Bulletin of the American Rock Garden Society

Vol. 36 Summer 1978 No. 3

The Bulletin

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LANGUID LADIES

PANAYOTI PETER CALLAS
Boulder, Colorado

For the eastern rock gardener or wildflower lover, *Mertensia* means *Mertensia virginica*, the lovely Virginia Bluebells whose very name conjures up images of coolness and woods in May. For the western rock gardener *Mertensia* implies *Mertensia paniculata, M. subcordata* or one of the other regional manifestations of the ubiquitous, tall Chiming Bells that overhang every subalpine freshet in the West during the entire alpine growing season. There are occasional rumbles concerning other species and a few travellers return from the West with tales of alpine sorts that vary from peak to peak, and mountain valley to Great Basin meadow. This endless tangle of tiny mertensias — the unquestioned alpine gems of the genus in America — isn't apt to be sorted out nomenclaturally for years, but one of the smaller sorts is not only instantly recognizable but a distinct, easy and rewarding garden plant.

This is *Mertensia lanceolata*, the Prairie Chiming Bells or Languid Ladies as it is called locally. This is the only species that grows on the high plains — the shortgrass prairie province — and it must come as a shock to many rock gardeners that there is a member of this moisture-loving genus that has adapted to grow among buffalo grass and cactus. Not long ago the plains from New Mexico to Saskatchewan would be punctuated with the innumerable question marks of Languid Ladies interspersed with Puccoons and Sand Lilies, but with the intensive development of agriculture, grazing, and cities over much of its range it

is getting harder and harder to find extensive colonies of this mertensia. For lovers of the Great Plains flora it is as evocative of spring as its mesic cousins to the East and West.

Mertensia lanceolata is not the brightest mertensia, nor the biggest nor the smallest. It is probably the easiest to grow under a wide range of conditions, and is so charming at its best that it deserves wider recognition, The stems, which rarely exceed ten inches, arise from a stout, questing taproot that forks repeatedly and has obviously done much to keep the prairie soils intact. Both the stiff stems and paddle-shaped leaves (which rarely exceed two inches in length) are a bright, gray-blue color. The stems bend gracefully into the typical inverted "J" form of mertensias, culminating in a panicle of pink buds that open a pale blue — in typical plants the color is not quite as intense as in most small mertensias. The first buds open with the warmer days of April and May and continue to open — especially in garden plants — well into June. Because the flowers open and are fertilized consecutively, the small, nut-like seeds ripen over a period of weeks and it is difficult to harvest any quantity at one time. The seeds scatter quickly once ripened and a single plant I originally moved into my garden quickly produced a mass of progeny by self-sowing. In my climate it has proven sufficiently threatening that I now take the precaution of harvesting the tips of the stems before most of the seed ripens in late June. This seems to have no effect on the vigor of my plants. As the prairie dries in the hot summer, the plant quickly goes dormant. It will disappear by mid-July even in well watered situations.

The dry, shortgrass prairie distributions of this plant might lead one to believe that it would demand dry culture in the garden. I have found that it will tolerate almost any soil from woodland duff to the hardest adobe clay. It hasn't shown the slightest resentment of summer watering or poorly drained spots in my garden. Seedlings have appeared near rhododendrons, in the chink of a concrete walk and under a dense, young pine. No matter what conditions it grows under, plants are remarkably uniform in stature and bloom, only plants in deep shade lose their healthy blue color of leaf and stem.

As is the case with many dryland plants, its seed germinates early in the spring, usually producing only one or two very large, three to four inch, paddle-shaped leaves the first year while its taproot plunges downward. Care should be taken to provide a deep container for seedlings because of this, although I have found it easy to move once the juvenile foliage ripens. Under optimal conditions the first flowering stem might appear the second year from seed, but by the third summer the plant will invariably produce its first, solitary flowering stem. Each year thereafter the plant will send up more and more stems until it forms a large vase of bloom with up to twenty stems arching gracefully out from the central point.

Mertensia lanceolata seems to be fairly uniform over most of the plains, but many sub-species are described by botanists from its more extreme points of distribution. Somewhere over its huge range there must exist white, deep blue and even pink variations in flower as have been found in other species of the genus. I only hope that someone will run across them soon since its numbers are inexorably reducing. Transplanting an established clump is an awesome and dubious task, but younger specimens move rather easily

in bloom. This should be resorted to only in the case of plants threatened with imminent destruction because of its increasing rarity. Gardeners shouldn't have to resort to transplanting to have a plant so vigorous and easily grown from seed. It will be fortunate if a plant that has been so drastically restricted in the wild will someday soon flourish in many gardens.

SEED EXCHANGE 1978

The 1978 Seed Exchange finally ceased filling requests on March 27 and shipped all remaining packets and reserves to the eighteen ARGS Chapters. This fascinating experience as Director of the Exchange has brought me an awareness of the generosity of rock gardeners around the world, of their willingness to share knowledge as well as seed, of their friendly cooperation in the seed exchange enterprise, and of their vast knowledge and experience in the world of rock garden plants. My thanks to all who have participated in any way.

My deepest gratitude is reserved for the sixty members of Northwestern Chapter who worked diligently to receive and catalogue the seed, to packet it and then to answer the 1294 requests which we were able to fill in some manner, using 34,167 packets for this purpose. There were additional requests which we were unable to fill for some reason or other. Shipments were made to twenty-five countries in addition to the United States and Canada.

All of us wish to express our appreciation to the 419 donors who made the Exchange possible. Our work was made easier when seed had been well cleaned, safely packaged, legibly labelled, and sent with an alphabetical list of correct botanical names accompanying the shipment.

Seed has begun to arrive for the 1979 Exchange. The closing date for receiving seed this year will be October 31. We urge all donors to honor this date. A rare exception will be made for late ripening seed which may be listed and then mailed when ready. But be sure to send it. Disappointment is keen when we list something which does not show. It is impossible to handle a complete donor list for late arrival. We urge all overseas members to follow the practice observed by most of them: pack seed lightly and send by air.

Our aim is to offer in the Seed List the finest in alpines and rock garden plants. Quality of the listings is far more important than quantity. Amounts of seed received have varied from barely enough for one packet to overpowering quantities. You will assist greatly if effort is extended to send sufficient seed for several packets at least, meanwhile urging friends who could gather seed of the same species to do so. On the other hand, the wastefulness of oversupply can be cut down if good judgment is used.

Frances K. Roberson

ARGS Bulletin References —

Vol. 18, No. 3 — "*Winnowings from the Seed Exchange*" — Dr. A. R. Kruckeberg

Vol. 21, No. 3 — "*Notes on Seed Saving*" — Bernard Harkness

Some Texas Plants in the Rock Garden

DONALD HUMPHREY
Falls Church, Virginia

Mention the Hindu Kush, the Atlas, the Pyrenees, the Big Horns, the Siskiyous and a hundred other mountain ranges and subranges of the temperate zones of the world and rock gardeners conjure up entrancing visions of alpine meadows besprinkled with choice, rare and therefore painfully desirable alpines. Walk the tundra of the high Rockies in Colorado and dozens of species of plants suitable for the rock garden may be found in a single acre.

Mention Texas and quite different images appear. One is more likely to think of oil wells than plants, more likely to think of prickly pear cactus than alpines. Walk the broad prairies of the Llano Estacado in the northern panhandle and find sorghum and cotton growing over thousands of acres of land irrigated by deep wells. But mental images and first impressions are not always trustworthy and in a big country one must be content to look far and wide for good things.

Texas has one of the largest floras in the United States. Nearly 5,000 species of higher plants are found in the state, of which 379 are endemic to Texas. This diverse flora includes subtropical species in the lower Rio Grande valley, coastal plain species along the Gulf, familiar eastern wildflowers in the forested eastern fringe of the state, plants of the high plains in the northern panhandle, scattered outliers of Rocky Mountain flora in Guadalupe Mountain and Big Bend National Parks, and the fascinating flora of the Chihuahuan desert in West Texas.

Actually, Texas has ten reasonably well defined plant zones: the pineywoods of eastern Texas, the Gulf prairies and marshes, the post oak savannah and blackland prairies intermingling west of the first two zones, the cross timbers and prairies in the north central part of the state, the south Texas plains of the lower Rio Grande, the Edwards plateau — a distinctive limestone upland of south central Texas, the rolling plains and the high plains in the northern panhandle, and the arid Trans Pecos mountains and basins.

Elevations vary from sea level along the Gulf coast to 8,751 feet at Guadalupe Peak in the Trans Pecos. Rainfall ranges from over 50 inches in east Texas to less than a foot annually in the west. Soils vary from acid in the east to basic and locally heavily alkaline in the west.

Only a few species of alpine or subalpine plants are found in the Chisos and Guadalupe mountains, but the state has many fine plants for the rock garden and the wild garden. My experiences with a number of these may be of interest to readers of the ARGS Bulletin, particularly to that ever increasing group who live south of the Mason-Dixon line, in the southwest or in California, for though many Texas plants are completely hardy, others are of questionable hardiness in the vicinity of Washington, D.C., (Zone 7) and others are apparently tender.

My first experience with Texas plants came from the 1968 seed list of the American Horticultural Society. This list, which usually has little of interest to the rock gardener, contained a number of seeds of wild flowers from Bexar County, Texas, of which San Antonio is the county seat. A glance at a map will quickly show that San Antonio is further south than New Orleans as well as large portions of northern Mexico, and I might have been prepared for little success. Not to be deterred by such realities I ordered seed of fourteen species, three of which were shrubs.

The species were *Allium drummondii, Anemone decapetala, Astragalus austrinus, Corydalis curvisiliqua, Eustylis purpurea, Gilia incisa, Lesquerella recurvata, Lonicera albiflora, Lygodesmia texana, Mahonia trifoliolata, Menodora heterophylla, Ruellia* sp., *Ugnadia speciosa,* and *Verbena pumila.*

Only eight species came up from seed, six survived, five of these bloomed, two species are with me still. My comments are confined to the six species.

Lygodesmia texana belongs to the chickory group of the Composite Family. The genus is known as Skeleton Plant by virtue of its leaves being reduced to bracts. It is a fleshy rooted perennial to one and a half feet high, freely branched and truly skeleton-like. Its flowers are lavender and rather showy. Mine never got above 10 inches high bloomed the first year and expired. It is not showy or elegant but I liked it and would be glad to have it back. The genus is widespread in the West and northern Mexico. Probably the best species is *Lygodesmia grandiflora,* a pale purple, large flowered species under a foot high with thread-like leaves found from Idaho to Arizona. I have never seen it offered in seed lists.

Eustylis purpurea, called Purple Pleat-leaf, belongs to a genus of the Iris Family largely confined to South America. I think of it as a small purple *Tigridia* with its fugacious flowers held vertically rather than horizontally. I still have it. It is bulbous, has a few pleated leaves and a zig-zag stem. With me it is generally about a foot high and blooms for a few weeks in midsummer. I think it outstanding. Seeds received from Mrs. Blackmar of Luling, Texas, about whom more later, produced plants superior to the Bexar County seeds. It needs full sun and an average garden soil. It dies down to the bulb in the fall.

Menodora heterophylla is of a curious genus of the Olive Family ranging from southern Colorado to southern California and deep into Mexico. While it is a perennial from a deep root, some species are shrubs or sub-shrubs. The seeds are large and encased in a spongy covering. With me it was a decumbent plant with several stems to seven inches long, blooming the first year. It is sometimes called Redbud in Texas, not to be confused with the tree of the same name. The buds are red, but upon opening they fade to yellow. It does not bloom profusely but has a long season of bloom and the flowers are eye catchers. I lost mine but if I could get seed again I would like to try it in a sandy soil in a protected spot. All members of this genus would seem worthy of a trial in southern rock gardens.

Lesquerella recurvata is of the large American genus that might be thought of as the New World's answer to the Old World's alyssum. *L. recurvata* is an annual with several branching stems set with bright yellow mustard flowers. It bloomed and departed, yet it belongs to that class of small annuals that I believe has a place in the rock garden.

Six of the eighteen Texas species are perennial. I have grown from seed *Lesquerella ovalifolia*, a very nice rock garden plant though not long lived with me. This is a high plains species found from northwest Texas northward. My seed came from Claude Barr.

Berberis trifoliolata, synonym *Mahonia trifoliolata*, is a first rate shrub with silvery patterned leaves. Its flowers are reputedly saffron scented and the red fruits are edible, hence the name, Currant-of-Texas. My three plants have survived five Virginia winters and are attractive, if somewhat sprawly — they have yet to bloom. In its native habitat the species attains six feet in height.

Gilia incisa is a dowd. Authorities can not agree whether it is annual, perennial, or biennial. It does not matter. I only mention it so one may be on guard against it. Its small, pinched, lavender-bluish flowers make no show on the weedy plant.

Though *Allium drummondii* did not come up from the above-mentioned seeds, I have since grown it from seed and have had it in bloom the second year. It is an attractive if not wildly showy *Allium*, a plains species found from Nebraska to northern Mexico. The scape is usually under a foot with white to pink flowers about one quarter inch across. The leaves are narrow, flattish and channelled on the underside. It is a spring bloomer.

My second brush with Texas plants came about fortuitously. I received a letter from ARGS member, Mrs. Bettina Blackmar, of Luling, Texas, a rural town northeast of San Antonio. She was interested in receiving seeds of *Marshallia obovata scaposa* which I had offered in the 1970 seed list. Her letter contained a packet of *Marshallia caespitosa* seeds. Thus began a correspondence of several years marked by exchanges of seeds and plants. Many of the following plants or seeds were received from Mrs. Blackmar, and have found a place in my garden.

The genus *Tradescantia* contains some sixty New World species varying from diminutive annuals to large perennials up to three feet high. Many of the species are overlarge or too vigorous for the rock garden. The best known exception is the delicate *Tradescantia rosea* from the southeastern United States. Last spring Mrs. Blackmar sent me a second species that merits a place in the choicest rock garden — *Tradescantia reverchonii*. The prostrate leaves are upwards of six inches in length with me, an inch broad, somewhat greyish in color and set with bristly hairs at nearly right angles to the leaf blade. The flowers are a pure, bright blue, the three-petalled flowers, over an inch across. They last only a day but the blooming period is rather long. Another species that sounds equally good is *Tradescantia tharpii* ranging north to Kansas, Oklahoma and Missouri. Its large, three-petalled flowers tend to be purple, pink or sometimes blue.

Androstephium coerulum has been known as *A. violaceum*, *Milla coerulea*, and *Brodiaea coerulea*. This puts it in a class with *Ipheion uniflora* for nomenclatural travels. It is a cormous plant of the Lily Family. Mrs. Blackmar sent me three bulbs five years ago. I still have them. Walter Carlton, a friend of Mrs. Blackmar, on a trip east last year brought me about twenty more corms. Mr. Carlton, a retired school teacher, is a fine naturalist and photographer specializing in Texas wildlife and wildflowers.

Nearly all of my plants have three to five linear leaves. They begin emerging by late February, but seem to be in no hurry so that the flower buds show up in mid to late March when

the leaves are two to four inches long. The flowers remind one somewhat of a violet-purple daffodil, having a funnel shaped corolla about an inch long. It needs a sunny site where it will not be overpowered or lost during its dormant period in summer and fall. The bulbs show no interest in increasing.

Hesperaloe parviflora is the so-called Red-flowered Yucca of the prairies and mesquite thickets of central Texas. It is said to be in cultivation in the Southwest. I have two of three plants sent me some years ago by Mrs. Blackmar. The larger of the two is planted on a south slope in a bed of gravel, rock and sand some twenty four inches deep. Mine has only a few leaves and seeing the five-foot-high stems with their inflorescences of rosy or salmon red flowers is an idle hope with me.

In the spring of 1973 I received several young plants from Mrs. Blackmar marked *Nolina macrocarpum* which I suspect are really *N. texana*, a species with numerous narrow leaves with stringy margins. The flowering stems are very short for the genus, being seldom longer than eighteen inches. The numerous, small, white flowers are borne in a dense, compound cluster. The plants survived the winter in good shape.

The genus *Cooperia* belongs to the Amaryllis Family and is closely related to *Zephyranthes*, having been at one time or another included in that genus. Five species are listed from Texas. Through the kindness of Mrs. Blackmar I have *C. pedunculata*, *C. drummondii*, and *C. smallii*. The first two are white flowered, the last is lemon yellow. These plants are bulbous with a few linear leaves. The flowering scapes are from six to twelve inches high, bearing salverform flowers. Their blooming period is quite protracted — from early spring to late summer — and their tendency to bloom following rain has given them the local name of Rain-lilies.

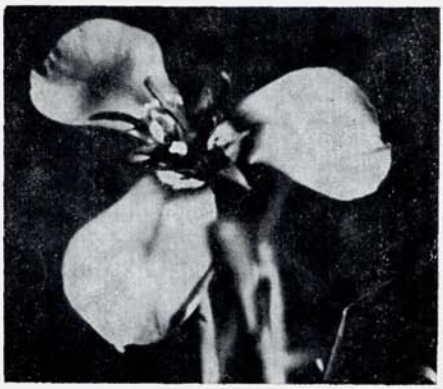
Cooperia smallii produced two flowers this past summer. The two inch, yellow, upstanding lily-like flowers are attractive but rather short lived.

More floriferous is *Habranthus texana*, a Texas endemic of a genus otherwise found mainly in South America. Its flowers are orange-yellow, shaped much like those of *Cooperia* but held horizontally rather than upright.

Texas has ten species of agave and five species of polianthes sometimes listed as *Agave* or *Manfreda*. *Polianthes maculosa*, sent to me last spring, has successfully wintered through twenty seven degrees of frost without protection in an exposed site in sandy soil. It has six to ten glaucous, basal leaves blotched with darker green or brownish spots. It is nearly deciduous in winter but not so much as *Polianthes virginica*. The flowering stem is up to two feet high and the purplish or greenish white flowers are two inches long. I do not know if they emit the strong perfume in the evening hours characteristic of *Polianthes virginica*.

The genus *Alophia* is a bulbous member of the Iris Family sometimes listed as *Herbertia*. Only one species is found in Texas and is endemic to the south Texas grasslands — *Alophia drummondii*, sometimes listed as *Herbertia coerulea* and *H. drummondii*. The pleated leaves may be a foot long, sheaing at the base. The two inch flower is borne on a foot high stalk. It is composed of three large outer perianth segments and three short, pointed inner ones. The color is pale to dark lavender, white at the base. Seeds germinated readily and plants with two to three leaves grew five inches high the first summer. The leaves appear to be

evergreen which may be a limiting factor in their northern distribution. So far, plants in the garden have survived over fifteen degrees of frost.



Alophia drummondii *M. W. Carlton*

One should be rather careful about giving a *Commelina* a place in the garden. However, *Commelina dianthifolia* is worth a try where it is hardy. It is a tuberous rooted perennial growing six inches or so in height. Its blue flowers are borne sporadically during the summer. My plant fell victim to its neighbors. In its native Trans Pecos country, it probably has little competition for space. I will grow it again if the opportunity arises, which is possible since seed is sometimes available in the seed lists.

Plants of *Ranunculus macranthus* came to me in a consignment of plants from Mrs. Blackmar. They were mostly a cluster of short, nearly tuberous roots, but took hold rapidly in the garden. The common name, Large Buttercup, is apt both as regards the flower and the plant. The flowers are bright yellow, up to one and a half inches across and have from eight to eighteen petals. It begins blooming in April on short stems which elongate as the plant goes to seed at one and a half feet. It looks unkempt for a while, turns brown and dies back to the ground to reappear as a loose rosette of leaves in the fall, staying green all winter. It will seed around modestly and I think it is a very fine plant if a little large for the rock garden. It is native to the southwestern U.S. and Mexico.

In the same consignment, I received plants of *Oenothera speciosa* looking particularly peaked. I planted their stringy roots in a part of the rock garden particularly needing rehabitation and lo and behold, its rhizomes raced across it sending up an abundance of foot high stems topped by a number of lovely three-inch pink flowers with pale yellow centers. I wouldn't be without it but if you grow it, don't plant it with anything choice. It has been in domestication for a long while and in the coal fields of the Appalachian plateau of Tennessee I found it one of the most common flowers in the yards of the mountain people. Its Spanish name, Amapola del Campo, seems particularly apt.

One *Oenothera* sent me has remained a mystery. I take it to be *Calylophus hartwegii*, more commonly known as *Oenothera lavandulifolia*. It is a woody based, decumbent, nearly caespitose plant with short, linear leaves. Its yellow flowers are over an inch across and have that ephemeral texture common to cistus and papaver. One plant in a dry, sunny spot bloomed profusely over a long period and died. Another in half shade, competing with fescue, has survived several years but does not look healthy nor does it bloom abundantly. The species ranges north to South Dakota so it should be perfectly hardy. If well grown it is a real charmer and merits front rank in the rock garden. Cuttings have failed to root and I am resigned to losing it.

Other Texas oenotheras I have grown are *O. brachycarpa* and *O. triloba.* These are nearly stemless rosette plants resembling dandelions with bright yellow flowers opening so predictably at dusk that one can set one's watch by them to the quarter hour. One evening five children and two adults looked on in rapt attention as six flowers opened in the space of two or three minutes. *O. brachycarpa* is the more western species with flowers nearly twice as large as *O. triloba.* The former is listed as a perennial, the latter as a winter annual or biennial. However, neither are long lived and after the plants die they leave a perfect rosette of woody seed capsules at ground level which when wet can be pried open and the contents spread around to guarantee the continuation of the species.

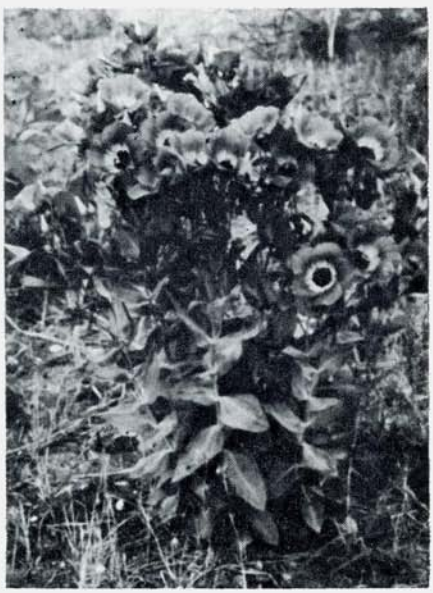
Oenothera missouriensis is too well known to need a description and *Oenothera drummondii* turned out to be a weedy species whose yellow flowers bloomed so late that I never saw them except as withered rags the following morning. I may have had a poor form.

Texas boasts twelve species of phlox, including several mid-western and eastern species. However, the only phlox of Texas provenance I have grown is the wild form of the annual, *Phlox drummondii* seed of which I received from Mrs. Blackmar. It seeds around mildly and puts on a brilliant display of red during the summer when color is welcome in the rock garden. Its various color forms run the gamut from red, purple, lavender, pink and white, with eyed forms not uncommon.

There are twenty-three species of penstemon in Texas. Most are a little large for the small rock garden. Five are endemic. Of these I have grown *P. triflorus* from the Edwards Plateau. It is reminiscent of *P. cobaea* but more refined with maroon flowers lined with lighter color within. It has not been permanent with me, but its hybrid with *P. cobaea* has lasted rather well. *Penstemon cobaea* is well known, growing from Texas to Nebraska and in its better color forms in its native range is a truly superb plant.

Penstemon murrayanus is definitely not a rock garden plant but it is so unusual that it deserves mention. It forms a few large cabbagy, glaucous leaves from which spring a three or four foot stem with perfoliate leaves, looking as though the stem had grown through them. The stem is topped by shocking red flowers over an inch long, blooming over a long period in early summer. It requires staking with me. Grown in a somewhat sandy soil, it is not difficult but the evergreen leaves should probably be given the protection of oak leaves or evergreen boughs in the north. It comes from the sandy soils of Texas, Louisiana, Arkansas and Oklahoma.

Eustoma grandiflorum is the pride



Eustoma grandiflorum *M. W. Carlton*

of Texas. A well grown plant with numerous two-foot stems bearing large purple, tulip-like flowers is a breathtaking sight. A member of the Gentian Family, it is found on the southern plains from Nebraska to Texas. It is a short-lived perennial with a white, carroty root that will not survive our northern Virginia winters without a thick but loose mulch. However, by lifting the roots and placing them in sand in a cutting frame, they winter safely and will bloom when placed in the garden. Growing it from the small, abundant seeds is the surest means of increase though the seedlings stay tiny for an inordinate period of time. Its spectacular beauty should guarantee it a place in warmer gardens.

Ipomopsis rubra is an eastern representative of a western genus, being found along the southeastern tier of states from North Carolina to Texas. It is a biennial or annual forming an attractive rosette of much divided, filiform leaves. In summer it sends up usually a single stem topped with numerous tubular, red flowers somewhat spotted within. It is much like *I. aggregata* often seen in abundance over the lower mountain slopes of the western states. Grown among low growing lilies or among other spikey plants it is an excellent filler and accent. It does best in a light, well drained soil in full sun. It does not require staking.

Admittedly, many of the plants described in this article are a little large for the smaller rock garden but not larger than many plants regularly described in rock garden books. Mostly they are plants of eastern Texas, but the Edwards Plateau, the northern panhandle and Trans Pecos Texas have many other perennials, annuals and subshrubs that could and should find a place in our rock gardens.

Who has grown *Centaurium beyrichii*, the beautiful mountain pink of rocky limestone hillsides? How many gardens are graced by *Nicolettia edwardsii*, a lovely annual daisy of the Edwards Plateau? Is yellow flowered *Allium coryi* hardy in northern gardens? Is *Talinum aurantiacum*, with its inch-wide orange flowers, in cultivation or any of the other seven Texas talinums, apart from *T. parviflorum?* Have any of our members ever seen the low-growing, scarlet-flowered *Silene plankii* from the Franklin Mountains? One need not answer these questions to realize that they conjure up that most tantalizing desire of rock gardeners, to bring new plants in from the wilds to be enjoyed and acclimatised to our gardens and to be shared with others.

The next International Rock Garden Conference, sponsored by our sister organizations, the Alpine Garden Society of England and the Scottish Rock Gardening Club, is already being planned. It is to be held in Nottingham, England in 1981. Plan now to keep that spring open; the conference in Harrogate was superb.

GROW YOUR FERNS FROM SPORES

JEANNE AND MILTON MULLOY
Waterbury, Conn.

Growing ferns from spores is fun and relatively easy, not nearly as difficult as it might seem from reading all the various directions in all the various publications that cover this subject. In addition, it is a grand way to increase the ferns you have, plus adding to your collection without recourse to digging up the rarer forms from the wild. There are many ways of growing spores, all quite successful, and the simple one described below has always worked well for us.

Obtaining Spores

You may gather your own. Collect a fertile frond or a few pinnae (leaflets) from plants in your own garden, steal from a friend's garden, gather from plants in the woods, along the roadside, or wherever you find them. Gentle removal of frond or pinna will not harm the plant in the least. Put it in an envelope (white is best — easier to see the spores) and let it dry. Shake the frond gently and the spores will fall out as a very fine powder.

Spores are obtainable from the seed lists of several plant societies, including our own ARGS Seed List, which often has a good selection. Also scan the seed lists of the Alpine Garden Society, the Scottish Rock Garden Club; the American Fern Society has a formidable listing. The Los Angeles International Fern Society has a "Spore Store" but their offerings are mostly tropical or subtropical species; if you like ferns as house plants, this is a good source.

Containers

Almost anything will do that can be made fairly air-tight, but we prefer plastic containers to retain moisture; this is of paramount importance. Plastic refrigerator dishes with close-fitting lids, plastic cups, even plastic pots with the drainage holes sealed, are appropriate.

Planting Medium

Here again you have choice: perlite or vermiculite, sterilized with boiling water, for the base (to help retain moisture) and wood soil or leaf mold, ordinary garden soil or commercial potting soil for the actual sowing surface. When using soil from your garden or compost pile, strain through one sixteenth-inch mesh, and sterilize in the oven at 250°F. for one hour. Commercial potting soils are supposed to be sterile, but it doesn't hurt to run this through your oven, too.

Preparing the Containers

If you use glass containers, sterilize by boiling. Plastic containers will not withstand boiling, so wash in very hot water and dry with paper towels. Fill one-third to one-half full with perlite or vermiculite and pour boiling water to just cover. Over this, fill to one-half inch of the top with sterilized soil. Press the soil down and make it smooth. Let stand until soil is saturated and cooled to room temperature.

Sowing the Spores

Place the spores on a piece of white paper and tap gently, allowing them

to roll off the edge onto the planting medium, or tap them directly from the envelope or whatever wrapping they are in. Sprinkle thinly over the prepared surface. A certain amount of chaff may fall along with the spores, but this does not matter. Cover the containers closely with the lid, a piece of glass, or with plastic wrap and keep at room temperature (68-70°F.) in good light but not direct sunlight; or place under fluorescent lights for fourteen to sixteen hours a day (some growers say twenty-four hours a day).

If you are sowing more than one kind of spore at the same time, take care not to get them mixed up. The fine, powdery spores have a tendency to cling to any instrument, to your fingers, to float in the air; they seem to lie in wait for the chance to hop into somebody else's container. So between plantings, wash your hands and any instruments you may be using, use fresh bits of paper for sowing, etc.

Germination

Now you play the waiting game. Germination should take place within a few days or weeks (some as long as six months, so don't give up). Meantime you can ignore the containers, except for an occasional peek to assure that moisture is constant. Ultimately you will notice a light green film, at first barely discernible. Then later, with growth, this film resolves into the green, flat, heart-shaped prothalia (sexual stage of a fern.) Now is the crucial time: the surface must be kept moist, shiny-wet, to enable the male cells within the prothallia to move about and fertilize the female cells. At this point, you can remove the lids or covering, place the containers in a terrarium, plastic sweater box, or any sort of modified Wardian case, cover the case with its lid, or plastic wrap, a sheet of glass or stiff plastic, and keep in good light (not sunlight) or under fluorescent lights for at least sixteen hours a day. Check frequently for moistness, using a fine spray or mister to maintain wetness.

Embryo Ferns

In due course, and this varies with species, the embryo ferns appear, tiny plantlets growing from the prothallia which disappear as the ferns develop. Despite efforts to sprinkle the spores thinly, you almost surely will find that in this initial growth period, you have a jungle of tiny plantlets. Breaking up such a pot full into small pads and transplanting these into several pots (see below) will thin out the jungle and so reduce the chances of damping off.

Six to eight months after the spores are sown, or when the ferns are one to two inches high, they are ready to be transplanted to individual pots. Use a sterilized mixture of equal parts of leafmold, good topsoil, peat, and vermiculite or perlite, with a little sand added to promote good drainage. The pots may be kept in a terrarium or under plastic, but with frequent watering this is not necessary. Indirect daylight or fluorescent lighting and room temperature are still the rule.

Planting Out

The young ferns should be ready for planting in the garden one and one-half to two and one-half years after sowing of spores. Spring is best, after all danger of frost is past. Keep the plants well watered until they have settled in and made some new growth. Some protection by mulching and/or evergreen boughs is recommended for their first winter outside.

Easy Ferns to Try

Do start with easy ferns at first and gradually work up to the more difficult ones. (This is so you won't get discouraged by failure of germination.) Our own first experience was with three easy ones: Ebony Spleenwort *(Asplenium platyneuron)*, Japanese Painted Fern *(Athyrium iseanum pictum, syn. A. goeringianum p.)*, and Rusty-back Fern *(Ceterach officinarum)*, a British and European species. We had good germination and the fernlets transplanted well, grew on well, and flourished in the garden, especially the Japanese Painted Fern, a good grower, colorful and hardy. *Don't* try any of the Grape Ferns or Rattlesnake Fern — there is something very tricky in their germination which is impossible to accomplish in containers. (Having said that, before this gets into print, somebody will no doubt come up with a sure-fire method.) While there are others that are difficult, most are easy. These three will get you off to a good start; you will be encouraged to try others. And any excess plants you may have will be welcomed at a seedling sale.

There are many other methods of growing ferns from spores, using such things as wet bricks, sterile water in jars, wetted Jiffy-7 peat pellets, wetted paper towels, almost anything that can be kept uniformly and constantly moist. These are discussed in the selected publications listed below. We have not tried them as yet, finding the foregoing method easy and successful.

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LINNAEA BOREALIS

H. LINCOLN FOSTER
Falls Village, Conn.

Jan Frederik Gronovius, an eminent early botanist, dedicated the European Twinflower, *Linnaea borealis*, to the revered Linnaeus, who was especially fond of this sweetly scented little creeper. The type species is found widely in northern Eurasia and Alaska where it overlaps variety *americana*. This American variety has its own extensive range, running in the west from Alaska to northern California and in the east from Greenland south to the mountains of West Virginia. Within this extensive range it tends to be rare because of its preference for cool, acid sites, common only in some northern woodlands and upland peat beds, where it may form large flat carpets, rambling over fallen logs and stumps, weaving among such plants as Bunchberry, Snowberry, Wineleaf Cinquefoil and Lingenberry.

The thin woody runners, downy with fine hairs, are thickly set with opposite, rounded oval leaves with shallow crenations and short petioles. These evergreen leaves are frequently russet tinged on the upper surface, much paler green beneath, beset on both surfaces with scattered hairs. The trailing stems advance rapidly in congenial sites, branching and rooting down as they progress.

At periodic intervals along the woody runners arise short erect shoots with overlapping leaves from the tip of which spring the flowering stems in June. The flowering stem or peduncle, about two inches tall, is very thin and wiry, dark green above, tinted with madder in the basal portion. At the summit the peduncle divides into two divergent pedicels, each bearing a delicate nodding flower, strongly almond scented. The plant belongs in the Honeysuckle Family, the Caprifoliaceae.

These blossoms, rather long lasting and densely arranged on a mature established carpet dance in an elfin way, moved by the slightest breeze on their filiform stems. Occasionally more than two divergent blossoms to a stem are reported, but the very name, Twinflower, tells us that two is the usual pattern. The pair of flowers, held elegantly apart yet on one plane are beautiful *en masse* but are so nobly proportioned and so handsomely shaped as to demand close inspection. They are narrowly flaring bells, less tubby and longer in the American variety than in the European species, up to fifteen millimeters in var. *americana*. There are five equal lobes at the mouth of the bell and a small five-parted calyx at the base, below which is a small bristly ovary clasped in two bracts. The fleshy corolla has an alabaster white base all splashed and streaked with pink on its outer surface, more deeply dotted and flecked with reddish pink within, intensified by an interior fringing of pink hairs. The center of the flower is graced with a slender white pistil and four unequal stamens, whose filaments are white and anthers very pale yellow.

The three parted ovary becomes a fuzzy brown ball as it matures the solitary seed.

To propagate this woodland elf one

Linnaea borealis var. americana

need not rely on the few seeds. It is more rapid and far surer to take off rooted runners, or to make cuttings of the short erect sterile shoots or tips of the runners. Cuttings, especially if taken early in the growing season, root rapidly and may be potted up to be held in a frame or alpine house for setting out the following spring. If given a shady situation in moist acid peaty soil, in three years there should be a spacious rug well set in June with the sweetly fragrant, dancing twin bells.

Ralph Waldo Emerson made his own commemoration of the twinflower and the man to whom it was dedicated:

"He saw beneath dim aisles,
in odorous beds,
The slight Linnaea hang its
twin-born heads,
And blessed the monument of
the man of flowers,
Which breathes his sweet fame
through northern bowers."

Emerson was, I fear, a better essayist than poet.

THE MOVING OF A GARDEN

RICHARD REDFIELD
Scotland, Conn.

In the Spring 1977 issue of the Bulletin I described some of our experiences covering a quarter of a century in two gardens. Now, with the idea in mind that it may be helpful to prospective garden movers, I will try to elaborate on some of the actual mechanics of the move from New Jersey to Connecticut, with attendant problems.

The site that we selected for our major gardening effort slopes moderately down to a small stream, with some swampy ground on either side of the stream. At the beginning of the site the exposure is southerly, then the slope curves gradually to provide southwesterly and, finally, full westerly exposure. The ground on the opposite side of the stream slopes upward again to provide an easterly exposure. This area is rather heavily wooded with fair sized trees, mostly Red Maple, Sugar Maple and Black Cherry, with some willow along the stream and White Pine up the slope, planted about twenty-five years ago. The open portion of the garden site was well carpeted with weed grasses, merging into a dense stand of sumac, with the usual interlacing of roots. The soil is typical of this part of Connecticut, i.e., stony, from pea sized pebbles to man sized boulders. Altogether, it was quite apparent that we were faced with a difficult job.

No doubt, the proper way to handle this job would have been to determine the size of the garden in advance, have the entire area cleared and then bring in machines to prepare the soil prior to planting anything. Several factors argued against this method, however. In the first place we simply could not determine, in advance, the size of the area we would eventually want to plant. Secondly, we wanted to start planting conifers and shrubs immediately and, finally we have an aversion to bulldozers, backhoes, etc. and we wanted to disturb the natural soil as little as possible. This, of course, meant that all of the clearing and grubbing out of roots would have to be done by hand.

We had acquired our Connecticut property in October 1971 and so were able to move only a few plants that autumn. In the spring of 1972 the moving operation began in earnest but even then, since we were still working, our trips were restricted to weekends. Enough plants would be dug in the evenings during the week to fill the station wagon so as not to waste any cargo space, but not so many that we could not get them safely planted in their new home on the weekend. Conifers and rhododendrons were the first priority.

Initially, individual holes were cut in the sod, just large enough to accommodate the plant comfortably and then these were mulched with wood chips. Later in the spring and early summer, when growth had progressed to the point where we considered it too risky to move the plants, time was spent in clearing the sod from among the individual plants. This area was then mulched with coarse gravel, which was available locally, and provided space for some of the smaller rock

garden plants, at least temporarily. The effort involved in moving a medium sized specimen of *Rhododendron x* 'Scintillation', although successful, very quickly convinced us that we were too old to struggle with the larger plants and so we arranged to give these plants to the Skylands Botanical Garden. Since we were moving to an area where winter temperatures averaged about ten degrees lower and damaging frosts were likely to occur later in the spring and earlier in the autumn, decisions also had to be made as to the probable hardiness of certain plants, particularly rhododendrons. Species and hybrids that had been borderline in New Jersey would almost certainly be hopeless in Connecticut and so no time and effort were wasted on such plants. Time enough to experiment when we had become settled in the new location.

From late August 1972 through September and October until frozen ground prevented, plants were moved each weekend and accorded the same treatment, simply planted through the rough grass and, when the open space was filled, amongst the sumac. The same procedure was followed during the spring, summer and autumn of 1973, although on a more intensive scale, since I had taken two months leave of absence in the spring and another month in the autumn. Full retirement came on December 31, 1973 and, along with that blessed event, the opportunity to spend almost full time on the moving project during the seasons of 1974 and 1975. Happily, all of these years were relatively wet and I cannot think of a single plant that was lost through lack of moisture.

At some point during one of these seasons a small rock garden was constructed beside steps leading down to the stream, since we needed some place to accommodate the alpines and other small plants that could not be subjected to the rough treatment accorded the larger plants. Nothing could be planted near the house, since we had planned complete reconstruction. This project was finally completed in the winter of 1976 and by March 1 of that year we had disposed of the New Jersey property and taken up full time residence in Connecticut. Now, almost two years later and with two full growing seasons behind us, we have been able to clear most of the area surrounding the plants and are in a better position to evaluate our successes and failures.

The conifers, with very few exceptions, are thriving happily in their new home. Two plants of *Pinus mugho*, one out of six *Picea glauca* 'Conica' and two of the dwarf forms of *Pinus sylvestris* were lost in the transplanting. Two *Chamaecyparis obtusa*, which survived the transplanting, succumbed after the first winter, apparently unable to withstand the exposed location in which they were placed. Others of this species, in more protected spots, have survived. Altogether we now have approximately one hundred individual conifers, the majority of them dwarf or slow growing forms. To be sure, most of them are young plants, but this simply means that we shall have the pleasure of watching them grow into the characteristic forms that make them so interesting.

As far as the rhododendrons are concerned, it appears that more time will be needed to form any conclusive opinions. Some of the dwarf species are showing improvement but others are having difficulty in carrying buds through the winter.

The woodland plants, both native and exotic, are doing well. *Jeffersonia dubia*, one of our particular favorites and one that was very successful in New

Jersey, is doing equally well in Connecticut, already self-sowing in considerable numbers. The double form of *Sanguinaria canadensis, Iris cristata* in several color forms, *Trillium luteum, T. hugeri, T. ozarkanum, T. nivale, T. catesbaei,* all of which were moderately successful in New Jersey, are well established. The double form of *Trillium grandiflorum* produced in excess of fifty flowers in 1977. *Adonis amurensis* is another plant that has increased substantially. Of course, most of these plants had simply been planted and then left undisturbed in the New Jersey garden. The move required that they be dug and so I "took the bull by the horns" in effect and divided them at the same time, but the response, in almost every instance, has been far beyond our expectations. Climbing Fern, *Lygodium palmatum*, is another case in point. We had grown this fern with modest success for some years, but the division at the time of transplanting has produced a remarkable increase in just two years.

The summer temperatures, particularly at night, are slightly cooler and less humid than in New Jersey and this seems to be helping some of the alpines. The encrusted saxifrages, which just barely struggled through the New Jersey summers, are much healthier and have produced good bloom. *Arenaria tetraquetra*, which has a reputation for being a shy bloomer in eastern gardens and which certainly lived up to that reputation in New Jersey, looks much healthier and bloomed well in 1977.

Altogether, this has been an exciting and rewarding, if somewhat exhausting, experience and we have no regrets for having given up the old garden. If we could change one factor in the whole move, it would be for it to have occurred when we were twenty years younger, with correspondingly greater physical resources.

Seeds Wanted

Mrs. William Mears of Anderson, Indiana, is very anxious to acquire seeds of *Penstemon lyallii* and hopes one of our members has a few he will be willing to send her.

THE FIRST THOUSAND DAYS OF A ROCK GARDEN

DR. A. B. BORKOVEC
Silver Spring, Maryland

A rock garden may be compared to a living organism that progresses through several developmental stages. In the first, what I would call an embryonic stage, it is more rock than a garden. This is the building stage in which inspiration is usually exceeded by perspiration, a stage suitable for theoretical discourses on soil permeability, acidity and alkalinity, water retention, and similar deep topics. True to form, I will spend some time on them, but the embryonic stage doesn't really count into my thousand days.

The next stage is the childhood or adolescence, a stage of mistakes and promise, always exciting and frequently disappointing. There is only one question that I propose to ask and answer in this connection: how long does this stage last? Here I come to the title of this article. My answer in a nice round figure is one thousand days. Now, this answer obviously needs some qualifications, but we will get to that later.

The next stage, adulthood, is of indefinite duration and almost infinite complexity. It also happens to be outside of the scope of this article. The final stage is a sad subject and I won't even give a name to it.

Now, after I have explained the mystery of my title, let us return to stage one.

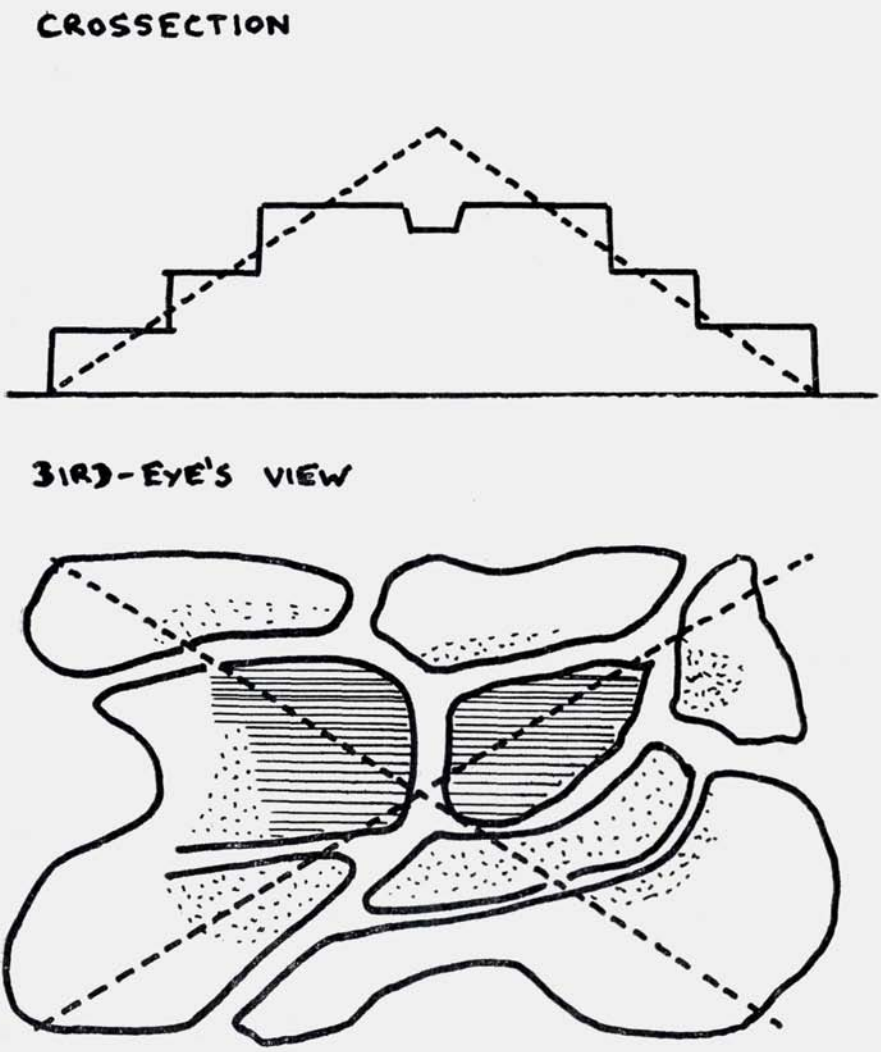
About four years ago, we and our cat (or should I say the cat and we?) moved from our house in the Maryland suburbs of Washington to another house, only a few miles away. In the process, I had to abandon a twelve-year old rock garden that I built in our tiny back yard and provided with some thousand species of plants. Since at that time I was already suffering from an advanced and apparently incurable stage of the RG-disease, and our new property was about five times as large as the old one, it was clear that there would be a new rock garden in the making the minute I took possession of the new house. The only questions were how long would it take and what would it cost.

On the new property, there was a fairly large and almost flat area that could be cleared of a few large oaks to provide me with about ten thousand square feet of sunny and part-shaded space. Excavation for a new addition to the house gave me some two hundred cubic yards of sterile Maryland clay and, unfortunately, hardly a single stone. I had two pairs of reasonably well preserved appendages, free weekends, several weeks of vacation, and a few hours every day, weather and my job permitting. The bank account was rather low at that time, and I soon abandoned all plans for hiring helpers, mechanical equipment, ordering truck-loads of Canadian tufa, or even Virginian weathered limestone. Nevertheless, I ultimately did get some fifty tons of dry-wall stone, sand, gravel, and crushed stone. In the meantime, mostly at nights, I did a lot of thinking and theorizing, and since

almost anyone who wants to start building a rock garden from scratch will encounter similar problems, I want to share with you some of the theories and their conversion to practice.

There are few but very important principles governing the construction of a rock garden in a climate as un-alpine as that of metropolitan Washington. First concerns soil and the associated problems such as drainage, water conservation, erosion, and the maintenance of acidity or alkalinity. Second is exposure to sun and to lesser extent exposure to prevailing winds. If I were a plant, and I suspect I may become

Fig. 1—The Pyramid Concept



one eventually, I would certainly consider these two of greatest importance. However, being a gardener, I necessarily introduce a whole complex of animalistic prejudices, i.e., esthetics, access, and the state of my pocketbook, not always in that order. Clearly, some compromise is needed. The variations are endless, but in my case, the mountain of soil in my back yard led me to narrowing them down to what I call the pyramid concept shown in Fig. 1. The basic idea of a pyramid with its four sides facing north, east, south, and west, is the maximum availability of different exposures, highest degree of drainage, and isolation of the root system of large trees that happen to stand nearby from that of the future occupants of the rock garden. On the other hand, a pyramid looks, well, like a pyramid, which poses an esthetic problem. My solution, shown with the solid line in the cross section and more clearly in the bird-eye's view in Fig. 1, was to cut off the top of the pyramid, and to break up the resulting plane by a path that descended curvaciously to the base. As every Egyptologist knows, pyramids are composed of steps. Translated into the garden concept, it meant a series of flat beds separated by paths that were carved into the pyramid so that no bed was at the foot level. In practice, the paths were surrounded with stone walls constructed rather loosely to create nooks and crevices for trailing and tufted plants. All straight lines and any geometrical regularity were strictly avoided.

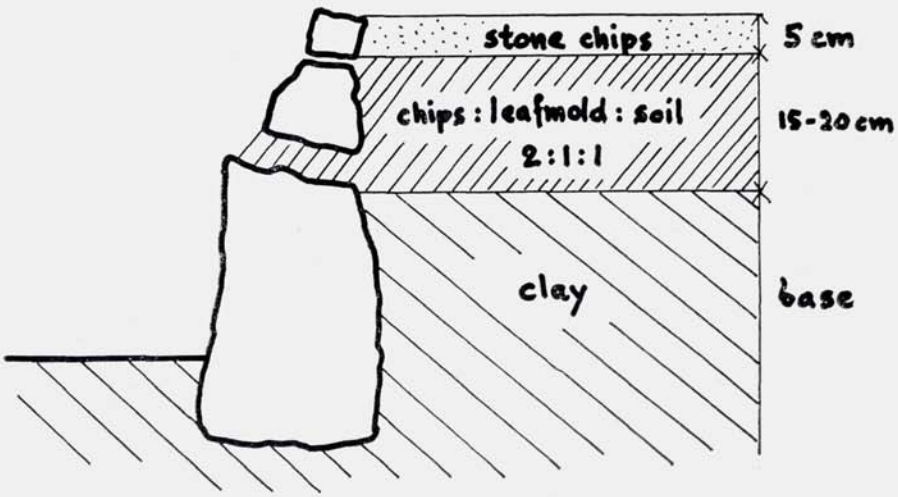
Actually, no flower bed was entirely flat, but the general construction had to be derived from and based on the initial pile of clay. As a result, the beds were essentially step-like projections emanating from the b a s i c pyramid. A cross section of a typical bed is shown in Fig. 2. After the wall of the bed was erected, the base clay layer was covered with about an eight to twelve-inch layer of specially prepared soil mixture consisting of crushed stone, leafmold, and soil (2:1:1), and topped with some two inches of mulch. Organic mulch of any kind was greatly admired by squirrels, racoons, slugs, and other mortal enemies of the rock garden. Gravel, i.e., rounded quartz pebbles, is pretty but much less effective than crushed stone, which in our area happens to be serpentine, a neutral mineral easily available and referred to as bluestone. I should note here, that another type of local bluestone is limestone, which is alkaline and has to be used with that understanding. No attempt was made to regulate the natural acidity of the clay base, but the middle layer in some beds was enriched with peat moss for achieving acidic conditions, while in other beds crushed limestone (the other bluestone) was substituted in both upper layers for the crushed serpentine to create moderate basicity.

Intimately connected with the soil structure is the question of water. The statement "perfect drainage and constant moisture" is well known to all readers of books on rock gardens. To provide perfect drainage in a raised bed is easy enough, but the moisture requirements converted to practical terms (in our area) means at least a gallon of water per square foot every other day. Unless you have a river flowing through your property, and plenty of time, this kind of watering procedure becomes prohibitive and calls for another compromise. The greatest advantage of the bottom clay layer in a pyramid is moisture retention, but not all plants will sink their roots one foot deep, and the fine hair roots of many choice plants located just a few

inches below the surface seldom withstand drying out. In our climate with periodic droughts in the spring and summer, watering is essential and only its frequency can be subject to management. Generally, water conservation increases with the content of humus in the middle layer of the model bed, but there is a limit to this practice. High-humus soil becomes soggy — and deadly for many plants — during prolonged wet periods, particularly when they are combined with high heat and humidity. I have no magic formula for the best compromise but the one part loam: one part humus: two parts crushed stone (or very sharp sand) formula is acceptable for many plants and locations; it retains moisture for several days even in the dog-days of summer.

One possible, although somewhat

Fig. 2—Soil Structure



limited solution to the watering problem is what may be called a semi-bog. Construction is simple. Dig a hole in the ground one foot deep and surround it with a one-foot high wall. Line the entire cavity with several layers of strong polyethylene sheet,* fill the pool with water (it must be water-tight), and suspend in the water a mixture of peat moss, decayed wood, and sand — no soil yet. Increase the height of the wall by another foot and fill the resulting cavity with the familiar mixture of soil, humus, and crushed stone. Finally, cover the entire bed with some mulching material, and you have a semi-bog. Mine is in part shade and requires no watering whatever. Ferns, primroses, and many other plants like this situation very much, however, my experience is still too limited for more specific recommendations.

To sum up, it took me about a year to finish the basic construction of the rock garden. I hesitate converting it into man-hours, but it must have

been well over five hundred. So much for the embryonic stage. The following three years, more or less one thousand days, were devoted largely to planting and to all the work associated with raising new plants. These were the childhood days of the rock garden in which a pile of stones was transformed into a garden.

**An excellent suggestion made in the March issue of the* Monthly Bulletin *of the* Alpine Garden Club of British Columbia, *Vol. 21, No. 3, is to line the hole for a pool or bog with a one-inch layer of newspaper before the plastic sheet is laid down. This helps to prevent holes being punched in the plastic sheet by small stones or other sharp objects. Another one-inch layer of newspaper over the plastic sheet before adding soil (or gravel) will prevent punctures from above. — Ed.*

Dr. Ira N. Gabrielson

Dr. Ira N. Gabrielson, a long time member and active supporter of the ARGS, died at age 87 in September, 1977. He was a director of the American Rock Garden Society for many years, becoming a vice-president in 1944 and president of the Society in 1946, serving for two years. He wrote articles for the Bulletin in its early years.

Dr. Gabrielson was the co-author of six books and the author of four, among them *Western American Alpines*, published in 1932, now a collectors' item among knowledgeable rock gardeners. In his garden in Oakton, Va. he grew over one hundred and eighty species of native wildflowers.

Born in Iowa, Dr. Gabrielson is perhaps best known for his work in conservation. In 1915 he joined the old federal Bureau of Biology Survey, forerunner of today's U.S. Fish and Wildlife Service, in which he spent the next twenty years doing basic ecological research in the field, mostly in the West. In 1935 he became chief of the Bureau and in 1940 was named the first director of the U.S. Fish and Wildlife Service. In this position he was largely responsible for adding millions of acres to the National Wildlife Refuge Systems or what he called "duck hotels." In 1946 he resigned from government service to become the head of the Wildlife Management Institute in Washington, D.C. serving in this capacity for twenty-four years.

Dr. Gabrielson helped found the International Union for Conservation of Nature and Natural Resources. He was a guiding force behind the American branch of the World Wildlife Fund and was instrumental in starting the Patuxent Wildlife Research Center in 1936. In his honor the Wildlife Management Institute has created the Ira N. Gabrielson Memorial Fund to support fellowships for scientists engaged in wildlife ecology.

The Contribution of Carl English

WALTER L. LYON
Seattle, Washington

Mr. English was a graduate of Washington State University with a Bachchelor of Science degree in Botany. He began work at the Locks in 1931 and worked there until he retired in 1974. He was placed in charge of the gardens in 1940.

The Hiram M. Chittenden Locks were built by the U.S. Army Corps of Engineers and were opened in 1916. The basic design of the grounds was established and plantings of trees and shrubs were made at that time. Many of the original plants were donated by the Seattle Parks Department. The large maples and the row of poplars, which stood along the front fence until removed a few years ago, were of this original planting.

From the time he was placed in charge, Carl began to replace some of the less desirable plants with plants he had grown from seed. He collected seeds of native plants throughout the western part of the United States. He always managed to take his vacation when the seeds were ripe. He supplied seeds of some plants to at least one nursery seed dealer, and he exchanged seeds with many botanical gardens and arboretums. And from these seeds, collected and acquired by trade, he grew most of the plants which are to be seen in the garden today. The amount of money spent on plants was very small. In going back through the files I found one invoice of plants purchased from the W. B. Clarke Nursery of San Jose, and I remember that in 1956 he purchased six Aristata Pines from the Richmond Nurseries. Some plants were donated by his friends for use at the Locks. Also, he obtained some from the University of Washington Arboretum and the National Arboretum. So you see, these gardens cost the Corps very little aside from the wages of the gardeners who cared for them.

I think his greatest contribution was in showing the great diversity of plant material which may be grown successfully here in the Puget Sound Region. He seemed to know intuitively just where a plant would be most likely to succeed. Of course this wasn't just intuition, but a good knowledge of the plant's natural habitat. And considering the poor growing conditions at the Locks, I think it is amazing that he was able to establish so many beautiful plants and to maintain them so well. Drainage is very poor over most of the area. The lower part of the gardens was filled by dredging from the ship canal when the locks were built. Most top soil was scraped from the upper end during the grading operation at the same time. Consequently those plants which require sharp drainage are often impossible to get established.

A case in point is *Pinus balfouriana,* which was one of Carl's favorite trees. He collected some seed of it in 1956, but was never able to get any to grow at the Locks. He gave me some of that same batch of seed, and because of better growing conditions, I was able to grow about a hundred trees. We tried some of these in various situations around the grounds, and were

never able to get them through the first season. Since Carl's retirement we revamped a small planting area at the upper end of the grounds. We dug out the soil to a depth of two to three feet, installed drain tile, and backfilled with a soil which would drain easily. We replanted the area mostly with *Pinus aristata* and included the last *P. balfouriana* which I had from that group. It is going into the second growing season still looking good, but of course I won't uncross my fingers for two or three years yet.

Most gardeners have some favorite plants, and I would like to mention a few of those which I know Carl admired greatly. Actually, he was interested in any plant. A few years ago we had a strange one volunteer in a geranium bed just east of the administration building. Carl examined it and said, "Looks like some species of *Datura*". I said, "To me it looks like a Jimson Weed." He wanted to see what the flowers and fruit looked like, so we left it. We still get a good crop of them in that bed every year, even though we haven't let it go to seed since.

Carl always admired x *Aesculus carnea*, var. *Briotii* and thought it would make a beautiful street tree. There are two sizeable trees planted on the corner in front of the administration building which are probably 30 years old. From these he obtained scions to graft on the horse-chestnut seedlings which volunteered about the grounds. With these young trees we have been replacing the old maples *(Acer platanoides* and *A. pseudoplatanus)* along the drive into the grounds. Each winter for several years we have been replacing two or three of these. Another horse-chestnut which is very attractive is *A. californica*. Generally it makes several trunks, and the light grey bark is especially noticed during the winter months. There are three nice specimens along the drive around the upper end of the grounds.

Carl was fond of so many plants. I don't know if there was one genus he favored over all others, but if there was, I suspect it must have been the oaks. There are several species in the garden, most of them grown from seed which he collected. It is a little surprising to me that the evergreen oaks of California and the Southwest have done so well here in a climate so different from their native home. Carl was especially proud of those.

Carl English *Chittendon Locks*

He was also very proud of two unrelated California natives which stand against the south wall of the machine shop. *Dendromecon harfordii*, a shrubby member of the poppy family with bright yellow flowers is one. The other is *Ceanothus thyrsiflorus*, which is loaded with striking pale blue flowers in the spring.

Another California native Carl greatly admired is *Carpenteria californica*. There is a nice specimen of this against the south wall of the public restroom building. In the same bed are good specimens of *Prunus mume* and *Quercus hypoleucoides*.

Carl was particularly fond of large leaves. There is a nice planting of *Peltiphyllum peltatum* on the south edge of the group of trees in the center of the lawn which borders the walk from the main gate to the administration building. This, too, he collected. When I first came to the Locks, there were two species of Gunnera growing in that same area. Unfortunately, they both succumbed to one of our cold winters a few years back.

Metasequoia glyptostroboides has been well publicized. Carl was able to get some of the first seed which came to this country, and there are several trees in the grounds. One very attractive specimen is on the corner directly west of the entrance to the administration building.

I'd like to mention two or three of my own favorites from Carl's garden. One is the *Ginkgo biloba* at the north corner of the new visitors' center. *Vitis cognetiae* climbs through the branches of it. In the fall the Ginkgo turns a beautiful, clear yellow, and the large leaves of the grape are brilliant red. Then there is *Hamamelis japonica*, var. *arborea*, which is against the west wall of the building just south of the greenhouse. And in the border against the north fence toward the upper end of the grounds, there is *Photinia beauverdiana*, a large deciduous shrub which has fall color as nice as any I have seen. It colors very late, after most of the other colored leaves have fallen.

Actually, these gardens are about all that is left of Carl. He spent all of his working hours here for most of his adult life, over forty-three years. He graduated from the university at the beginning of the depression, and probably his thriftiness resulted from the struggle to earn a living and make a place for himself in the horticultural world during those lean years. He believed that you could solve most problems with some hard work rather than spending a lot of the taxpayers' money. I know that Carl thoroughly enjoyed all those years of hard work. I know too that his wife, Edith, was a great help to him during those years. She was a botanist, a gardener, a very good photographer and teacher. I first became acquainted with Carl when I enrolled in one of her evening botany classes. I feel very fortunate to have known them both.

Keeping records of your plants and seeds, such as their provenance, when sown, date of germination, when transplanted, etc., can be very important. Writing this information on a piece of masking tape with a permanent waterproof marking pen and sticking it to the pot or seed pan is an excellent, easy way of doing this; much cheaper than using labels, even split labels, and with less likelihood of losing or mixing up the information due to the mysterious disappearance of the label or its transferrence into the wrong pot. —D. DeV.

THE BALDWIN DWARFS

JOEL W. SPINGARN
Baldwin, N.Y.

Natural dwarf conifers originate in three ways. Many gardeners have heard the expression "witches broom," but for those who might not be familiar with the expression, it is a curious conglomeration of dwarf branchlets on a normal tree. These may be only a few inches thick or sometimes two or three feet. Such growths are thought to originate from some irritation in the tissues of the branches or buds, possibly caused by insects, fungus or a virus but the exact cause is not known. These dwarf branches can sometimes be propagated by cuttings or grafts to start a new dwarf conifer.

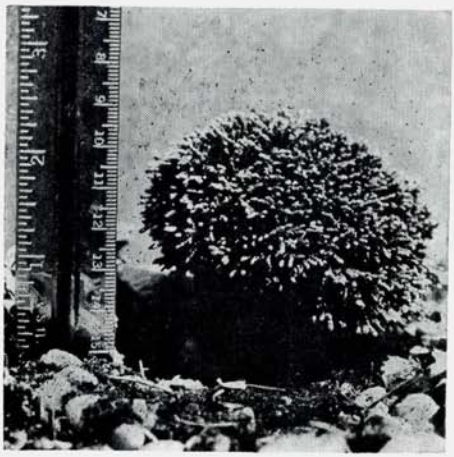
The second way a dwarf conifer may originate is through a circumstance of its environment. These are called climatic dwarfs. Trees, which grow upright at low altitudes may become genetically fixed as dwarf shrubs after being buffeted by the elements for generations at high altitudes. These trees often retain their dwarf stature when brought down to a lower altitude.

The majority of dwarf conifers originate from seed of normal sized trees. It is a natural tendency for some species to produce quite a lot of variation in the seedling population. Usually the variation consists of only a slight difference in color, habit or foliage but occasionally a seedling will depart drastically and bear very little resemblance to its parents. These odd trees are most frequently propagated by cuttings or grafts. If they bear fertile seed, which is quite unusual, the seedlings almost invariably revert to type.

About sixty years ago the Red Lodge Nursery in England found a few cones on an old plant of *Chamaecyparis obtusa* 'Nana Gracilis', commonly known as the Dwarf Hinoki Cypress. The seed not only proved viable but resulted in a series of dwarf plants measuring just a few inches to a foot high. The resulting varieties, 'Minima' and 'Caespitosa', were at that time possibly the dwarfest conifers that had originated in cultivation in the northern hemisphere. Unfortunately, however, the most desirable and dwarfest plants of the group proved to be not hardy in this area (zone 7) and were, to me, quite a disappointment. *C. o.* 'Minima', 'Caespitosa', 'Juniperoides' and 'Juniperoides Compacta' cannot be grown in the open on Long Island, N.Y., without severe winter burn. Occasionally a microclimate can be found in the garden where one of these forms survives, but in a bad winter, cold winds and bright sun often damage them severely so they are best grown in an alpine house or in pots that can be plunged in cold frames during the winter.

In the year 1966 a possible combination of climatic elements caused the initiation of cones on a number of dwarf conifers in Baldwin, Long Island. The plants that yielded seed were *Chamaecyparis obtusa* 'Nana Gracilis', 'Gracilis Aurea', 'Lycopodioides' and *Chamaecyparis lawsoniana* 'Aurea Rogersii'. Some of this seed proved viable, notably that of *C. o.* 'Nana Gracilis' and 'Gracilis Aurea'. A quantity of the seed was sent to various plantsmen and arboreta but only Alfred

Fordham of the Arnold Arboretum in Boston, Mass., reported raising some plants; however, I do not believe any of these seedlings have been brought into cultivation.



C.obtusa 'Pixie'—10 yrs. old *Spingarn*

Of the seed I sowed, quite a number of seedlings resulted. During the first four years undesirable and rank growing forms were culled out, leaving a total of forty-one seedlings in 1971. Seven of these were twelve or more inches high. About a dozen were between five and eight inches high and the remaining plants one and a half to four inches high. All of these are growing in a sandy, acid soil with good drainage.

Some of these seedlings have proved to be quite handsome and excellent plants for use in troughs and rock gardens. They vary in texture, color and growth rate but all are very diminutive and, what is really important, they are hardy in this area of little snow cover, with winter temperatures down to 10°F. fairly frequently and rarely to 0°F. Summer temperatures often rise above 90°F. and have exceeded 100°F. for brief periods. I feel they make good replacements for the Rogers seedlings. As a result, I have named nine of these seedlings that have proved outstanding in some manner.

From the seed of *C.o.* 'Nana Gracilis', five plants were named as varieties: 'Gnome' and 'Pixie' being the most diminutive and of a very dark green color. In outline, 'Pixie' is a flattened globe and 'Gnome' more ball shaped. The variety 'Elf', also very slow in growth, is developing a pointed top and will probably become pyramidal in shape. The variety 'Leprechaun', a bit stronger growing and dark green in color, is ball shaped.

The last of this group, *C. o.* 'Golden Fairy', has developed into an exquisite dwarf golden pyramid.

Of the plants raised from seed of *Chamaecyparis obtusa* 'Gracilis Aurea', the following were named. The first, 'Golden Sprite', I consider to be the most outstanding of the entire group. A beautiful golden globe, of very small stature, and probably the first *golden* golf ball type in cultivation. The second,

C.obtusa 'Golden Fairy'—10 yrs. old *Spingarn*

'Golden Filament', is, as the name implies, a diminutive golden filiform type, somewhat spreading. 'Golden Nymph', another thickly matted golden dwarf, is somewhat round in outline, and the last variety, 'Dainty Doll', is a green form, irregular in outline, that has recently developed a leader.

It is interesting that since this occurrence two other individuals have collected seed of *Chamaecyparis obtusa* 'Nana Gracilis' and have produced some dwarfs. In addition, Alfred Fordham has collected cones from witches brooms of some pines, *Pinus strobus* and *Pinus banksiana* and possibly others, which have produced some excellent dwarf conifers. Apparently the setting of viable seed on dwarf conifers, although rare, happens more frequently than once believed.

May I suggest that those who have mature dwarf conifers examine their plants in September and October for cones. It might lead to some exciting discoveries.

NEW OFFICERS AND DIRECTORS

Vice-president: Robert L. Means

Bob Means is a member of both the New England and Connecticut Chapters and is currently a member of the finance committee of ARGS. He is a board member of the Northeast Rose Society and an active worker in the Massachusetts Horticultural Society. A professional fund raiser, he heads the Northeast Chapter of the National Society of Fund Raisers. He is a graduate of Harvard University.

Bob and Joan Means have been members of ARGS since 1972 and have attended all the national and regional meetings since that time. They work as a team in varied gardening interests and last year the Massachusetts Horticultural Society gave them a Special Award for variety of specimens grown.

Secretary: Donald M. Peach

Don is a member of the Illinois-Wisconsin Chapter and has served as vice-chairman and chapter chairman of this group. He is a member of the ARGS board of directors and has served on several ARGS committees.

Don is managing editor of a publishing firm which publishes five agriculturally oriented national magazines. He is a graduate of the University of Illinois.

Former president of the Men's Garden Club of Kirkwood, Missouri, he joined ARGS in 1972 and has attended all the national and regional meetings of ARGS since. His gardening activities include a small rock garden and a small woodland wildflower garden. His wife, Georgia, manages a floral shop for a large Milwaukee hospital.

Directors, three year term:

Elizabeth Corning (Betty) is nationally known for her organizational abilities in women's garden clubs and was largely responsible for the highly successful Winter Study Weekend at Albany, N.Y. in 1977.

John Kovalchik was a staunch member of the team that put together the successful Pittsburg Annual Meeting in 1976. He and his co-workers of the Allegheny Chapter have done much to promote rock gardening through their plant sales.

Charlotte Ray, a member of the Delaware Valley Chapter since 1972, has been active in nursery and greenhouse businesses, besides building her own rock garden.

Award of Merit Winners — 1978

Since 1965 the American Rock Garden Society has presented Awards of Merit to members of the Society who have made outstanding contributions to the Society or to rock and alpine gardening or both.

This year three Awards of Merit were presented at the 1978 Annual Meeting held in Stamford, Connecticut. They are as follows:

NORMAN C. DENO

If one were to go to that great computer in Washington, D.C. containing the personal statistics of all the adult citizens, in search of an individual with these qualifications: University PhD, engaged in organic and inorganic chemical research, must have been rock gardening since age eight, able to present evidence of success in growing and flowering a wide range of plant species considered by experts to be miffy in gardens, especially the choicest plants of the mountains and high plains of western North America, and who is willing to freely share the results of his plant research with the world, it is quite likely that on the computer readout would appear just one name: Norman C. Deno of Penn. State University.

One warning: a visit to Dr. Deno's garden in the middle of Pennsylvania is pretty sure to leave the ordinary rock gardener in a state of horticultural shock. The visitor may find growing in the side and front yards of coarse, yellow sand a dozen or more species of western phlox: *PP. nana, alyssifolia, andicola, longifolia,* and even one species which naturally grows in the stabilized sand dunes of northern Indiana, *Phlox bifida.* Among other difficult-to-tame plants, the visitor may see three or four eriogonum species, several townsendias, *Douglasia vitaliana, Leucocrinum montanum, Brevistyla acuta,* a large-flowered *Arenaria saxosa* from New Mexico, and growing healthily along with a Penstemon Society-seed list of plants, shrubby *Penstemon fruticosus.*

Choice European plants are at home in the Deno dunes too: *Acantholimon, Draba dedeana,* and flourishing and flowering better than any you are likely to find in the Alps — *Gentiana angustifolia* varieties of the *Gentiana acaulis* group.

So, for innovative research in growing so many rock garden plants which the "How To —" books omit, and for sharing the information with ARGS members in the on-going series of articles in the Bulletin, titled "How to Grow —", and for service to the Society

on various committees and currently as a Director, the American Rock Garden Society presents to Norman C. Deno this Award of Merit.

MADALENE MODIC

Back in 1937 when the American Rock Garden Society was still in its infancy, Madalene, while vacationing in Canada, first saw a well designed rock garden planted with choice material. Two years later the Modic family moved into their present home. The surroundings abounded in ideal settings for rock gardens, wall gardens and terraces. Using a copy of *The Rock Garden Primer* by Archie Thornton and with the able help of her husband, Rudy, and their two sons a program of landscape beautification was launched. Rocks were gathered from near and far. Stone walls were constructed to modify the acute grade in some areas and to provide level terraced beds in others. Tons of rocks were arranged on the slopes to provide a congenial home and to complement a wide selection of suitable plants.

Madalene first learned of the ARGS in 1955 and became a member without delay. She also joined other plant societies to increase her knowledge and to exchange seeds with members. Raised on a farm, common-sense growing practices were inherent and she soon became proficient at propagating, both vegetatively and from seeds. Only in this manner could she supply the needs of her ever expanding garden areas.

Though her first love among plants is alpines, her interest in growing things encompasses all: wildflowers and rhododendrons in one shady area, primulas predominate in another, hardy cactus on a sunny slope, perennial borders, and rows of cut flower material near the productive vegetable garden. The various areas are individualized yet beautifully blended into the overall scheme by selected plantings of evergreen and deciduous trees and shrubs.

In 1965 the few local members of the ARGS and anyone known to be mildly interested in rock gardening were invited to attend a meeting arranged by Mrs. Modic. The Allegheny Chapter was formed with Madalene serving as chairman until the group was well established.

Most of the local members and many visiting from other areas have been generously supplied with choice plants from her extensive propagating frames and from the gardens. Though she has no formal training in horticulture and floriculture, she possesses a knowledge of plants which gives that certainty of touch so essential to the successful gowing of a wide range of plants. This know-how, too, she has shared with many: through articles in the Chapter newsletter, the ARGS Bulletin, a regular column in *Ozark Gardens Magazine* for nine years, in various round-robins, and an extensive correspondence with plant lovers both here and abroad. She lectures extensively to interested groups and her gardens are never closed to individuals or parties.

Madalene Modic has a special place in the hearts of all who know her. It is fitting that she is honored by the Society in the presentation of its Award of Merit.

BRIAN O. MULLIGAN

Brian Mulligan's distinguished career in horticulture continues unabated today in his "retirement," as it did when he was director of the University of Washington Arboretum in Seattle. Brian is always the final authority on the identity of even the most obscure and uncommon plant, both in the wild and in the garden. Since his retirement in 1972, he has made notable contributions to the study and appreciation of cultivated plants. The locator catalog on the woody plants of the University of Washington Arboretum is a case in point. This work, published in 1977 *(Woody Plants in the University of Washington Arboretum)* is a careful, painstaking, and useful compilation of the woody plant treasure of that collection.

Brian is involved in many other plant-oriented activities these days. He still gives expert service to the Arboretum, is editor of the Newsletter *(Douglasia)* of the Washington Native Plant Society, and gives of his time and expert knowledge to many different horticultural ventures. But, of course, he is known to the rock garden clan all over the world for his many contributions to furthering the knowledge and pleasure of growing alpines and other rock garden subjects. Many have read his informative articles and enjoyed his superb black-and-white photos in the journals of rock gardening — our own Bulletin and the British journals. He has served on the board of directors and as vice-president of the ARGS, and was chairman of the Northwest Unit in 1963.

In the field, at rock garden plant sales and shows and at every meeting of the Northwest Chapter; one can count on Brian (and his charming, knowledgeable wife, Margaret) to add with their knowledge and plant-growing skill to produce the unusual for all to enjoy. Plants in all their variety are a Mulligan passion that he shares with others and thereby enriches all our lives.

The Mulligan history starts in 1907, when Brian O. Mulligan was born, near Belfast, Northern Ireland. By 1927 he had graduated from the Royal Horticultural Society's school of horticulture at Wisley, Surrey, England. From then on, he has pursued ornamental horticulture with zeal and skill to this moment. In 1946 he assumed responsibility for the new arboretum in Seattle, becoming the director of the University of Washington Arboretum the next year. He retired in 1972, with the title of Director Emeritus — and a very active and useful Emeritus he continues to be!

Brian's achievements as a plantsman have been acknowledged in many ways: through responsible affiliations with

horticultural organizations and by awards given him. He was appointed Vice President of the Royal Horticultural Society in 1974; he was a founding member of the Washington Native Plant Society, and is currently serving as a board member and editor for that Society. Brian's work in horticulture has been recognized both at home and abroad. In 1963 he was given a Gold Medal by the Massachusetts Horticultural Society. In 1964 he was presented with the Bronze Medal from the Seattle Garden Club for bringing International Recognition to the University of Washington Arboretum. In 1971 he was given the prestigious Veitch Memorial Gold Medal by the Royal Horticultural Society for service to horticulture. In 1971 he was given the Bronze Medal by the Seattle Chapter of the American Rhododendron Society — the highest award given by a chapter.

The ARGS Award of Merit to Brian O. Mulligan thus honors and recognizes with gratitude the distinguished services to horticulture in general and to rock garden plantsmanship in particular that he has so generously given over the years.

THE NATIVE ORCHIDS OF THE UNITED STATES AND CANADA
by Carlyle Luer. The New York Botanical Garden, 1975; Bronx, N.Y.

In this definitive work, Carlyle Luer deals in exquisite detail with the one hundred and eight species and varieties of orchids found in the United States and Canada. The orchids of Florida are examined in the companion volume, *The Native Orchids of Florida*. For the sake of completeness, twenty-five additional species which occur both in Florida and the other states are also included, as are the species of Alaska and Hawaii.

Luer provides keys of the genera, species and varieties. The key to the genera uses only characters found above the ground, therefore the plant does not need to be uprooted for identification. Luer also gives the original Greek or Latin spelling, along with the definition and/or derivation, of the genus and species name. Included with each species description is a list of synonyms, information regarding the flowering season, informative and interesting remarks, a map showing distribution and diagrams of the floral structure.

Besides being an excellent example of the art of the botanical monograph, this work also provides a photographic record of the North American orchids. These photographs are of the highest

technical quality and set new standards in the areas of scientific and field photography. For most species, there are photographs of the plant's habit and habitat and photomacrographs of the flower's structure and interesting color and foliage variations. Regular readers of our bulletin will recognize the photographs of F. W. Case, author of *Orchids of the Western Great Lakes* and recipient of our society's 1974 Edgar T. Wherry award.

The discussions of insect pollination and mycorrhizal symbiosis, as well as those on saprophytism among the orchids and the development of orchid floral specializations all indicate the advanced degree of evolutionary divergence by the orchids from the ancestral monocot stock. It is a sad comment on human beings that these most incredible examples of organic evolution are now threatened with extinction as a result of human activities. Perhaps this great work will help provide the impetus in preventing the day when books like those of Luer's are all that remain of the Orchidaceae.

Rufino Osorio

ANDROSACES

by D. George Smith and Duncan Lowe, The Alpine Garden Society, 1977; Woking, Surrey, England.

The third hard cover guide in the series published by the Alpine Garden Society is devoted to the Androsaces. It carries on superbly the high standard set by former publications in the series dealing with Daphnes and the Asiatic Primulas.

Androsaces, because most of them display the ultimate characteristics of the classic alpine plant, and because they do present a challenge in cultivation, are highly prized by devoted rock gardeners. Seeds of the species when offered in the seed exchanges of the various societies here and abroad are always in short supply (which itself says something of the challenge in their cultivation) and are inevitably oversubscribed (hinting at their universal desirability.)

The joint authors, Dr. George Smith and Duncan Lowe make an admirable team. The former is a lecturer in Chemistry at the University of Manchester, with a long-standing devotion to the alpine plants of Europe, the Balkans, and the Himalayas, to which regions he has made trips to study in their native haunts the choicest alpines, especially the androsaces.

The junior author, a Chartered Engineer is an ardent grower of alpine plants including all available androsaces, and is an accomplished artist whose many drawings illustrate this volume so handsomely. His line drawings of the species, plus the verbal deliniation of the species, make this work an indispensible guide for all rock gardeners.

This valuable catalog of the androsace species from all corners of the world runs from *A. albana* through such remote ones as *A. delavayi* to the recently introduced Himalayan *A. zambalensis* and includes all the more usual and the difficult aretians that make such a mark on the show benches. It also includes some close relatives, such as *Vitaliana primuliflora*, sometimes absorbed into *Androsace*, but not here, and with recent taxonomic authority *Douglasia*, which is absorbed here in *Androsace*.

To further illustrate the variety and beauty of the genus plus some notion of natural habitat, there is a section devoted to thirty-five black and white photographs — mostly of high quality — depicting chiefly those species sel-

dom seen in cultivation. How one's mouth waters at the close-up shots of *Androsace muscoides*, *A. tapete* and *A. delavayi*, tight furry cushions studded with stemless flowers in their Himalayan haunts.

Aside from the valuable guide to the different species based on field studies and careful reading of the technical literature, this work does pack into ten pages near the front of the book fairly straight-forward advice on cultivation and propagation of androsaces. This information is founded on the author's own considerable experience and in consultation with expert growers in England and Scotland, most of whose names in the acknowledgements are familiar to anyone reading the show reports. This is expert advice, but we must remember that here in America, especially on the east coast and in mid-continent, conditions are very different. I hope that someday we may have an American counterpart of this work.

There is the statement, for instance, on page seven: "It is probably true to state that all androsaces known to cultivation can be grown and flowered in the open garden." This is followed, to be sure, by advice about overhead winter protection for the more difficult species, and a warning about perfect drainage for all. Even with such precautions and with careful imitation of suggested soil mixes, it is doubtful that those of us who are deviled by the "summer muggs" will ever have the high mountain androsaces flourishing in "the open garden." Yet we can learn a great deal about their successful culture in raised beds or in pots by reading this work with care and inventive imagination.

American readers may be surprised at and may tend to reject the lumping of our *Douglasia* species into the genus *Androsace*, even though the authors always indicate in parentheses that the species discussed is in the Douglasia Section, something they do not do for species in other recognized sections. Their authority is quoted on page 31: "The section Douglasia has recently been included in the genus *Androsace* by Dr. P. Wendelbo of Bergen, who is followed in this by Dr. A. Kress of the Munich Botanic Garden. We are convinced by the evidence presented, which relates to the structure of the pollen and the floral parts, to chromosome studies, and the general habit of the species, and we therefore propose to follow Wendelbo in this Guide. We hope that most fellow amateurs will see the sense in this."

Yet it is interesting to note that the authors reject Wendelbo's and Kress's authority when it comes to the European *Douglasia vitaliana*, which Wendelbo would call *Androsace vitaliana*. They prefer to follow here Dr. I. K. Ferguson who, in Flora Europaea, has named the plant *Vitaliana primuliflora*.

There is persuasive evidence to justify maintaining old distinctions and familiar nomenclature, *or* in following Wendelbo and Kress, *or* even in looking forward to new studies when all of these diversities, along with *Dionysia*, are lumped into the genus *Primula*.

As gardeners, however, we welcome this Alpine Garden Society Guide on the Androsaces and congratulate G. F. Smith and D. B. Lowe on a work of obvious devotion, skill, and scholarly enterprise, and will probably continue, for a while at least, to refer to our *Douglasia laevigata* and *D. montana* and our *D. vitaliana* as Douglasias.

H. Lincoln Foster

MIGHT DOUGLASIAS BE ANDROSACES?

The demotion of the genus *Douglasia* by Wendelbo, supported in the recent Alpine Garden Society publication, *Androsaces,* is not likely to be looked upon with much favor in the western world at least, if only in that the name commemorates David Douglas, one of the foremost of early western botanical explorers.

As a genus, Douglasia was founded in 1827 by Lindley to accommodate Douglas's Canadian Rockies plant, which became the type for the genus, *Douglasia nivalis.* Further exploration in western North America brought the number of species to five, six with the annexation in 1873 of the European plant originally called *Primula vitaliana* by Linnaeus.

"*Douglasia* appears to be related to both *Primula* and to the perennial sections of Androsace," wrote Constance in his 1938 revision of the genus. He had undertaken this study in an attempt to establish some further distinctions of the floral characters for substantiation of the separation of Knuth's two sections, Eudouglasia and Gregoria. At this, however, he did not succeed, concluding that the yellow color was the sole constant factor dividing the European Gregoria from the American Eudouglasia, but it has been seen by subsequent workers as sufficient distinction for establishing Gregoria as a genus, and now *Douglasia* has been submerged while *Gregoria* (elevated to the generic *Vitaliana)* has been preserved according to the present authors. But there is nothing so certain as change, and tomorrow they may be all restored the way they were.

Although it is probably quite logical to classify these similar plants within *Androsace,* the generic distinctions not being very prominent ones in this aggregate of the primulaceous species, the point is, does such action lend any greater understanding to *Androsace,* to *Douglasia,* to *Vitaliana,* or to the family Primulaceae? If not, then we should feel no faint twinge of conscience at our stubborn insistence in calling our American species *Douglasia.* Would it not be just as logical to further annex *Dionysia?*

Roy Davidson

• • • *of Cabbages and Kings* • • •

One of the problems with which I am faced as editor of the Bulletin is the swarm of plant names, botanical and colloquial, with which I am faced upon the arrival of every manuscript. Each name presents me with a number of decisions.

First, I must decide the orthographic form in which the names should appear. If it is a scientific name, I must be sure that the generic name starts with a capital letter and the specific name does not and that both are underlined so that the typographer will set them in italics. If there are more than two latinized words in a botanical name I must discover if these denote a botanical form or variant in which case they too must be italicized, as in *Aquilegia flabellata nana alba.* If, however, the additional name or names indicate a clone they must be set in roman type, enclosed in single quotes and start with capital letters, as in *Chamaecyparis pisifera* 'Squarrosa Dumosa.'

These decisions are not entirely mine to make, thank goodness. The rules

of taxonomic orthography are set forth in the International Code of Botanical Nomenclature, which also decrees that it is proper to capitalize (but use roman type) when writing the name of a plant family, thus: Liliaceae (Lily Family.) This to some extent simplifies the editor's life.

What, however, am I to do about colloquial names? Here I am more free to choose the orthographic style. The final decision is mine.

Not many years ago the pages of horticultural books and magazines were sprinkled with capital letters so that you read that a particular spray was "effective in the control of blight on Cucumbers and Melons" and was "useful for Tomato blight, too." Even such weeds as "Chickweed, Pussley and the Grasses" were raised to capitalized status along with Roses and Iris. Such capitalization is now out of fashion and probably rightly so and I use only lower case letters for these generalized plant names without a qualm. But how about the colloquial names of specific plants? These, too, no longer start with capital letters and you read about the "pinxter flower, climbing bittersweet, and blue cohosh." This I frequently find confusing. Is the author speaking of a particular plant or is he indicating that bittersweet climbs? Is he particularizing a plant or its color when he writes of blue cohosh? In order to try to clarify this kind of confusion I have opted, when a specific plant is being mentioned by its colloquial name, to use capitals for the initial letters as in Pink Lady's-slipper. But I waver, occasionally. Is the author growing "violets and Bluets" or "violets and bluets"? Do I italicize or capitalize any of the names when I am presented with a list of plants some called by their botanical and others by their colloquial epithets as in: "Among the rocks grew bellflowers, various thymes, saxifrage, armeria, and sempervivums."? I'm afraid I tend to slither back and forth over these matters and frequently forget my own policy.

Once I have slid rather tentatively over this hurdle of orthography, I am faced with another. Are the plant names spelled correctly? Dare I rely on the author's accuracy of spelling and typing or should I look them up? Some are completely unfamiliar. I have never, for instance, been on speaking, much less spelling, terms with either *Ugnadia speciousa* or *Houttuynia cordata* and chasing these down through the library shelves takes a while. Some are old friends, but even here I am frequently uncertain. I can never remember without looking it up whether alyssum is spelled with two l's or two s's or both. Is there one y in synthyris or two? Is there a y in cytisus, in cypripedium and is the latter spelled cypripedium or cyprepedium? Is it saxifrage or saxafrage? Alas, I must look them up.

But the real tight-rope is whether or not to check if the botanical name the author uses is the most current. Taxonomists have a nasty habit of revising botanical nomenclature with surprising frequency. Species and even genera are re-christened. Some taxonomists split, others lump and genera are absorbed into others and species are omniverously swallowed up. Most of this lumping, even from the point of view of hard-nosed horticulturists, seems to make sense and it does simplify the nomenclatural swarms that splitters had devised through their years of monographs and closet introspections; but still it is hard to learn new names in mid-stream and, if any of you have been following, in the pages of the Monthly Bulletin

of the Alpine Garden Club of British Columbia, the squabble over the absorption of our American douglasias into the genus *Androsace*, it is obvious that many horticulturists take a very dim view indeed of such lumping.

Such in-fighting is fun to watch from the side lines but it leaves the horticultural writer and the editor with a problem. Do we now refer to *Douglasia laevigata* as *Androsace laevigata* or continue to allow the old familiar name to appear in print in our pages? On the other hand, what should we call the European *Douglasia vitaliana*, which has been shunted back and forth from *Primula* to *Douglasia* to *Androsace* to *Gregoria* and is now resting somewhat uneasily under the name *Vitaliana primuliflora*. (See Book Reviews in this issue.)

But even if an editor wishes in all good faith to follow the latest nomenclature, how does he go about discovering what it is? For the latest names of European plants he can paw through the four volumes of *Flora Europaea*. Here is the latest taxonomic bible, the final flourish of a group of renowned scientists who wrangled for years to reach agreement and at last, perhaps to avoid prolonging the battle over species and even genera, had to agree before they all died and were forced to pass on their life-time notations to a new group of disputants. And their decision in most cases is to lump.

We, however, possess only the first three volumes of *Flora Europaea*, and though each volume contains an alphabetical index to the plants in that volume, including (in italics) their former names with a reference to page and section where they are described under their latest epithet, there is no general index for all three volumes, which is understandable. One must therefore know in advance in which volume to search as these are arranged, in the best botanical tradition, by Order and Family. Unfortunately, neither your editor nor her able assistant, to whom such matters as nomenclature are usually left, have had courses in systematic botany; we learned our plants and their names one by one as we met them and never inquired into their family backgrounds. Consequently a search for a particular name through the pages of our three volumes of *Flora Europaea* is, for us, a rather tortuous and prolonged one. And *Flora Europaea*, as its name implies, covers only the plants of Europe. What of the flora of the Americas, Asia, the Middle-East, Africa, Australia, and New Zealand? Our book-shelves do not house the books that would give us information on the plants of the world, not even of the temperate regions and the nearest botanical library is at least an hour and three-quarters away.

What to do? Should we engage a team of taxonomic experts to check each article? This seems a little extreme and certainly time-consuming even if we could find the experts who would be willing to so serve.

It is, indeed, a quandary of plant names.

More On Peat Blocks

Bernard Jackson, manager and naturalist of Oxen Pond Botanic Park in Newfoundland sends in the following remarks on peat blocks and peat beds, the subject of an article by Alfred Evans in Volume 35, Number 4 and by Ronald Beckwith's expression of concern that peat blocks might not be able to take our climate:

Here on the Avalon Peninsula of Newfoundland we suffer from a very erratic climate, one of our main prob-

lems being the continuous freezing and thawing temperatures during a considerable period of the year. In 1971 we built a trial wall of peat blocks and back-filled it with shredded peat. It was tucked away out of sight and was purely an experiment as I was concerned that such a wall would disintegrate under our climatic conditions. As far as I can determine, no noticeable deterioration of the blocks has yet occurred. *Cornus canadensis* from the adjacent woodland has completely covered the shredded peat backfill. We have now gone into peat beds more seriously but do not use the orthodox size of peat block because we feel (rightly or wrongly) that they would break too easily. Our blocks are approximately two feet long, fifteen inches wide and fifteen inches deep. We dig them ourselves and take them only from the surface of the bog to ensure a very fibrous block. They are placed into position whilst wet and any trimming of the blocks (for angles, etc.) is done with a sharp hunting knife. As we are primarily interested in the native species we are quite happy to leave (within reason) the bogland flora growing in the block they came in. Because of the shortage of available soil, we use a growing medium of approximately fifty-fifty shredded peat and coarse sand. We have incorporated some well decomposed leaf-mold into the top three inches. It is too early to say whether this mixture will be successful.

On the subject of unusual color forms, Mr. Jackson goes on to say: "I, like many others, have run into the white phase of a number of our native plants. I have a nice clump of white *Epilobium angustifolium* which is sometimes seen in the wild around here. This past season I was given the white Harebell, *Campanula rotundifolia* forma *albiflora*, and know of three wild sites. Occasionally, white *Rhododendron canadense* and *Kalmia angustifolia* are recorded in Newfoundland but I have not got them into the park yet. I did, however, collect a white *Kalmia polifolia* a couple of years back. A pink *Campanula rotundifolia* was reported to me this year and I photographed a dark pink *Cornus canadensis* some years ago."

Some Unexpected Joys

Mina Colvin of Nashville, Indiana writes in about some of the unexpected joys of gardening:

My baby pictures were taken amidst the wild and domestic flowers in the garden of my next-door aunt and uncle in east central Ilinois. Thus I seem to have aways known trillium, lady's-slippers and bluebells.

A move later in life to Brown County, Indiana, introduced me to *Phlox bifida* and eventually to my finding *P.b.* 'Starbrite.' *(Vol. 32, p. 184 —Ed.)* This brought great joy in itself, yet sharing a new and different plant with others was an experience I wish everyone could have; only then could you understand the elevated, right off the floor feelings I had in 1976 when I was chosen as one of the Plant Explorers for the Interim International Conference. I glowed from early May when I first heard about it, all through the July conference in Seattle and even into the cold of the next winter. In fact I doubt if that light ever goes out.

My sister-in-law, Norma, noticed this glow and decided to find out what caused it. She and my brother had recently moved to a wooded hill near us and she had become interested in gardening. As I edit the Great Lakes

Chapter Newsletter, I shared it with her along with a few plants from my garden she had admired — not too many, though, just enough to whet her appetite and keep her interested.

We were having the Spring, 1977, Chapter meeting in Brown County and this was a perfect opportunity to invite them to see how rock gardens were put together — Brown County style — and meet some of the people of whom I had spoken so highly. The Friday night before our meeting I had an informal get-together to relax our members from Michigan and this gave Norma and her husband, Paul, an idea of what was in store for them.

It had been raining that day but by the time we had supper and had seen everybody's slides it had quit and we all went out to look at the garden by flashlight. Actually this was a good idea as no one could tell which of the wet and droopy plants were weeds and which were flowers. The sempervivums and sedums, of which I am very fond, looked good in their spring colors.

Saturday dawned bright and beautiful. The Hendrickson garden was the first we visited and it is quite impressive to the novice — to the intermediate and old timer as well. It has been ten years since I went on my first garden tour but I enjoyed this one even more. To see a garden is great but to see the awakening joy in another's eyes is truly the greatest.

Our next stop was on a hill, a true Brown County ridge. Our hostess, Virginia Grabenhoffer, was truly the mostest as she suggested that we walk the trails and take whatever we found, even if it was an orchid. The fact that there were orchids here was good news to me as I hadn't been able to find any on our place. But I didn't go looking as I know orchids need more care than I am willing to give them and I had already taken pictures of a gorgeous clump of *Cypripedium parviflorum* on the ARGS trip to Door County, Wisconsin in 1973. So while the others walked the trails and dug their treasures from this Rebel Hill of the Grabenhoffers, I went around with our hostess and Norma to visit the ginseng beds, the outdoor fireplaces, and the heavenly view. I could see from Norma's eyes that she was mentally filling out filing cards of all the ideas and the wonderful plants we saw.

The next day at the Eastman garden on Greasy Creek Road, Norma seemed more relaxed as she wandered around and enjoyed this, her second day of enlightenment. I figured she might be more at her ease because she was seeing plants she could recognize, but maybe it was the well tended rose garden or the delicious looking rhubarb patch or the charming foot-bridge across the stream between the house and the roses. Whatever it was we all felt a pleasing sense of tranquility that made us all desire to linger a while. Here again was a generous gardener who gave of her plants as if there would be no more springs.

After the tour I had to hurry home to greet those who were planning to stop in and see my place. It had not been on the official tour for many reasons, the main one being that I am not yet proud enough of it to show it to visitors. Another was that our parking area was filled with wood chips delivered by the electric company's tree trimmers. Each load had looked better than the last until they completely filled the area.

After a meeting there is always a let down and no time to savor the memories while finding places for all the plants one has bought. The next day Norma called to say they had toured their hill and had found a plant

with a gorgeous yellow bloom. I had all kinds of questions and suggestions such as: "Did you get all the roots? — Plant it in conditions like those in which you found it." She explained that it had long green leaves and a cup-like flower, nothing like anything she had seen in any of the gardens we had visited. Finally I told her to calm down; I'd bring my wildflower book and come over even if it was pouring rain. When she and Paul met me at their open door and she pointed to her find, I didn't need a book to know it was a Yellow Lady's-slipper, *Cypripedium parviflorum*, in all its glory. Somehow it seemed to know it was the star of the area, showing off for its proud new owner. Since then it has been watched, displayed and glorified, much to its delight; even after blooming it is still the most outstanding plant in the bed.

Norma says, "You'll never know the joy I had in finding that orchid," and I keep saying, "Yes, I do know." But she doesn't really believe me. Yet there is one thing I do know: she has given me the unexpected joy of awakening a new gardener.

My Alpine House

Harold Siebert, who has a rock garden nursery in Stony Plain, Alberta, necessarily has a very large alpine house but members who are considering such an adjunct, might find some of his suggestions helpful in constructing a small one:

My alpine house brings me hours and hours of pleasure. It is twenty-six feet wide and a hundred long and built somewhat in the shape of a quonset hut. It is oriented so that the ends face north and south to take advantage of the light both summer and winter.

The lower portion of the walls (up to three feet) are constructed of a double layer of weatherproof plywood with three inches of fibre-glass insulation sandwiched between them. To the upper edge of these are fastened hoops of hollow, square tubing of galvanized cold rolled steel. This forms the framework that supports the double layer of polyethylene sheeting which covers most of the upper walls and roof of the alpine house.

The two ends of the house are of rigid construction, however. Four-by-four boards are fastened across the arc of the end hoops. The walls below these rafters contain the doors and openings for ventilation. The double layer of six-mill poly is fastened at the ends to these rafters, while the edges are secured at the sides to the top of the plywood walls. I use a special lathe called Poly-Zip for fastening down the plastic sheeting. This is a narrow track that is nailed to the surface to which the poly is to be fastened. The folded edge of the sheets are laid over this track and a plastic strip snaps into the track to hold the sheets firmly in place, thus forming an airtight seal. A small fan in one corner of the alpine house blows a stream of air between the two layers of poly to form an insulating air-cushion. This keeps the winter out.

Because polyethylene does deteriorate and I cannot afford to have punctures or air leaks, I put new sheets on the alpine house every year. This is a relatively simple operation with the Poly-Zip lathe fastenings.

My alpine house is heated by two overhead forced air furnaces each of 150,000 BTU's and they keep the temperature to a comparatively balmy 35°F. in winter even when the outside temperature dips to -56°F. or even lower. It gets cold in Alberta and we

have high winds. A small fifteen inch suction fan with a thermostatic control is set in the south wall to keep the air moving and the humidity down.

In summer it's a different story. With the thermometer racing upward 100°F., two large fans three feet in circumference set in the north end of the alpine house draw outside air in through the ventilation openings in the south end. Watering is then a daily task.

I cannot use cold frames outside because even a rather hardy plant, which would survive if planted directly in the ground, cannot take the extremes of temperature we experience here if its roots are confined in a pot. I raise all my plants in plastic pots: conifers, miniature roses, alpines, primulas and gentians, even pleiones, dwarf bulbs and sempervivums. These are all kept on raised benches of wood made of one-by six board spaced three-quarters of an inch apart to permit drainage and air circulation.

Last summer I added another alpine house of the same size. More work — yes — but also more pleasure from my gems.

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