.

You may think that the little clematis is one of those esoteric,

rarest-of-rare plants, but that's not exactly true. It certainly isn't ubiquitous, like lupines, and it forms relatively small colonies where it does occur. Just the same, it appears over a large geographic area of the northern prairies and Rocky Mountain states. Claude Barr, the late rancher-nurseryman who wrote *Jewels of the Plains*, said it was "right at home" in the Black Hills of North Dakota and that it ranges westward into Montana and Wyoming. It can easily be seen in the Bighorns, and "sparingly" south through the Rockies to New Mexico. Out of bloom, showing only its bundle of plumed seeds, the little clematis could be overlooked as just a small pulsatilla. The tufts of foliage, only a few inches high, are composed of compound leaves divided into three leaflets and then cut still again into another three segments. But even in full bloom, this clematis may be missed. The flowers seem to absorb light rather than reflect it and sometimes are masked by the glare of white limestone rocks or are hidden in the shade of grasses and even shrubs.

Yet they are spectacular—as though a large, spurless *Aquilegia* had crossed with a peony. Borne well above the foliage on 4-6" stems, the flowers may be several inches wide. The four sepals may be blue-lavender, pink, or even a wonderful burgundy-red—the same color as *Semiaquilegia ecalcarata*, another member of the Ranunculaceae. Often the sepals droop downward, but on warm, sunny days they flare out to reveal a paler ring of petal-like appendages (staminodes) which surround a boss of golden stamens.

It hardly seems possible that there could be any question about what to call this distinctive clematis, but taxonomists don't seem to recognize its herbaceous nature and lump it together with vines. Field guides are not more helpful. We rely heavily on "the pink book," Duft and Mosley's *Alpine Wildflowers of the Rocky Mountains*, but they don't list clematis at all! Perhaps they are wise. A little research in books owned by most serious rock gardeners reveals, if you read between the lines, that the Rocky Mountain clematis may have been a can of worms for botanists. I don't have access to a university library to hunt down the fine points, but apparently what happened is this: There are two vining clematis in the Rocky Mountains that have rather similar flowers. Historically our seemingly herbaceous little clematis has been, at best, a mere subspecies of one of these. As so often happens, the vines were described and named, and then got some new names which taxonomists later decided were not valid. Unfortunately, in the process of getting rid of the erroneous names, the plants were mixed up to the point where botanists disagreed which vine should get the new old name and

which should get the old new name.

In fact, there's so much mistaken-identity comedy attached to Rocky Mountain clematis that some rock gardeners have even called the little clematis by the name *C. hirsutissima*. But really, there should be no confusion here. *Clematis hirsutissima* is a rather tall, herbaceous perennial with relatively small, dull-purple flowers shaped like upside-down urns or "sugar bowls." It looks nothing like the clematis involved in the Gilbert and Sullivan act. The other Rocky Mountain clematis have flowers like the European vine *C. alpina*, and this was reflected in one name, *Clematis alpina* v. *occidentalis*, which later became *Clematis pseudoalpina*, but which plant originally had been named *Clematis columbiana* by plant explorer Thomas Nuttall. But which vine was it he named? There's a big one that climbs into trees and has three-part-ed leaves in which the individual leaflets are broad, entire, and sometimes toothed. There's a smaller vine, a shrub-scrambler in which the three leaflets are cleft nearly in two. (And then, of course, there is our little one, which has leaflets divided nearly in three. I hope I haven't lost you by now but don't feel bad. Apparently, a lot of botanists became so mired down that they didn't even describe our little clematis!)

Hortus III says that the vine originally named by Thomas Nuttall as *Clematis columbiana*, which later became known erroneously as *C. alpina* v. *occidentalis* and also as *C. pseudoalpina*, is the big vine with ovate, simple leaves. The other vine, says *Hortus*, is a mostly trailing plant with leaflets cleft in two, and it should be known as *C. tenuiloba*. And what about the little one? *Hortus* doesn't mention it.

Neither does Dr. Weber, but when it comes to the vines, he joins the battle like a veritable Tarzan. Not that he points an accusatory finger, but it's clear that *Hortus* has things exactly backwards. Weber says that the vine Nuttall described and named *C. columbiana* isn't the tree-climbing, big-leaved one—it's the other, merely clambering, smaller vine. As a result, the tree-climber now is assigned part of one of the supposedly "invalid" names, and is *Clematis occidentalis* v. *grosseserrata* (as Rydberg called it). The smaller vine, "easily distinguished by the doubly compound leaves," is no longer *C. tenuiloba* but, by the taxonomic rules of priority, seniority, etc., must be called by the name that Nuttall gave it, *C. columbiana*. And with this, Weber stops, never explaining where our small clematis might fit into the picture.

But glory be! in his *Vascular Plants of Wyoming*, Robert Dorn agrees with Weber, but he also takes that extra step of recognizing that our little clematis has at least some botanical personality of its own. Dorn divides *C. columbiana* into two groups, both of them "usually woody, often vines," differentiated only by the shape of their leaves. The one with biternate leaves, the small shrub-climbing vine, he calls *C. columbiana* v. *columbiana*. The plant with leaflets cut nearly in three he calls *C. columbiana* v. *tenuiloba*. This is our little clematis, though few of us are likely to recognize our 6"-high darling after all the ducking words Dorn uses. Somehow, a "usually woody, often vine" with leaflets "essentially" cut in three doesn't exactly describe what most of us see as an herbaceous alpine.

Gardeners and botanists often disagree about the important distin-

guishing characteristics of plants, so it should come as no surprise that Claude Barr (one of the few people to describe our little clematis) suggests that taxonomists have missed the point. "This species is not a vine; it has not climbing faculties," Barr insists in *Jewels of the Plains*. Sometimes, he says, a rhizomatous stem "may stretch out, lightly buried in soil and duff, to 30 inches, putting out few or no roots...but the habit is compact when nutrients, moisture, and light are right..." What we have here, Barr said, is a "low, herbaceous perennial," which he, for one, found easy to grow in a shady part of his South Dakota prairie garden in a mix of clay, humus, and limestone rubble. Not many of us have had the chance to experiment with the plant in our own gardens, but I recently heard one Michigan gardener boast that he has a square yard of it on his scree. Personally, I think he should dig up his patch and settle, once and for all, whether we're talking about a woody plant or not. Should he consider spreading the resulting divisions around, I'll be the first in line!

Barr did much of the research for his book at the Rocky Mountain Herbarium at the University of Wyoming in Laramie, at a time when the various Rocky Mountain species of *Clematis* were undergoing their identity crises. This may explain his own confusion as to what to call our little clematis. He says that a "low vine with long-stalked triparted leaves which clambers over bushes" is *C. columbiana*, and this corresponds with the current nomenclature. Obviously, Barr didn't think that this same name should also do for the little clematis. But why, since he was so adamant that the little clematis is herbaceous and not a climber, did he call it *C. occidentalis*, a name which

has always been used for unmistakable vines? It's a mystery, but there now seems little doubt that he was mistaken in doing so.

And yet Barr was on target, it seems to this gardener, in his belief that the little clematis deserves a name specifically its own. For the time being, I suppose, we must adopt Dorn's nomenclature and call it *Clematis columbiana v. tenuiloba*, although we may feel that the last word hasn't been said on the subject. Maybe my memory is faulty, but I think I saw a specimen blooming nicely at Kew Gardens in 1992 under the simple label *Clematis tenuiloba*. Of course, this name might end up by confusing us even more, since it once was applied erroneously to the

vining *C. columbiana v. columbiana*. Still, it's a moniker which a number of gardeners are using, rightly or wrongly. Recently I asked a visiting lecturer on Rocky Mountain plants what he thought. He didn't want to commit himself. "But then what should we call the plant?" I persisted. He laughed. "Just call it," he said, "the little clematis."

Drawing by Panayoti Kelaidis

Joan Means, along with her husband Bob, gardens at their country home in Georgetown, Massachusetts. Joan cultivates many choice Westerners which they study in the wild on repeated visits to the Rockies and far West.



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Growing Alpines in Vail

by Nicola Ripley

Where better to grow alpine plants than in Vail, Colorado? Situated at 8200' on the Western Slope of the Rocky Mountains, Vail experiences much the same weather as the tundra. Although still below treeline, the city receives intense sunshine, has a cool, dry summer with significant temperature drops at night, and great quantities of snow in winter.

Vail receives its first large snowfall of winter towards the end of October. For the last two years, snow has built up fast enough that Vail Mountain has been opened for skiing by the end of the first week of November. This blanket of white remains on the ground until late April or early May. Consistent snow cover is an essential ingredient in growing magnificent alpines in Vail. Under this protection, the temperature stays around freezing while the air above plummets to -25°F.

Most of Colorado's moisture comes as snow; the overall climate is quite dry. Many alpines suffer from disease and rotting during wet seasons at lower elevations, especially in the spring. Snowmelt does not seem to affect the plants in the same negative way.

Experience in the Betty Ford Alpine Garden in Vail has shown that plants considered to be tender at this elevation and climatic zone (4) are actually extremely hardy. One good example is *Raoulia australis*, which forms carpets of tiny silver leaves less than a quarter of an inch tall and has minute yellow flowers in late summer or early fall. All members of the genus come from Australasia, not an area given to severe winters. This particular species is from New Zealand and is considered strictly an alpine house species in areas that suffer wet, cold winters.

Another species that has delighted us by surviving against the odds is the dwarf shrub *Euryops acraeus*. This South African composite thrives when planted out in the open and makes a valuable addition to the garden with its gray, linear leaves on erect stems to 18" high and its profuse yellow blooms. *Euryops acraeus* was previously considered a shrub for the alpine house only, a substantial snow cover can give equal protection.

Solar radiation in Vail is almost 30% higher than at sea level, and ultraviolet radiation 90% higher. This results in an

incredible intensity of color in Vail's alpine flowers, from the intense azure blue of *Gentiana acaulis* to the iridescent purple-red flowers of *Primula x pruhoniciana* 'Wanda'.

Cool temperatures in summer combined with wind in exposed places can create a harsh environment. One familiar plant adaptation is the formation of tight cushions. This growth habit minimizes the surface area exposed to wind and all the resulting problems of desiccation and structural damage. The characteristic cushion form is rarely achieved in gardens except in mountain regions. At lower elevations the tiny *Silene acaulis* forms loose, untidy mats, but here it grows as an extremely tight, congested mound covered with multitudes of stemless pink flowers. *Silene* cushions grow at an imperceptible rate under extreme conditions—12" cushions found on alpine ridges in the central Rockies may be more than 30 years old. My own studies of this species in Britain showed that at lower elevations *Silene acaulis* grows at about twice that rate. Studies by Spomer (1964) revealed temperature to be the most important factor affecting the morphology of cushion plants.

Many species of *Primula* thrive in Vail. One section of the Vail Alpine Garden has been devoted to this genus, and in early spring the display is unparalleled, the colors of a unique brilliance. Many primulas traditionally confined to cool, shady corners are grown in full sun in Vail. We grow *Juliae* hybrids, virtually all members of the European *Auricula* section, and many Himalayan species, as well as our native species.

The show of bloom by *Meconopsis horridula*, native to the Himalayas, was certainly the year's garden highlight for me. The abundance of clear blue, 3" flowers crowded onto its bristly 9" stem were in perfect proportion. It is not a revelation that this species performs

better at altitude. In its wild habitat, *M. horridula* is also much more compact than when grown in the lowlands. Seed was set and collected, and we are delighted that the plant has so far proven amenable to cultivation in Vail. We hope to overwinter *M. betonicifolia* and *M. paniculata* this year.

Saxifrages are also outstanding performers for us. I could go on at great length about those that do well, including virtually all of the encrusted group and most species and hybrids of the porophyllum section that we have tried. I consider *Saxifraga longifolia* to be the most spectacular of the genus. This magnificent monocarpic species pushes forth a 2' inflorescence with a myriad of white flowers. The rosette is a splendid symmetrical mound of silvery gray leaves—a valuable addition on its own to any rock garden. We propagate this species by seed and have had good success. *Saxifraga sempervivum* is another tremendous plant, with perfect rosettes of silvery leaves. The emergence in spring of unusual red-purple flower scapes covered in hairs is a great bonus.

Initially, most gardeners feel that our climate would be detrimental to the cultivation of their garden favorites. Actually, we have found that both alpinists as well as many traditional perennials grow better here than in most other parts of the country. Cultivating plants at this elevation has revealed a great deal about their growth habits and hardiness, and we will continue to learn. It is no surprise that alpine plants exhibit the characteristics that we admire most—compact growth habit, long blooming time, vivid colors and extreme hardiness—in the environment in which they evolved.

Nicola Ripley is nursery manager at Colorado Alpines. She studied alpine ecology in Britain.



Vail Alpine Garden rock garden (pp. 59-60)

Marty Jones

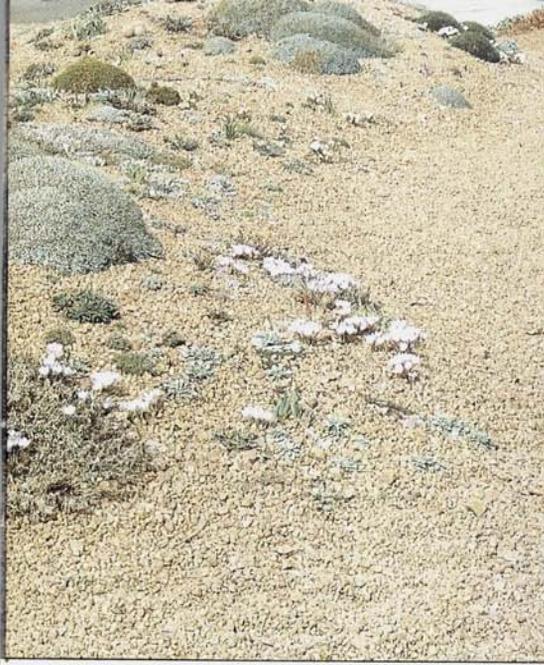


Kelaidis garden May (pp. 49-53)

photos by Panayoti and Gwen Kelaidis

Early June





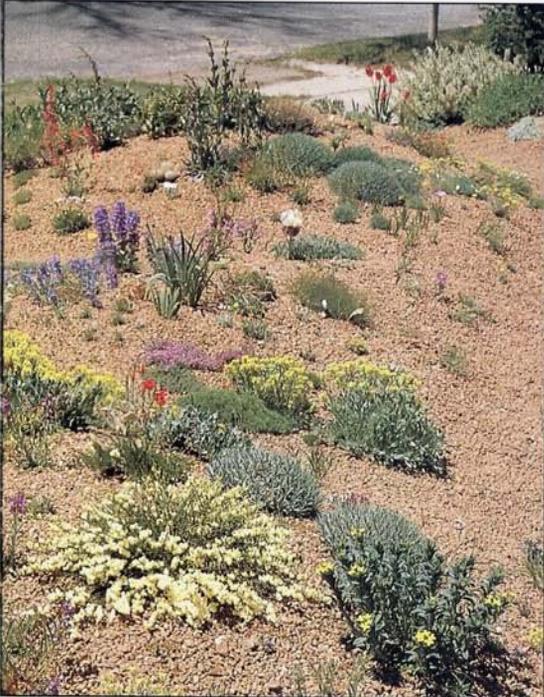
March, crocus in bloom



April, physarias in bloom

May, penstemons in bloom

Late June, acantholimonis in bloom

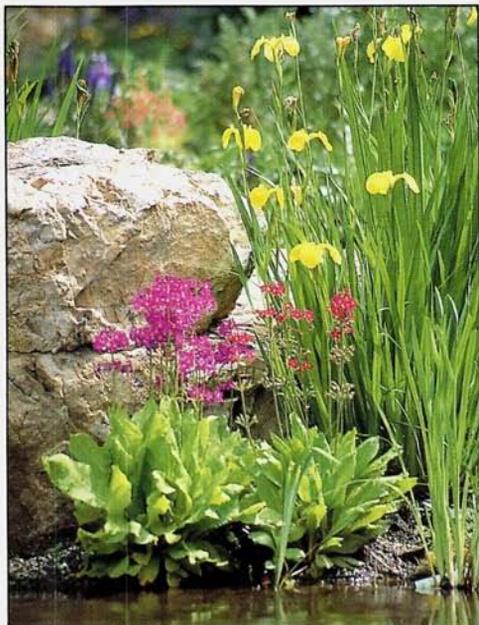




Saxifraga sempervivum (p. 60)

photos in Vail Alpine Garden by Marty Jones

Candelabra primulas, *Iris pseudoacora*



Meconopsis horridula (p. 60)



Propagation

Quick and Easy Gibberelin Treatment

Treating seeds with GA-3 (gibberelic acid-3) is now a standard method in my work on seed germination. GA-3 is the only readily available form of the plant hormone gibberelin. Tests on over 500 species make it clear that GA-3 treatment is a valuable tool. To treat so many kinds of seed it was necessary to develop a rapid and efficient method of applying the chemical. You can easily use this method to get better, faster, more reliable germination from the precious seeds you receive this winter. No weighings, volume measurements, or filtration are required. The materials, except for GA-3, can be purchased at a grocery store and a business supply store. The experiments take up very little space, and they can be set up rapidly and examined rapidly.

SUPPLIES NEEDED:

1. ScotTowels Big Roll white paper towels (other brands may disintegrate)
2. Pilot Permanent SC-UF indelible black ink pen
3. Toothpicks, Forster's round with square center (not flat)
4. 1-gallon polyethylene Baggies by Hefty
5. GA-3 (1 gram is enough for 1,000 treatments.)
6. Seed

STEPS

—Tear off a perforated section of paper towel and fold in half three times, alternating directions, to give a rectangular pad 4.5"x 5.5".

—Write the name of the species and any other information desired on the outside of this pad with a Pilot indelible black ink pen.

—Open the final (third) fold and moisten the towel with water.

—Cut a 3" x 3" piece of polyethylene film from a plastic bag and place it in the center between the folds of the towel. Use the thinnest bags available.

—Fold a 2.5" x 2.5" piece of paper towel three times to give a rectangular pad.

—Moisten this smaller piece of towel until saturated and place it on top of the polyethylene. Place this inner pad with one edge along the inside of the third fold of the outer towel.

—Place the seeds on the inner pad.

—Insert the tip of a toothpick into a vial of 95% GA-3 powder about 5 mm and pick up the amount of GA-3 that this length of toothpick holds. This should be about one cubic mm of powder.

—Sprinkle the powder evenly over the seed.

—Fold the whole triple pad once and place in a bag. You can put 10-20 towels in one bag. Fold loosely to close. Place at the temperature desired, room temperature or in the refrigerator at 40°F.

—Examine seeds every few days. Remove any seeds that germinate with a toothpick and plant in pots.

Seed does not usually germinate the first day after treatment. Most species have an induction period anywhere from 10-14 days, so give the seeds a chance. A few kinds may not germinate for three months.

I keep a supply of 4" pots filled with a seedling mix of peat and perlite near my germination experiments. When a seed type germinates, I lift the tiny seedlings from the paper towel with a toothpick and plant them in 4" pots, usually in four rows of four, or sixteen to a pot. Return the towel with the ungerminated seed to the plastic bag. As more seedlings germinate, add them to the pot. The pots are placed in plastic bags loosely closed with twist ties and placed under fluorescent lights at 70°F. Check them every three weeks or so for moisture. We usually grow the seedlings in these bags for about six months before transplanting to larger pots or to the garden.

If you don't have a place for growing under lights, start your GA-3 treatments when the weather is temperate. Transferring gibberelin-stimulated seedlings into outdoor conditions may present a greater challenge than growing them on under lights.

This method will expose the seeds to a concentration of about 1,000 parts per million of GA-3, the concentration found to be optimal for most seeds. By applying GA-3 to only the inner pad, the chemical is used efficiently; there are no solutions of GA-3 that have to be discarded because they have been mixed with water too long and have lost their effectiveness. The moist outer pad serves as a water reservoir maintaining 100% relative humidity so that the inner pad does not dry out.

If the seedlings are elongated and spindly (etiolated), try using half as much GA-3. Also, you may need to check the towels on the first two days after exposure. The procedure can be varied by using less GA-3.

The above procedure may seem crude and qualitative. However, more careful procedures involving weighings and volume measurements are not as exact as they might first appear. GA-3 is absorbed by different seed coats to varying degrees, so the concentrations that reach the embryo may be much lower than that applied externally. Also, once GA-3 is mixed with water it deteriorates and this destroys all efforts at quantitative control.

GA-3 affects various species of seed differently. In some species normal seedlings result over wide ranges of treatment. In others germination is not affected. GA-3 may even kill some seed.

Here are some of the reasons you may want to try using GA-3.

1. Get faster germination.
2. Germinate seeds that otherwise don't germinate or only very sparingly.
3. Get immediate germination for seed that otherwise requires chilling.
4. Get immediate germination from seed that otherwise would need to be stored for six months before sowing.
5. Speed up two-step germination in lilies.
6. Germinate species that otherwise require light.

If you have empty seed pots out in your frames, seed pots covered with moss or liverworts you've kept for two or three years waiting for germination, why not try GA-3 stimulated germination for some of the species you have failed with? For starters, try *Physoplexis comosa*, *Gentiana verna*, *Linum*

capitatum, *Aquilegia*, the knottier primulas, or *Trollius*. The method doesn't work for everything—there is no effect so far on junco iris, and *Corydalis nobilis* and *Cicimifuga racemosa* germinate but immediately rot! Over 600 species have now been tested. For details, refer to the upcoming revised edition of *Seed Germination: Theory and Practice* (see ad p. 77).

Chemicals can be obtained from:

Carolina Biological Supply, 2700 York Rd., Burlington, NC 27215 1-800-334-5551
Sigma Chemical Company, PO Box 14508, St. Louis, MO 63178 1-800-325-3010
5 grams of GA-3 95% active powder cost about \$70. The chemical does not deteriorate when kept in a closed glass container. Five grams would probably be enough to supply ten people for ten years. Chemical companies have some restrictions on selling to individuals but are happy to sell to a business, such as a nursery or a school. Each chapter could certainly make arrangements for a single purchase that would supply everyone interested.

—Norman C. Deno

Books

Creative Propagation: A Grower's Guide, by Peter Thompson. 1989. Timber Press: Portland, Oregon 224 pp., numerous B&W line drawings, 6.25" x 9.25"; paperbound edition, 1992; \$19.95. ISBN 0-88192-251-X

Anyone intimately or even casually engaged in the growing of alpiners and rock garden plants will at some time attempt to propagate some of their plant material. There is generally a need for replacement plants, and renovation or expansion of existing gardens creates the need for additional plants. The seed exchanges of the ARGS and other like societies contain listings of seeds from the world over and number well into the thousands. Many of the plants represented can be acquired only on a "do-it-yourself" basis.

Creative Propagation: A Grower's Guide is an invaluable source of information for the novice grower. It describes in detail many up-to-date methods of propagation—except for grafting, rather conspicuous by its complete absence. Micro propagation, too, is omitted, but this method is generally used only in the realm of large specialist growers with expensive facilities and equipment.

Though there is only one chapter devoted exclusively to alpiners, many of the methods and practices for the increase of other plants are applicable. Line drawings are used effectively and instructively throughout to aid in understanding the text. The text is very readable, using terms easy to understand. All these factors make this book a must for the novice grower.

—Carl Gehenio

Skalky a jejich stavba (Rock Gardens and Their Construction), by Vojtech Holubec and Ota Vlasak. 1992. AGEM:Prague, The Czech Republic. 8.5" x 12", 96 pp., 133 color lithographs, 10 line drawings. Hardbound. ISBN 80-901009-0-2.

Unless you open this somewhat odd-sized, slender volume, you won't understand why a book written in the Czech language is being reviewed on these pages. It is the lithographically reproduced color photographs that in a universal language describe some of the most beautiful alpine plants, stunning mountain scenery, and enviably perfect rock gardens. It is because of the wealth of illustrations and a pleasing though rather wasteful graphic design that the text is short, even though it deals with a wide variety of subjects. The first two-thirds deals with rock garden design and construction in a manner closely similar to H. L. Foster's *Rock Gardening* and includes brief chapters on raised beds, miniature gardens (troughs), pests and diseases, fertilization, maintenance, watering, and similar topics. In a chapter on non-traditional design, a modernistic system of inclined slabs containing Himalayan saxifrages is described and illustrated, but otherwise the treatment of the topics follows the tradition of Farrer and other British and American writers: no Almond Puddings or Plum Buns, all stone of the same geological material preferably sedimentary with flat cleavage planes, individual pieces as large as you can handle and afford. The emphasis on a "natural" look is ever present and sometimes extreme. For example, when paths in the rock garden are discussed, the authors seem to prefer none whatever. Instead, they suggest series of meandering stepping stones "overgrown with *Raoulia subsericea*, *Dryas octopetala*..." Well, not my *Raoulia* or *Dryas*! However, it must be admitted that the two frontispiece pictures of a pathless rock garden look very nice and natural.

The last third of the book is a whirlwind tour of most of the European and some American alpine mountain ranges and their flowers. This section would be of considerable interest to American readers because it mentions, albeit too briefly, some of the least known but floristically tantalizing mountains in Europe: the Krkonose Mountains of Bohemia, the Carpathians of Slovakia and Rumania, and the Balkan complex of Bulgaria. During the communist regime [1948-1989], the Czechs were not allowed to travel west of the Iron Curtain, but they were relatively free to explore the mountains of the so-called Socialist Block, and their experiences, some of them published in this *Bulletin*, contributed to the elevation of Czech rock gardening to its present high standard. Also, the seeds collected by these explorers found their way to the US and British seed exchanges, and so many of us became directly acquainted with some of the treasures of the East European mountains. The climate of the Czech lands, roughly similar to that of western Pennsylvania, is only partly responsible for the know-how and successes of Czech rock gardeners. Anyone who considers the cultivation of *Androsace helvetica* "relatively easy" and *Potentilla nitida* "absolutely easy," as do the present authors, must have more than one green thumb. The heavy emphasis on employing travertine (tufa) in the rock garden may be another clue, although the authors caution those who garden in warm and humid areas that mosses and liverworts can drastically reduce the advantages of these structural materi-

als. Although after reading this book I am still in the dark as to the success of the Czech rock gardeners in growing to perfection all the gentians, primulas, campanulas, and other beauties illustrated here, I can now better appreciate the seemingly obvious fact that a well-constructed rock garden is the most important first step in the right direction.

Regrettably, the book doesn't contain an index of plants, and the location and ownership of gardens illustrated are only seldom mentioned. This, however, is of little consequence to American readers, who would surely be delighted with the visual impact of the outstanding illustrations.

—Alexej B. Borkovec

The Genus Primula in Cultivation and in the Wild, by Josef J. Halda. 1992. Illus. Jarmila Haldova. 364 pp., 16 color pages, over 300 line drawings. Tethys Books:2735 S. Pennsylvania, Englewood, Colorado 80110. Paperbound, \$29.50. ISBN 0-96322289-0-0

Here is the primula book we have been waiting for. Nearly every known primula is included, using the new nomenclature and current names. Those of us who grew up with the Smith and Fletcher nomenclature will be guided by the comprehensive index.

About 80% of the approximately 500 species included in the text are accompanied by Jarmila Haldova's excellent, botanically correct drawings.

Forty years ago I grew and photographed velvety-leaved *Omphalogramma vincaeflora*. I knew that it formerly had been included in the genus *Primula* but had been segregated to its own genus. Much to my amazement, here on page 45 is my old friend once more in *Primula*, subgenus *Omphalogramma*, section *Omphalogramma*. For me, it grew very well in a mixture of beach gravel and oak leaf mould on a lakeshore with northeastern exposure.

On page 119 we find *Androsace saxifragifolia* is now *Primula umbellata*. This may not excite you, but one of this plant's habitats should—mountainous New Guinea. And if you want to join the crème-de-la-crème of alpine gardening, turn to pp. 302-303 and set course for bringing a well-grown *P. triloba* or *P. tsongpenii* to the shows. If Jarmila's drawings don't hook you on these plants, you had better check your pulse.

This book is an excellent blend of botanical nomenclature and plain English. The novice grower will find what he or she wants to know about habitat, growing conditions, and availability. The devotee will be shocked to find how much he or she doesn't know.

In no way do I wish to detract from the excitement the reader gets as the magic world of *Primula* unfolds page by page—as a kid I read seed catalogs rather than comic books for excitement, so I know how it is. Just be aware that there simply were not enough living people to proofread all the final text before publication. Things always go wrong with captions for pictures. Please ask for a list of corrections, pen them in, and prepare to love this great gift from the Halda family.

—Cy Happy

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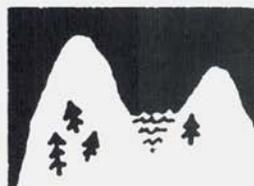
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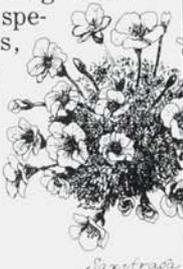
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