



Phlox 'Chattahoochee'

Bulletin of the
American
Rock Garden Society

Vol. 33

Fall, 1975

No. 4

The Bulletin

Editor Emeritus

DR. EDGAR T. WHERRY, 41 W. Allen Lane, Philadelphia, Pa. 19119

Editor

H. N. PORTER, 158 Whitfield St., Guilford, Conn. 06437

Editorial Advisory Committee:

Roy Davidson	Donald Peach
H. Lincoln Foster	Owen Pearce
Laura Louise Foster	Sharon Sutton
Bernard Harkness	Margaret Williams
Anita Kistler	

Contents

Vol. 33 No. 4

Fall 1975

The Compost Pile	157
A Tufa Cliff in My Garden — Roy Elliott	167
The Tufa Garden of Paul Palomino — Catherine Hull	168
<i>Houstonia Caerulea</i> — H. Lincoln Foster	172
Rock Garden Ferns — The Woodsias — James R. Baggett	175
Colors and Combinations — Selma Fuller	178
Hurricane Ridge — Gus N. Arneson	180
Obituary	182
Saxifrages of the Section Porophyllum (Kabschia) — Drs. Radvan Horny, Jiri Sojak, Karel Webr	183
Some Woodland Groundcovers for the Northeast — Edward B. Leimseider	192
Plants of the Julian Alps and Karawanken Mts.— Josef Halda	195
Book Review	200
Requests by Members — Sallie Allen	201

Published quarterly by the AMERICAN ROCK GARDEN SOCIETY, incorporated under the laws of the State of New Jersey. You are invited to join—annual dues (*Bulletin included*) are: Ordinary Membership, \$5.00; Family Membership, \$7.00; Patron Membership, \$25.00; Life Membership, \$150.00; Overseas Membership, \$3.50. Subscription to *Bulletin* alone, \$4.00 annually. Optional airmail delivery overseas, \$4.00 *additional*." The office of publication is located at 90 Pierpont Road, Waterbury, Conn. 06705. Address communications regarding membership, dues, and other matters relating to the Society to M. S. Mulloy, 90 Pierpont Road, Waterbury, Conn. 06705. Address manuscripts and other matters relating to the *Bulletin* to H. N. Porter, 158 Whitfield St., Guilford Conn. 06437. Second class postage paid at Guilford Conn.

Bulletin of the American Rock Garden Society



Vol. 33

Fall, 1975

No. 4



THE COMPOST PILE

Our *Bulletin* has a new look as you will have noticed. Many will doubtless feel a nostalgic pang for the little green quarterly with the table of contents on the cover, as do I, yet the sentiment for change seemed strong. Buffy Parker, an accomplished professional in these matters, designed the cover and advised on the typography, accepting with good grace the stringent limits on choice of type-face, paper, etc. imposed by the necessity for the utmost economy. Timmy Foster is our unofficial art director and staff artist. Officially she is a member of the editorial advisory committee.

The *Bulletin* also has a new editor. Merle Sutton, after valiantly maintaining the great tradition for thirteen years, finally yielded to weakness of the flesh and resigned. He takes with him the affectionate admiration of myriads.

The Compost Pile is in one sense the successor to Merle Sutton's *Omnium Gatherum* and Dr. Worth's *Salmagundi*. I hope, however, that it will evolve to something like the *Alpine Anthology* of the *Bulletin of the AGS* in England, i.e., a *mélange* of notes sent in by members on experiences happy or sad, hints on culture, including propagation, questions to which some other member may know the answer, jokes and poems, in short a rich and fertile mix of plant lore. If everyone who reads these words will send in a paragraph or two, we will be off to a good start. There is a pleasure in communicating one's joys and exasperations.

I also hope to hear from my fellow members what they want from the *Bulletin*. If the *Bulletin* is to be the best possible horticultural journal

for rock gardeners, it must receive the thoughtful and creative attention of us all. So write in your thoughts and let us get a dialogue going.

One idea that has occurred to me, is to feature in each issue one plant genus, or the flora of a particular area, or a method of growing, and to treat that feature from more than one perspective. The subject for this issue was suggested by Catherine Hull's contribution and is.

Tufamania

There seems to be a growing excitement with the possibilities of growing our plants in tufa, an excitement I share for the following reason. I used to think that one either stayed at home and applied various sophisticated life-sustaining techniques to one's plants or one went gadding off to the mountains of the world and lost one's choicest treasures. Paul Palomino, however, is always going off — he is in Wyoming as I write, — yet grows to perfection in his tufa garden plants that I can barely keep alive in the alpine house.

The possibilities of tufa gardening for alpinists seems to have been discovered in the 1930's by Clarence Elliott, that most inventive of nurserymen to whom we also owe sink or trough gardening and the concept of the alpine lawn. At about the same time, there are mentions in our own *Bulletin* of successful experiments.

The difficulty in acquiring the material has probably held many back. We would welcome information about sources of supply in different parts of the country for printing in the *Bulletin*. Here in the Northeast the source is in Iliac Gorge, New York. (When you go to the Eastern Study Weekend in Boston, return home via the N.Y. Thruway. Attach a U-Haul trailer to your car in Utica. Proceed to Frankfort, not far away, where you will find Mr. Ferdula, with whom you will have made an appointment. He will load you up and you are on your way.) It would be an admirable undertaking for the chapters of the ARGS to secure truckloads for distribution to their members. This was in fact done here in Connecticut through the heroic initiative of Eliot Jesson and Howard Pfeifer.

Tufa is used in four ways. The simplest is as an ingredient in potting mixes, in the form of dust or chunks. *Campanula trachelium*, *C. zoysii* and *Phyteuma comosum* have done well for me in pots full of tufa chunks, its interstices crammed with a leafmold and fine grit mixture. I have, however, failed in using a similar mixture for weaning newly rooted cuttings of such plants as *Lepidium nanum* and *Petrocallis pyrenaica*, with which I have succeeded in more conventional mediums. The fault, no doubt, lies in my habits, not in the medium itself.

One may also use a largish tufa block as a planter for a self-contained miniature garden, one in which the medium is the container. We reprint below a mimeographed hand-out from the Royal Botanic Garden, Edinburgh. We would only add that if there is a danger of the block drying out in Scotland, that danger is much more to be guarded against in most of the U.S.A.

Miniature Tufa Gardens

"The word garden is used here to describe the arrangement and growing of plants on blocks of tufa. Tufa is a light porous form of limestone resulting mainly from the precipitation from mineral springs of calcium and magnesium carbonates, with traces of aluminum, silica and iron. It is a suitable medium for growing certain difficult plants, because it induces them to grow slowly, so retaining a compact habit, and is suited to small plants that might be swamped by their more vigorous neighbours on the rock garden. In addition, its lightness and ease of working make it suitable for those who wish to grow rock garden plants but have no space for a rock garden (e.g. flat dwellers).

"Tufa varies considerably in texture and hardness: at one extreme it can be so soft that it crumbles, whilst at the other it is hard and flint-like. The choice for planting should be of medium hardness, i.e. easy to work. Freshly quarried tufa may be white or creamy yellow, mellowing with age to a warm grey or golden yellow. Because of its porous nature, drainage is excellent; nevertheless, it holds sufficient water for plant growth.

"A block of average size about 18" x 12" x 12" would weigh about 75 lbs., depending on hardness and water content. Larger blocks may be used when space is available and access not a problem, but much smaller pieces should be avoided as only a few plants can be grown on them; they will dry out too quickly during the summer, and do not make an attractive 'garden'.

Tools and the preparatin of planting holes

"Over-large blocks may be cut down with a coarse toothed saw. Planting holes may be made with a chisel, brace and bit or electric drill. The holes should never be horizontal but slope downwards near to the vertical. The diameter of the hole depends on the size of plant, with up to 3" for potted plants; for seedlings and rooted cuttings (which are preferable) only 1" is needed. The depth of the hole will be from 3" to 4½".

Compost and planting

"The ingredients measured by volume, for the compost, are:

2 parts coarse sand

2 parts leafmould or peat

1 part of the tufa chippings remaining
after making the holes.

Young plants are preferable when planting, as they are easier to insert into the holes and quicker to establish. Relatively little compost is used, because the roots will penetrate the tufa when established. Wash the soil from the roots of pot-grown plants and push them into the hole, having first put in some of the compost. Using a stick about pencil thickness, poke compost around the roots until the hole is filled. When using seedlings and rooted cuttings the hole can be filled with compost and firmed first and the plant then inserted with a dibber. After planting, water the tufa block copiously with a rosed can, to settle the soil around the plant and wash away unwanted material. Top up the holes if the soil has settled

during watering and finish off with a layer of tufa chippings; for larger holes gravel or limestone chippings may be used.

Positioning of the finished blocks

“While the blocks are best in full sun, they do tend to dry out unduly during summer or if exposed to drying winds. They should be protected from wind and given some shade, as long as there is still plenty of light. Stand the blocks in a tray of sand which is kept permanently moist; the tufa will absorb the water from the sand. Overhead watering is necessary in summer and should be done either in the morning or late evening. Newly planted blocks need individual watering and extra attention until the plants are established.

“Some plants which are suited to growing on tufa:

<i>Androsace ciliata</i>	<i>Lewisia brachycalyx</i>
<i> cylindrica</i>	<i> columbiana</i>
<i> helvetica</i>	<i> pygmaea</i>
<i> pubescens</i>	<i> rediviva</i>
<i> pyrenaica</i>	<i>Myosotis rupicola</i>
<i>Arenaria tetraquetra</i>	<i>Petrocoptis pyrenaica</i>
<i>Armeria caespitosa</i>	<i>Phlox douglasii</i>
<i>Asperula caespitosa</i>	<i> depressa</i>
<i> lactiflora</i>	<i>Phyteuma comosum</i>
<i> nitida</i>	<i>Potentilla clusiana</i>
<i> suberosa</i>	<i> nitida</i>
<i>Asplenium ruta-muraria</i>	<i>Primula allionii</i>
<i> septentrionale</i>	<i> carniolica</i>
<i> trichomanes</i>	<i> clusiana</i>
<i>Campanula herzegovina</i> ‘NANA’	<i> rubra</i>
<i> piperi</i>	<i>Ranunculus crenatus</i>
<i> raineri</i>	<i>Saxifraga aizoon</i> ‘MINUTIFOLIA’
<i> saxifraga</i>	<i> aretioides</i>
<i>Daphne petraea</i>	<i> burserana</i> ‘GLORIA’
<i> alpina</i>	<i> burserana</i> ‘BROOKSIDE’
<i>Dianthus haematocalyx</i>	<i> caesia</i>
<i> muriale</i>	<i> ‘CHRISTINE’</i>
<i> simulans</i>	<i> cochlearis</i> ‘MINOR’
<i>Douglasia laevigata</i>	<i> ‘ELIZABETHAE’</i>
<i> montana</i>	<i> lilacina</i>
<i>Draba aizoides</i>	<i> marginata</i>
<i> bryoides imbricata</i>	<i> squarrosa</i>
<i> dedeana</i>	<i>Sempervivum allionii</i>
<i> mollissima</i>	<i> arachnoideum</i>
<i> rigida</i>	<i> tomentosum</i>
<i>Edraianthus pumilio</i>	<i> ciliosum</i>
<i> serpyllifolius</i>	<i> puttonii</i> ”.

A third use of tufa is for the construction of a covered tufa cliff, an invention of Roy Elliott which he regards as his most successful experiment

in a life-time of gardening. The master's own account may be found on page 167 below. A photograph, giving a general sense of the mode of construction, can be found on page 29 of Elliott's *Alpine Gardening* (London 1963). Roy Davidson in Seattle has recently constructed such a cliff against a retaining wall. The fly in the ointment was a mole in the interstices.

The fourth use of tufa is as a substitute for stone in the construction of a conventional rock garden. See Catherine Hull's article below pp. 168-171.

Lincoln Foster reports a happy accident *Daphne blagayana*

The creamy white, fragrant and long lasting flowers of the sprawling *Daphne blagayana* are among the first to grace the garden here in Northwest Connecticut, except during those years when a late freeze descends after the blossoms have fully expanded. The plant, it must be confessed, does become rather gangling and bare-branched as it ages, with tufts of leaves only on the tips of the long woody shots.

Farrer had a prescription for the growing of this daphne, as fanciful as anything to be found in *The English Rock Garden*. "In cultivation here it merely requires a sunny warm corner (it does well in shade though, too) a rough soil of stones and peat and loam and sand: and then to be treated like some independent-minded person in the palmy days of Hebrew priesthood, and stoned with stones until he — does not die — but lives the more gloriously, and makes them a Bethel from which at every point peer forth his tufts of leaves and fragrant heads. Each passer-by, to be popular in the garden, should cast a limestone boulder (or any other sort of boulder) upon the *Daphne*, until its pile becomes a sort of Absalom's grave, perpetually getting higher and wider, and the *Daphne* therewith, until in the end you have a cairn of stones as at Glasnevin, half a dozen yards across, filled everywhere with the flower-heads of *Daphne blagayana*."

I must confess I have never tested Farrer's recommendations, nor have I encouraged my visitors to hurl rocks at my *Daphne blagayana*, but by a happy accident I have what I think is an easier, and handsomer method of providing concealment for the naked branches and a pleasing background for the flower-heads. When I first put in a small plant of this daphne on a raised bed beyond the terrace, near it was a young plant of *Juniperus squamata prostrata*. The juniper spread fairly steadily in all directions and in short order began to encroach on the daphne. My first impulse was to move the daphne or severely restrain the juniper. By the time I got around to doing either, the juniper had completely engulfed the woody stems of the daphne, leaving only the leafy tufts and flower-heads above the billowing carpet of green juniper foliage. These two bed-fellows have been growing thus together for at least five years, the juniper providing shade for the roots, a skirt for the bare limbs and a pleasing background for the flowers of *D. blagayana*. It is possible that this evergreen coverlet has made it more likely that the daphne blossoms delay their early opening and are hence not so readily frost bitten as they might be if they were rising out of an ugly, stony grave.

And Bernard Harkness a Triumph A Successful Transplant: *Clematis Fremontii* var. *Riehlii*.

With an estimated 1,500,000 plants existing in Missouri, Riehl's Leatherleaf Clematis presumably will not be counted among our endangered species. This population estimation comes from a thorough botanical investigation by Ralph Erickson. Publication of Dr. Erickson's research was in *Annals of the Missouri Botanical Garden* in 1943 and 1945, and one paper was chosen for inclusion in *Papers on Plant Systematics*, Robert Ornduff, editor, (Little, Brown & Co. 1967).

Areas supporting this population are somewhat isolated outcrops of dolomite limestone; the soil cover is thin, slightly acid and fairly high in organic matter. The whole area is about 400 square miles at the eastern end of the Ozarks in east-central Missouri. The usual weather pattern provides wet conditions in spring and fall but dry in the summer. Growth there is rapid in the spring, flowering by the last week in April or the first in May. The leaves may turn brown in July but the semi-woody stems persist until fall winds tumble them away.

I had not read Dr. Erickson's paper before my October, 1968 seed collecting trip in the Ozarks and I did not visit the area where Riehl's Clematis abounds. However, Steyermark's *Flora of Missouri* directed me to an outlying location in Ozark County, near Dora. No seeds were left on the plants found there, but one seedling plant, possibly two years of age, was lifted and brought back to Geneva, New York. It has thrived in my garden ever since. First flowering was in 1972.

Dr. Erickson reports that attempts to germinate seeds under greenhouse conditions were largely unsuccessful. I can report better results following a different method. On October 23, 1974 seed from the one plant from Missouri was sown in an 8" x 5" plastic pan that once contained a dozen florist's transplants of pepper or zinnia. It was placed outside on the north side of the garage and sunk in sandy fill. Germination started July 21, 1975 and at this date, September 1, there are fifty plants, some starting stem growth. I estimate close to 100% germination.

A fifteen inch plant with dull pale blue flowers might well be disappointing to many gardeners and they would agree with Sampson Clay who recommends that the Viorna group of Leather-leaf Clematis be ignored — "unless you have plenty of space to play with". But to those intrigued by the shale-barren flora a congener representing Missourian glades has plant interest. I take pleasure in having visitors feel its tough-textured leaves and to hear the west wind rustling them as I weed.

And Norman Clark whets our appetite for Seattle

Of course, you'll all want to participate in field trips. For no matter how superb the spoken word, nor how perfect the pictorial representation, nothing can take the place of an on-site inspection. There will be plenty of opportunities presented for all who wish to do so before, during and following the F.I.I.R.G.P.C. next July 18-25 in Seattle, Washington and Vancouver, British Columbia.

FIELD TRIPS — DURING THE CONFERENCE

Let's look at the outings which your planning committee has arranged as part of the full registration package for the Conference. Tuesday afternoon will be devoted to visits to private gardens of the Tacoma area. (Seattle-Tacoma — 32 miles) Thursday afternoon, because of the evening program, will be spent in Seattle gardens. Conferees will be divided somehow into five groups each of which will visit a minimum of two gardens.

In between, we shall all go via bus to Mt. Rainier for the day. Nothing else is planned for this Wednesday since this is a 200 mile round-trip and a maximum of daylight on the mountain is the objective. Evening meals will be left for each to do as one chooses. Mt. Rainier is of volcanic origin in contrast to its Cascade surroundings. We shall travel to the North-East portion of the National Park and make Sunrise at 6400 foot elevation our point of departure. With a bit of luck, the 14,410 foot crest will be glistening just 6½ miles sight distance away. For those who may find difficulty at this altitude, there are a few short walks, that can be enjoyed, including one of less than 1/4 mile to the Emmons Glacier vista. Mt. Rainier Natural History Association maintains a selfguiding Nature Trail which many will find interesting. For those who want to and can spend more time on the mountain there will be opportunity to go by well maintained trail to any of several other points of interest. Comfortable shoes are recommended for this strolling, and, as the National Park folder suggests, the experienced visitor comes prepared for rain and coolness as well as for sunshine and heat.

The strong hiker can expect to make a 5.0 mile circuit on the Burroughs Mountain trail climbing to 7300 feet at highest point. At one M.P.H., several of us made this trip on August 2, 1975 with light jackets under partly cloudy skies. Even so, sunglasses come in handy. At the conference time of year, we are blessed with a potential of 15½ hours of daylight with sunrise at 5:30 a.m. and sunset about 9:00 p.m. So there should be no cause to hurry.

Upon adjournment of the Seattle portion, two more tours in Vancouver area are in store. The first on Saturday will take us to the more than 110 acre Botanical Gardens of the University of British Columbia while the second, on closing day, will permit the viewing of the new Van Dusen Botanical Garden. The latter will demonstrate the potential worth of a renovated golf course as a horticultural classroom.

PRE-CONFERENCE TOURS:

From a study of the interest finders, it has been determined, in general, that those of you who are coming to the Pacific Northwest from the greatest distance, are going to come early and will stay late so as to make the most of your visit. Accordingly, there is an opportunity for you to indicate your interests and intentions regarding pre- and post-conference tours at the time of your registration.

Arrival in Seattle on Wednesday the 14th will permit the scheduling of the three-day trip to Mount Baker, over the recently opened North Cascades Highway to Lake Chelan, before the return to Seattle on Saturday via Stevens Pass.

Should you elect to make the Olympic Peninsula trip instead, you

should plan to arrive on Thursday the 15th ready for an early start on Friday. The bus will go by ferry, and floating-bridge to Hurricane Ridge Visitors Center, elevation 5100 feet, near Port Angeles for a leisurely afternoon 1-1/4 mile stroll along an asphalt path to the 5757 high summit of Hurricane Hill. The next day the bus will continue West and South approximately 75 miles to the famous Hoh River Rain Forest. Return to Seattle is estimated at 10:00 p.m.

For all cost, meals, and lodging information, please study your registration form.

POST-CONFERENCE TOURS

Both commercial and modified-commercial tours will be available immediately following the conference which terminates in Vancouver, British Columbia.

Commercial tours of various durations will be offered to Whistler Mountain (one day) or to the Canadian Rockies (seven days). Costs of these excursions will not be known until May 1976. However, brochures will be made available at the Conference. Arrangements will also have to be made at that time.

Two extremely exciting tours of medium length will also be offered. The longer of the two will continue to Port Angeles by ferry at the conclusion of the shorter which will return to Vancouver. These tours will take you on July 26 to Victoria for a visit to world famous Butchart Gardens and on to the West coast of Vancouver Island. The highlights of these tours will be visits to at least two private gardens of Victoria, which in turn will be capped with a salmon barbecue by courtesy of the Vancouver Island Rock & Garden Society. The longer tour will then visit Port Angeles, Hurricane Ridge, and Seattle before its return to Vancouver on July 29th.

To avoid disappointment, it is suggested that you process your registration at the earliest convenience.

Our Collator, Mr. Brownmiller, Reports: Information Exchange

This installment might well be entitled, "Phlox Chattahoochee Revisited".

Information has poured in amending earlier reported anomalies. The species had not been lost in this country as had been assumed, but is still growing lustily in Eastern gardens. However since its dissemination has spread to Europe the question remains whether the reports deal with the identical form of the plant, be it species, hybrid or mutation or more than one of these aberrants.

Dr. Wherry writes, "As this Phlox has proved difficult to keep growing in southeastern gardens in Pennsylvania, the statement that it is commonly grown around Vienna was both surprising and interesting. I will appreciate receiving a pressed specimen of at least a small flowering shoot for study for its diagnostic characters." At this writing in April 1975, the cutting from Austria has not yet sprouted. Presumably the Phlox now growing in eastern U.S. has been derived from a single source and therefore all the specimens should be identical unless one has remutated, which is not without the realm of possibility. At any rate the present cultivators of it not only are well aware of the chain of gifting, beginning with the late Mrs. Norman Henry but have written it up for the record.

This was published in "The Connecticut Plantsman", Vol. 1, No. 4, June-July, 1973 donated by Howard Porter of the Connecticut Chapter. This excellent issue records in detail three cultivars of Phlox, one of them being Phlox Chattahoochee. Lack of space precludes any attempt to infringe upon the copyright laws, so we can only mention that it contains a history and the diagnostic features of the plant by Dr. Wherry, together with Henry Fuller's and Morris Berd's experiences and cultural recommendations, all under the aegis of the Editor of the Chapter Bulletin. The chain of gardens the plant passed through is an excellent example of the spirit of the ARGS, in which generosity, involvement and helpfulness are endemic.

Beginning with the aforesaid Mrs. Henry who had found the plant, the Phlox found its way through the gardens of Harold Epstein, John Osborne, Henry Fuller, Ellie B. and Boyd Kline, Richard Langfelder, Alois Kober, also Morris Berd and Thomas Buchter of Skylands. That it has been considered lost forever by some growers now and again may be due entirely to Howard Porter's explanation, "I think the reason so many have lost it is not because it is a particularly difficult plant, but because it looks as if it could fend for itself as do its close relatives. But this it cannot do." The consensus is that the plant is Phlox X glutinosa, Buckley 1843, having some characteristics of both parents, Phlox pilosa and P. divaricata. Yet all great botanical minds do not run in the same channels.

First of all, just what did the late Mrs. Henry find? Most informants say only one plant but a letter from Thomas Buchter of the Dept. of Environmental Protection, who has been reported by others as having a large collection, states, "In my note from Miss Henry, she informs me that her mother collected the Phlox in many colors and the localities are listed in their records. I think it would be best if a seedling population could be raised. The seedlings would give a true identity. If similar, the Phlox would be a species. If it is a hybrid the seedlings would be representative of both parents." Is it then possible that acute and trusted observers have failed to find seed that might have been there?

Secondly, a quote from Roy Davidson, "We found it (Phlox Chattahoochee) a much prized plant in England and Scotland last spring and for a good reason — it seems to be ideally suited to the cooler conditions there. It is my understanding that in order to have "true P. x glutinosa "Chattahoochee" with a tiny red eye which is its delight you must propagate it by clonal means." None of the other informants mentions this red eye. Is everyone then, speaking about the same plant?*

*If other informants have not reported the red eye, — or rather tiny ten-pointed star, very fetching, — it is because they took it for granted. This is the salient characteristic of the plant and has been so reported for many years, e.g. in the RHS Dictionary of Gardening (1955) s.v. *P. divaricata* (wrongly).

By the same token it is misleading of Miss Henry to state that her mother found specimens of *P. 'Chattahoochee'* in many colors. The name belongs to a specific cultivar which is also a clone, i.e., it does not come true from seed. The plant has never been rediscovered in the wild nor is there herbarium material that corresponds to it — so Dr. Wherry. The only question is whether the plant should be considered a cultivar of *P. x glutinosa* or of *P. pilosa*. Some years ago Dr. Wherry reported on a batch of seedlings sent him by Henry Fuller. Most were classified as *P. pilosa* but one, at least, showed characteristics of *P. divaricata*, and so hybrid origin seemed to be established. But the experiment needs to be repeated if anyone secures seed from an isolated clump. — Ed.

Thirdly, an observation from John Osborne, "About ten years ago after I had raised some seedlings of this Phlox, Dr. Wherry and I came to the conclusion that it was probably a hybrid of *P. pilosa* and *P. divaricata*. Since that time, I at least, have changed my mind. I now believe it to be a mutation, probably of *P. pilosa*." This brings us back to where we had started. If the Evening Primrose which Hugo de Vries studied, had mutated repeatedly, might not this Phlox have mutated to a red eye and other characteristics? We hope that growers will send, but not deluge, Dr. Wherry with pressed flowering shoots to ascertain as closely as is possible its true botanical status. If any new information comes to light we hope Dr. Wherry will write it up for the record.

IRIS VERNA

Eleanor Brinckerhoff sends in the following excerpt from "Vernal Iris" by Stephen F. Hamblin (*ARGS Bull.* Vol. 14 (1956) no. 2, p. 50)

"Botanists have made one variety (var. *smalliana*), not yet in the trade, which ranges from Pennsylvania to Florida, and which is more robust growth.

"From the wild four variations have been listed since 1930, but they have not become widely planted: 'Vernamont', soft blue, from West Virginia; 'Vernapied', lilac blue, from Virginia; 'Superba', deep blue, from North Carolina; and 'Coastal', lilac blue, 3 inches, from our coastal plain.

"The following varieties have been found wild in Virginia, but are rarely seen as yet: 'Vernal Snow', pure white, superlatively beautiful; 'Vernal Fairy', white tinted lavender standards, falls pure white; 'Vernal Dawn', pinkish lavender; 'Vernal Simplicity', pure lavender, orange throat lacking; 'Vernal Sky', pale sky blue; 'Vernal Evening', deep lavender, and 'Vernal Night', deepest violet purple."

She wonders if any of them are still in cultivation, and if so, would someone be willing to share bits: The white form, she reports, has been rediscovered by Dick Redfield who is giving it plenty of TLC, hoping to make it plentiful some day.



1. *Androsace hausmannii* 2. *Sax. squarrosa*. 3. *Petrocallis pyrenaica*. 4. *Camp. zoyisii*. 5. *Eritrichium terglouense*, 6. *Gentiana terglouensis*, 7. *Potentilla nitida*, 8. *Saussurea pygmaea*, 9. *Ranunculus traunfelleri*, 10. *Soldanella minima*. (See p. 195 fl. below)

A TUFA CLIFF IN MY GARDEN

Roy Elliott, *Birmingham, England*

(Reprinted by permission from *The Garden, Journal of the Royal Horticultural Society*, Vol. 100, part 8, August, 1975)

Many years ago — it must have been in the early fifties — I visited the late Dwight Ripley's house at Horam in Sussex and saw his cliff garden. It was virtually a cold greenhouse, built into a hillside with the rear wall consisting of a sandstone cliff. It was late in the season, and there, among the tumbling white and blues of *Campanula isophylla* trailing down the vertical face, I first saw the fabulous *Limonium asparagoides* with its panicles of rose-coloured flowers and the delicate tracery of its fern-like leaves. It has taken me over twenty years to obtain the plant, and now it grows on my own cliff garden.

The idea of building a cliff out of tufa came to me, undoubtedly, as the result of seeing that plant in its cliff setting. If plants could look so entrancing growing from the crevices of a sandstone cliff, how much better would they look if planted directly into a superlative growing medium like tufa? Tufa is not a rock in the accepted sense, and its incidence is, unfortunately, rare. It is a deposition of calcium carbonate which slowly builds up where water, leaching through lime-rich rocks within a hill and taking in soluble calcium bicarbonate in the process, emerges into the carbon dioxide of the atmosphere: the water evaporates and the tufa is slowly deposited as insoluble calcium carbonate. This is the process which forms stalactites and stalagmites: it is initially soft and porous, but gradually hardens on exposure to the atmosphere.

I decided to build my tufa cliff against a stout boundary wall at the end of my garden, and as a first step a glass roof was cantilevered from the wall of an adequate depth to protect the cliff and those working on it. Six tons of Welsh tufa were delivered, mainly in large blocks, at a price per ton which is now less than its current price per cwt. Once one has got over the shock of seeing the soft, white, ugly and crumbling appearance of newly-delivered tufa, one finds that it is a marvellous medium to work with. It can be cut with a hand-saw, and joints between blocks can be shaped with an old coal chopper.

The cliff was built 2 to 3 feet from the rear wall, with a backing of good quality soil to support it. Since only fibrous-rooted plants can be established in the tufa itself, this soil was necessary to support the plants which were placed on horizontal ledges or in crevices. The cliff faces due south, but because of the site chosen and the shade afforded by a potting shed at one end, the cliff can provide every aspect from baking hot crevices to cool shady corners.

When the task was completed, we viewed the stark and ugly whiteness of the cliff with grave misgivings, but the passing of the years has not only given an attractive patina to the tufa, but it has convinced us that this was the most satisfactory gardening experiment of a lifetime. We can, of course, grow only lime-lovers: but difficult plants become easy — even *Jankaea heldreichii* increases in size annually without causing us a moment's

worry. Soft-leaved plants like *Verbascum dumulosum* thrive on the ledges, protected from winter wet. In the hot, sun-baked aspects *Omphalodes luciliae* flowers almost the year through and liberally deposits seedlings on the ledge below: the shy-flowering *Iris unguicularis* ssp. *cretica* flowers from November through to April.

My object is to describe the cliff rather than its plants, so I should explain how we establish plants in tufa. First a hole is drilled into, but not through, the tufa with a 1-inch drill (or thereabouts). Rooted cuttings, or seedlings, are laid on a dibber and eased into the hole; dry sand is then poured in around the roots, and watered. Most of the silver saxifrages, a group of plants which really thrive, have been established in this way, though we now find they tend to sow themselves into the tufa: we feel there can be no finer sight than the magnificent rosettes of *Saxifraga* 'Tumbling Waters' casting forth their great tumbling panicles from the vertical face of the cliff.

Little labour is involved; watering is automatic from sprinkler nozzles overhead, and is only called for every fortnight or so in hot weather (and never at all from November to March). The water is always left on for about six hours, however, so that it shall permeate right through the tufa blocks. Our worst, and almost only weed on the tufa, is that irrepressible beauty *Erinus alpinus* which I allowed to seed down in a moment of rashness. With troubles like that, who would want to complain?

It is a pity that tufa is today so hard to come by, and so expensive; yet I suspect that there must be many sources, if one only knew where to look. One of my earliest gardening friends was a long-distance engine driver who loved alpine plants. He used to stop his express at a cutting in the west country, while he and his fireman nipped up an embankment to dislodge a block of tufa from an outcrop. A couple of minutes later, his tufa was in the cab and his passengers none the wiser. He had a large rock garden . . . all tufa. He retired long ago: he felt that today's Inter City services had little to offer him, and I think he was probably right.

THE TUFA GARDEN OF PAUL PALOMINO

Catherine Hull, *Manchester, Massachusetts*

It is February and snowing in Massachusetts and I am sitting at my desk remembering a miracle — the garden of Paul Palomino. I have seen it only twice, on an April afternoon in 1974 for three hours and again in November for two hours in the rain. A long article could be written about the choice of trees and rhododendrons, the troughs, frames, Pine Barren plants, pool and waterfall, and the alpine house, but I want to describe just one thing: the tufa garden. For those who have not had the opportunity to visit Paul his home is in Seaford, Long Island on a residential street of houses on small lots. Small is stressed only because it compounds the miracle of what has been created in an area 60 feet by 130 feet. When I first drove along the street there was no need to look for a number, the only house with dwarf conifers and rock plants in front had to be it. The gate to the main garden is in back and when I entered I was lost to all else until darkness came.

As you go through the gate the house is on the left, the alpine house on the right and extending beyond it is a lawn bounded by trees and shrubs with woodland and mountain plants intermingling. Off center in the lawn to the left is Paul's most recent achievement, the tufa mound or hummock or mountain. By any name it is a joy to behold. The mound with tufa outcroppings rises from level ground to 4 feet 6 inches at its highest point (Paul made it 5 feet but it has settled), 20 feet long and 15 feet at its widest. It is neatly defined by an edging of bluestone veneer, not in a square or a rectangle but in an irregular oval pattern. There is no pretense of this-happened-all-by-itself, the bluestone firmly and formally sets off the tufa garden as a deliberate entity of its own, and yet rising within its boundary, stone and plants have been placed with such skill that the effect is a microcosm of mountain scenery. When I saw it in April, its first spring, the visual impression was already of weathered harmony of long standing.

What is growing on the mound? To name all the plants would require pages of plant, comma, plant, comma, producing no clear picture, but since even photographs do not do justice to the relation of plants to rock there seems no way around the list method. This perforce will be a curtailed one, a mere sample of what is there and what others might plant if they choose to make a similar rock garden. The top right of the mound and the right front face which get all day sun are planted principally with Western American alpenes, with some others intermixed.

Allium tribracteatum

Aquilegia jonesii

Arenaria nevadensis

Aster alpinus

Astragalus

Castilleja sp.

Ceterach officinarum

Compositae

Dianthus alpinus

D. erinaceus, *D. microlepis*

Drabas

Erigeron aureus

E. uncialis var. *conjugans*

Erinacea pungens

Eriogonums

Fritallaria atropurpurea

Gypsophila aretioides caucasica

Kelseya uniflora

Lepidium nanum

Lesquerella tumulosa

L. kingii

Lewisia

Linanthastrum nuttallii

Onosma

Penstemon

Western Phlox

Phlox nana var. *ensifolia*

The upper left, half-shaded area has:

Campanula lasiocarpa

C. piperi

Celmisia sp.

Coprosma sp.

Daphne alpina, *D. arbuscula*

Dryas drummondii

Edraianthus pumilio

E. serpyllifolius

Enkianthus perulatus compactus

Gentiana forms

Kalmia polifolia var. *microphylla*

Leucopogon fraseri

Lewisia

Petrophytum caespitosum

Primula auricula forms

P. garryarde 'Guinevere'

P. marginata forms

P. minima

P. takedana

Raymonda myconi

Haberlea rhodopensis
H. virginialis
Heuchera cylindrica
H. grossularifolia

R. myconi alba
Salix boydii
Soldanellas

On the lower left section, also half-shaded, there are:

<i>Aciphylla hectori</i>	<i>Campanula tommasiniana</i>
<i>Androsace brigantiaca</i> , <i>A. carnea</i>	<i>Ceterach officinarum</i>
<i>A. halleri</i> , <i>A. hedraeantha</i>	<i>Phyllothamnus erectus</i>
<i>A. lactea</i> , <i>A. mathildae</i>	<i>Phyteuma comosum</i>
<i>Asperula nitida</i>	<i>Saxifraga forms</i>

In both sunny and shaded areas there are ferns tucked in the tufa foundation wall:

<i>Asplenium trichomanes var. incisum</i>	<i>Cheilanthes jeei</i>
<i>A. ruta-muraria</i>	<i>C. lanosa</i>
<i>Blechnum penna-marina</i>	<i>Pellaea ornithopus</i>
<i>Ceterach officinarum</i>	<i>Polystichum imbricans</i>

Asplenium richardii, *Cheilanthes gracillima* and *Pellaeas atropurpurea* and *bridgesii* are going to be added.

Placed strategically on the mound giving accents of green all year are the following dwarf conifers:

<i>Chamaecyparis obtusa nana</i>	<i>Juniperus communis compressa</i>
<i>C. obtusa nana contorta</i>	<i>J. communis echiniformis</i>
<i>C. obtusa nana Newyood no.s 1 & 2</i>	<i>Picea abies pygmaea</i>
<i>C. obtusa nana rezek</i>	<i>Pinus mugho 'Gnome'</i>
<i>C. obtusa nana stoneham</i>	<i>P. parviflora 'Adcocks dwarf'</i>
<i>C. pisifera pygmaea</i>	<i>Tsuga canadensis 'Minuta'</i>
<i>Cedrus deodara pygmaea</i>	<i>T. canadensis 'Pygmaea'</i>
<i>Cryptomeria vilmoriniana</i>	

All hardy alpine seed collected or received from the societies or friends has been sown on the tufa garden. Among the results have been:

<i>Androsace</i>	<i>E. ovalifolium</i>
<i>Campanula piperi</i>	<i>Lepidium nanum</i>
<i>Castilleja</i>	<i>Lesquerella kingii</i>
<i>Collomia debilis var. larsenii</i>	<i>Lewisia</i>
<i>Daphne alpina</i>	<i>Linanthes nuttallii</i>
<i>Douglasia montana</i>	<i>Lupinus lyalli</i>
<i>Draba mollissima</i>	<i>Choice primulas</i>
<i>Eriogonum caespitosum</i>	

In answer to "How did you build the mound?" Paul explained that first he thought about it for years and read everything he could find on the subject of tufa. He reads about alpine plants all the time anyway! and works with them in every spare daylight hour. In addition he has travelled widely on his holidays and observed plants in gardens and in the wild in England, Scotland, New Zealand and our own Western mountains. When the plan had taken full shape and the time for action had come

(the spring of 1973?), he dug the area thoroughly but not very deeply, just turning up the ground and burying some unsightly stones and other debris, with no attempt at making layers of special drainage. It would have been pointless as once dug the ground was covered with a single thickness of plastic to keep out any invading tree roots. Then started the labor of mixing the soil in situ. The quantities used were approximately 3 yards of builders sand, 1½ yards of leaf mold from beech trees, 8 bales of peat moss and almost 1 yard of loam. The mixture was purposely on the acid side to counteract the alkalinity of the tufa.* All these ingredients were turned together 6 times; nothing was sifted or sieved, just broken up by hand where necessary. Paul had made a special trip to the quarry in Illion Gorge, New York to hand pick the 8 tons of tufa which were later delivered by truck to Long Island. As the mounding of the soil began so did the placing of the tufa. This phase required great care. Every stone had to be embedded firmly so that Paul or a visitor could scale the mountain at will to view any particular plant. He worked and reworked the arrangement of the tufa, postponing planting till the mound was complete. Some pieces of stone had to be removed later for dwarf conifers but in every instance his original vision prevailed. Gravel was worked into the top 10 inches of soil and later, as plants were put in, more was forked into the holes and the whole hummock was top dressed with 4 inches of gravel. Before beginning planting Paul ran a hose full force on the mound to locate valleys of runoff and then plugged any such waterways with rocks.

Paul says that the care and feeding of the tufa garden are very simple. He does not feed anything except the primroses and these get some liquid fish fertilizer in spring after flowering. He does not deliberately water the tufa mound in summer other than to let the lawn sprinkler hit it in dry spells. For winter protection he scatters pine needles on plants that might need some shelter against the vagaries and extremes of an East coast winter, the sudden shifts from sun to cloud, wind and cold, with and more often without snow cover.

The meticulous work, the patience in placing the tufa in the building stage, make all the more astounding the thoroughly natural final effect, natural above its undisguised, well tailored, man-made base. The harmony of such a tableau in a small garden is proof positive of the value of discipline in design, a demanding and often irksome discipline which in the end leaves an impression of effortlessness. One looks and enjoys without consciousness of any hard work or struggle — the highest tribute to skillful rock gardening. After years of thought and study and two weeks of intensive work, this innovative gardener now reaps immense pleasure with a minimum of maintenance. To see alpine plants growing in character as if in their native home is a great reward for the man who created the setting and for all who come to see it.

*Paul adds "The soil mix formula is not meant to be a secret formula or sure-fire way for growing plants. It's one that I thought would work and it does for me in my garden under my growing conditions." There speaks a wise and cautious man.

HOUSTONIA CAERULEA

H. Lincoln Foster, Falls Village, Conn.

To see a run-down upland meadow or pasture of New England misted with sheets of Bluets in flower is an annual joy in early May. So common and so lovely are they in their natural setting that we rarely think of them as worthy of rock garden culture. Not so in England or other parts of the world where they are not native.

The principle flush of flowers in nature is preceded by a few of the earliest blossoms of spring, and all summer into fall there are scattered flowers to be found on the neat tufts of evergreen foliage.

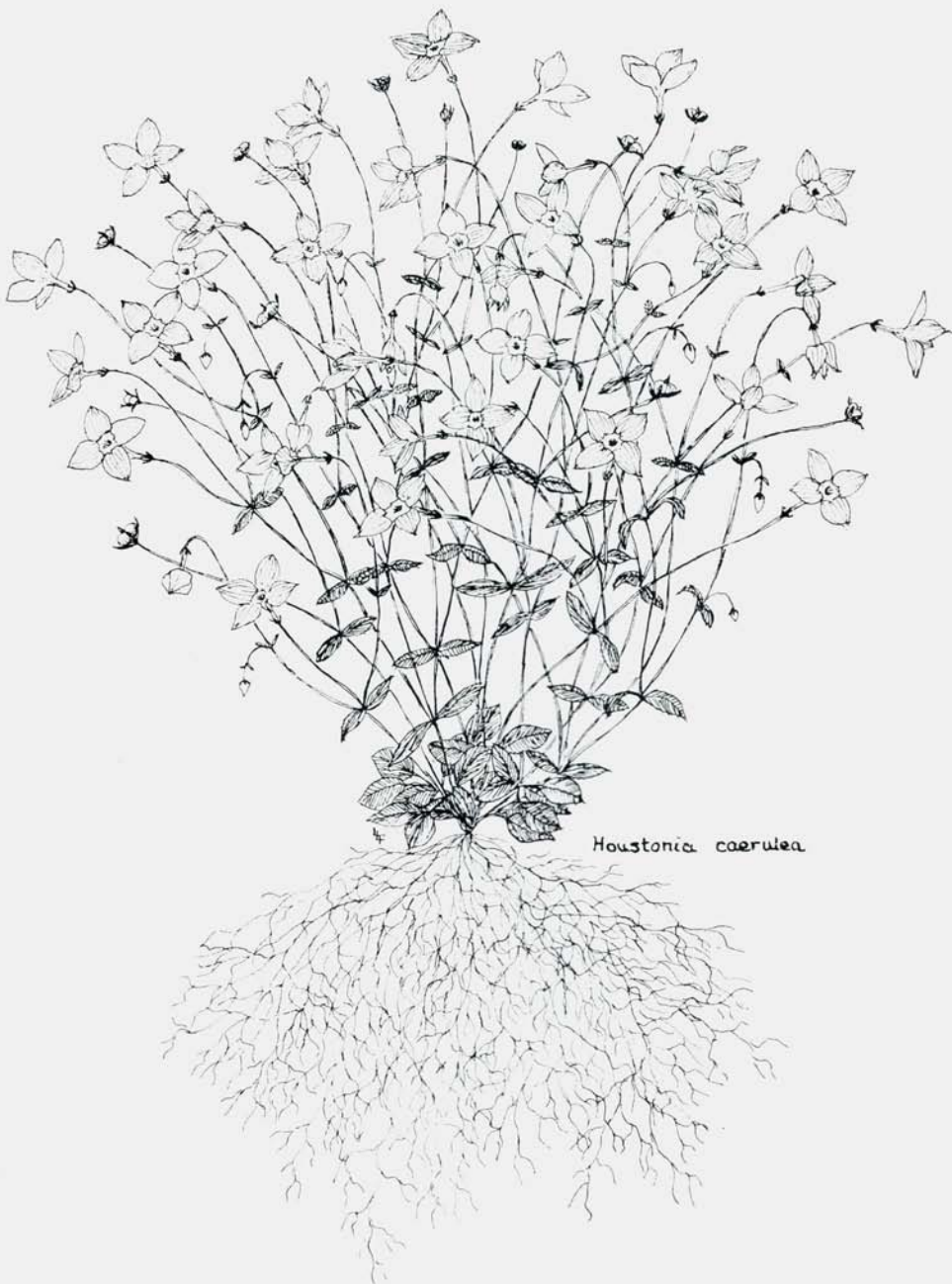
So treasured is the plant in England that Farrer exclaims: "a creeping treasure with spreading tufts that emit all the summer through (but especially in May) an incredible and plant-hiding profusion of exquisite little pale-blue four rayed stars borne singly on fine stems of 3 or 4 inches."

Even in that English book devoted exclusively to the aristocrats of rock garden plants, *Collectors' Alpines*, Royton Heath writes of *Houstonia*: "a genus of plants which has two species (*caerulea* and *serpyllifolia*) that can be used for pan culture and these are well known, but somehow the Bluets are not so easy to grow into large specimens for they seem to have the tendency to die away after two years or so."

The august pages of the *R. H. S. Dictionary of Gardening* contain this recommendation: "*H. caerulea* forms a good pot plant under cold frame treatment or for the alpine house, and may be used for surfacing soil in pots in which bare-stemmed hardy plants are grown."

Our lovely pasture plant has not been entirely neglected, however, by at least one perceptive rock garden author in America. That doyen of American rock gardening, Louise Beebe Wilder, in a work long out of print and sadly overlooked, *The Rock Garden*, is worth quoting in full. "*Houstonia*", she writes, "is a most precious small native, the daintiest and most engaging of fairies — and sometimes the most elusive. Not by any means are these little Quaker Ladies to be led by the nose. In some places they will dwell and in some they will not. We may set them out in a pleasantly shaded and cool spot, but we need not be surprised if the next season this choice locality is quite deserted, and to find away along the edges of the starved paths, on precarious ledges, or from the midst of tight wads of Saxifrages, in all sorts of unexpected places, little gatherings of demure Quaker Ladies, quite gleeful and heady with liberty. Gradually they will increase, choosing their own neighbourhoods, until there are throngs of the charming creatures, and one is glad to be alive just to look at them."

The winsome and capricious *Houstonia caerulea* grows wild from Nova Scotia, Ontario and Wisconsin, south to Alabama, Georgia and Missouri. In the northern part of its range it tends to inhabit open turfey slopes and fields, while to the south it is more likely to grow in shady thickets and woods. In its middle range in Connecticut it thrives either in sun or shade so long as the site does not become parched. Though perhaps more common and vigorous on acid than on limy soils it certainly does not entirely shun the latter.



Houstonia caerulea

The *Houstonias*, of which there are a number of species in temperate North America, belong to the Rubiaceae, the Madder family. The family is chiefly tropical containing the Coffee- and Peruvian-bark trees, and our genus is named by Linnaeus for Dr. William Houston, an English botanist who specialized in tropical American plants.

Our Bluets, also called Innocence or Quaker-Ladies, form small pads of delicate small-leaved tufts joined together by short thread-like rhizomes, which remain green over the winter but do not reach large dimensions. Particular plants may be only annual in duration or may persist for a few years, but in congenial sites they self-sow readily and reach flowering size within a year. An individual plant calls to mind an old fashioned brooch of intricate gold filigree jewelled with tiny brilliant green leaves and delicate flowers of enamel. From even the smallest tuft of foliage there springs up as the season warms a dense tangle of wiry, thread-like stems branching as they go with a few tiny leaves paired along the stems, each filiform branch carrying a single 4 petaled, salverform blossom. These guileless flowers in their jostled cluster show a range of blue from the palest almost white to deep sky blue, all with a yellow eye. They range in size from only 2.5 to 4 full millimeters across.

In England a form of Quaker-Ladies has been selected for its large flowers of deep blue color and nominated 'Millard's Variety.' This has been for years propagated vegetatively by division and by cuttings and even tends to come fairly true from seed of segregated plants. In the wild pure white forms have been found and are listed as forma *albiflora*.

The range of flower size and color suggests a program for an enterprising plantsman. By collecting the largest flowered and deepest colored forms and growing them in segregation from the general run, seedlings from these plants by selection could doubtless in a very few generations produce a superior strain for garden culture.

There is also the possibility that this species as commonly found can be crossed with the variety *faxonorum*, found only in alpine regions of the White Mountains of New Hampshire and on the borders of streams on the islands of St. Pierre and Miquelon off the southern coast of Newfoundland. This handsome variety has large pure white flowers with a deep golden center produced on plants of firmer substance throughout. Variety *faxonorum* appears to be reliably perennial in nature but is not easy to grow in more low-land gardens. Hybrids might have ease of culture with increased size and substance.

Yet another possibility is a program of hybridizing with the more southern species, *H. serpyllifolia*, the creeping, thyme-leaved Bluet. This species, a good garden plant in its own right, forms large mats of closepacked, deep green, small foliage and is certainly a long lived perennial. The flowers, on characteristic wiry stems, are always a good intense blue but they are not as thickly set as are those of *H. caerulea*. The southern mat former is found in really moist soils along streams in the mountains of Pennsylvania and West Virginia to Georgia and Tennessee. Hybrids between the two species could possibly combine the virtues of both.

There are other quite different species within the genus, a group of garden worthy upright perennials up to 2 feet in height, bearing opposite leaves up the stiff stems and tubular pink flowers in clusters at the apex. In all, this is a genus of native plants worthy of more attention than has so far been given it by American rock gardeners.

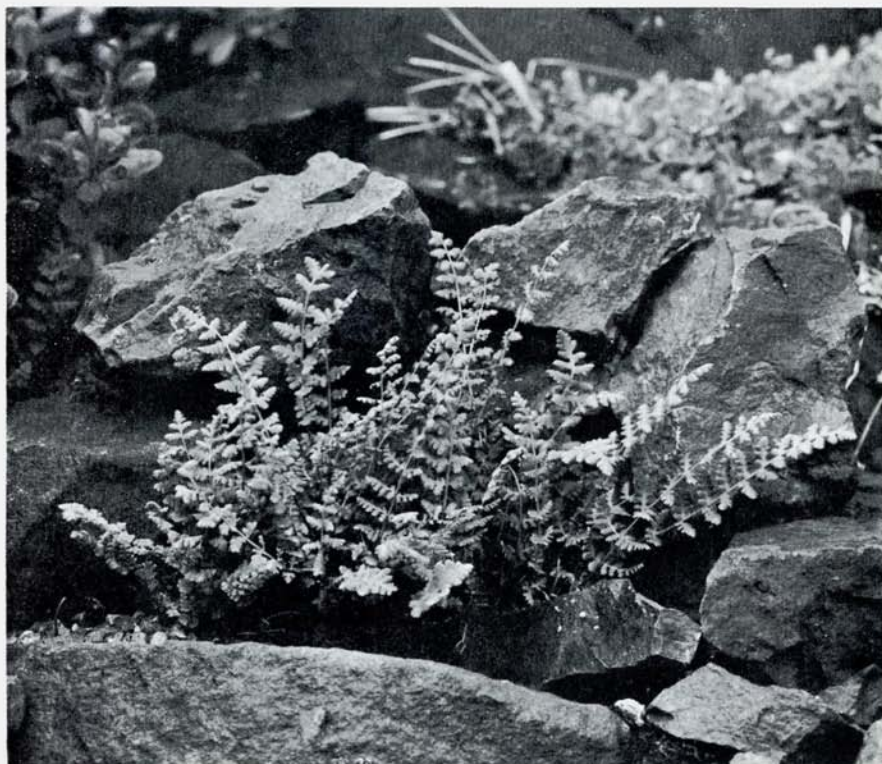


Figure 1. *Woodsia scopulina*

J. R. Baggett

ROCK GARDEN FERNS

Woodsia scopulina, ilvensis, and obtusa

James R. Baggett, *Corvallis, Oregon*

Among the smaller ferns useful for the rock garden, the *Woodsias* are perhaps less favored than the *Cheilanthes* and *Asplenium* species. This is probably because they lack the firmly evergreen leaves of the other two genera, and the silvery colors often bestowed by the scales or hairs of *Cheilanthes*. They are, none-the-less, easy, interesting, and beautiful ferns which belong in every rock garden collection. Although all of the *Woodsias* may be worthy of culture, only *W. scopulina*, *ilvensis*, and *obtusa* will be discussed here, with a promise to consider some others in a future article.

The genus *Woodsia* is comprised generally of small to medium, densely tufted ferns which grow in rocky habitats. The number of species in the genus is a matter of great disagreement and ranges from 21 to 40, depending on the botanical author consulted. They are ferns of cooler areas, either northern or high altitude and many are very hardy (four are found in Alaska and two of these, *W. alpina* and *W. glabella*, range to near the northern coastline). *Woodsias* are found around the Northern Hemisphere, in South America, and one species grows in Africa. The following eight species are found in the continental United States: *W. W. alpina*, *ilvensis*, *glabella*, *mexicana*, *obtusata*, *oregana*, *plummerae*, and *scopulina*. In addition there are two which are sometimes considered varieties: *W. appalachiana* (*W. scopulina* v. *appalachiana*) and *W. cathartiana* (*W. oregana* v. *cathartiana*).

Of the genera of small rock ferns, *Cystopteris* is the nearest relative, being placed with *Woodsia* in separate families, such as *Aspidiaceae* or *Athyriaceae*, by some authors. The *Woodsias* somewhat resemble *Cystopteris fragilis* in size and general appearance, but *Woodsia* foliage has more substance and is more persistent through the season. The key character to distinguish *Woodsia* from *Cystopteris* and other ferns is the inferior indusium, or covering of the sorus. In *Cystopteris* the indusium is a simple hood-like structure which attaches to one side and partially under the sporangia. The sporangia of *Woodsia* are formed on the indusium which resembles a saucer or bowl, except that it is usually split into many scale-like segments. The form of the indusium, along with the presence and characteristics of hairs or scales, is important in differentiation of *Woodsia* species. Leaves are pinnate to bipinnate, with considerable similarity among the common species.

The ROCKY MOUNTAIN WOODSIA, *W. scopulina* (Figure 1), is medium in size among the species, commonly reaching 5-7 inches in height. The leaves are essentially bipinnate with the pinnae well spaced. The sori are borne in profusion, giving the undersides of the leaves a brown and thickened appearance. The most important identifying character is the presence of hyaline, jointed hairs with glandular tips, on the rachis and leaf undersides with a few on the upper leaf surface. The indusium is readily visible and could be described as moderately dissected with uneven or ragged segment tips.

W. scopulina is primarily a fern of Western North America from Alaska and Saskatchewan to California, New Mexico, and Arizona, but also ranging sparsely into Quebec, Ontario, and Northern Wisconsin. It grows in rock crevices and talus slopes. Since some botanists have it preferring calcareous soils and others non-calcareous, I suspect it is mostly indifferent. In Central Oregon it is common in rugged lava flows at about 4000 ft. elevation, where its roots penetrate the spaces between rough pieces of basalt. The summers are dry but there is adequate moisture during the rest of the year. The soil around the roots consists of a little pumice dust and decaying organic material. In the garden this *Woodsia* gets along well in rock crevices and ledges filled with the usual organic-gritty soil mix and some nourishment to get started. It is tolerant of normal irrigation

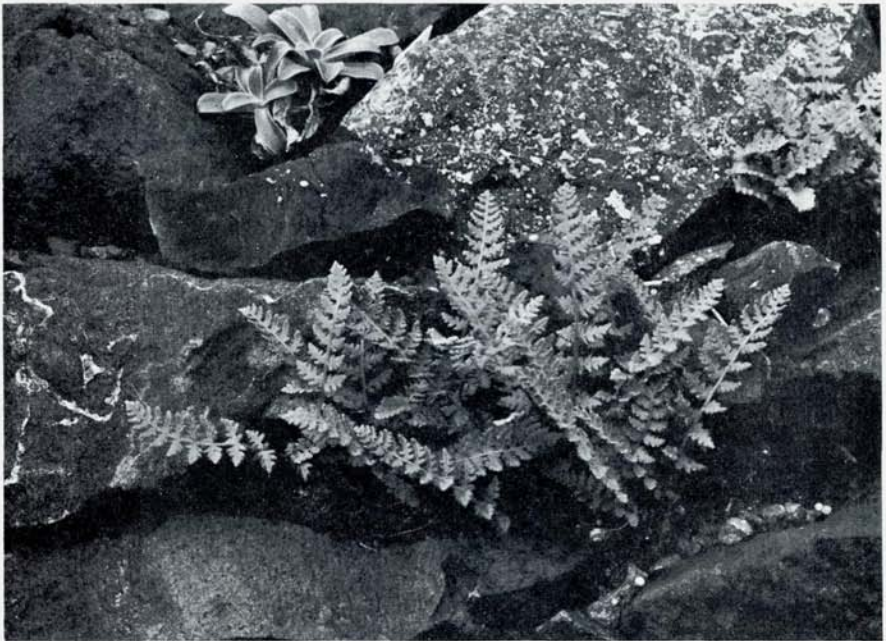


Figure 2. *Woodsia ilvensis*

J. R. Baggett

and winter rains, provided there is good drainage, and is fairly drought tolerant when established. In my garden it is dependable and pleasing, requiring no special care. It does best in afternoon or partial shade, and though it will grow in full sun, the foliage browns in midsummer under such conditions. With some shade the leaves will often be green and attractive through August, but they characteristically become brown toward the end of the summer. Some new growth sometimes occurs in the cool moist weather of fall. At the end of the season or during the winter the leaves should be removed completely.

The RUSTY WOODSIA, *W. ilvensis* (Figure 2), is slightly smaller, though not the smallest of the genus, commonly growing to 4-5 inches. Although it can greatly resemble *W. scopulina*, the pinnae are usually less reflexed, less deeply incised, and have fewer divisions. These differences affect the general appearance, as can be vaguely seen in the photographs. The two species can be differentiated readily with a lens, because *W. ilvensis* has scales mixed with long slender hairs which are usually present in profusion and become matted over the sori. The indusium in *W. ilvensis* is split into many more and thinner segments, but these are difficult to see and differentiate from the foliage hairs when only a hand lens is available.

W. ilvensis is widely distributed around the entire Northern Hemisphere, but limited to the northern or mountainous portions. It ranges as far south

as about 35° latitude, *ie* in Japan and the United States. In North America the range includes Alaska, much of Canada, the Northcentral and Northeastern states and isolated locations in the Eastern mountains as far south as North Carolina. It is absent from the Pacific Northwest states. The habitat is the usual rocky situation, but generally excluding limestone.

Aside from a possible greater aversion to limestone soils and rocks, the culture of *W. ilvensis* is the same as for *W. scopulina* and I find them equally easy to grow.

The BLUNT LOBED WOODSIA, *W. obtusa* (no photo available), is the largest Woodsia found in North America and, as my available information suggests, may be the largest in the world. It can reach about 20 inches in height and easily exceeds 1 ft, with an open, rangy, and sometimes untidy appearance. Though the common name suggests blunt lobes, this seems to describe only the sterile leaves, because the fertile leaves could easily pass for giant versions of those of *W. scopulina*. Other than size, this fern can be recognized by the short, stiff, glandular bristles which occur thickly on the stipe and rachis, and by the indusium. This is comprised of five or six broad segments and looks like a star with somewhat ragged points. The stipe and rachis are sparsely adorned with scales.

The range of *W. obtusa* is much more southerly than the preceding species, including the Southern states to Western Texas, north to Minnesota, and east to Ontario. It is missing from all the Western states. The habitat is more diverse, including well drained banks and shallow soil over rocks, as well as truly rocky situations. In many areas it is very abundant, earning the name of Common Woodsia.

W. obtusa is easy to grow, and though not so small, compact, or as desirable in many rock garden situations as other species, it has its place and seems well worth including in this article. There is a certain pleasure from ferns which plant themselves around the garden by spores, and this one does it almost to the point of being a weed. Yet it is easy to pull out and I have found it necessary to eliminate very few of them. More than the other Woodsias, *W. obtusa* tends to continually produce new leaves, making it possible, by trimming out the older ones, to have green presentable foliage nearly all year. In spite of its southerly range it appears to be adequately hardy, as are *W. scopulina* and *W. ilvensis*. All three of these should thrive in most North American rock gardens and should not be missing from your collection.

COLORS AND COMBINATIONS

Selma Fuller, Easton, Connecticut

The short *Rhododendron* 'Ramapo', useful in the rock garden, is especially striking if its unusual color is emphasized. It goes well with the usual color of *Phlox divaricata*, but it looks especially well with a turquoise shade that appeared at our place and which we are propagating. As an edging for this planting the unusual plum colored shade of myrtle, *Vinca minor*, is effective.

If a sunny rock garden has a vista that looks into dark woods the tall white spires of *Cimicifuga racemosa* are peaceful looking. There are different species of *Cimicifuga* which happily bloom at different times. All are good. Seed is produced generously. Does anybody know how to get the seed to perform?

The short *Rhododendron* 'P.J.M.' is said to have different shades, but the shade usually seen could be a bit difficult if it did not come so early in the spring that any color is welcome. At a great rock garden this plant is used in quantity, and to subdue its pronounced pinky-purple a gardener used the greatest quantity of dazzling yellow primroses. Never would I have thought of this. But seeing is believing. The combination was striking and beautiful. It was a Constance Spry effect. She was famous for using combinations that just could not be used together, and putting with them what it took to make a glorious splash. I once heard her lecture. She showed the array of colors she used in the dishes for the wedding dinner of Mrs. Simpson and the Prince of Wales. At the question period a wistful woman asked, "Mrs. Spry, wouldn't those colors be dangerous used together in a garden?" Constance Spry answered "Madam, there is nothing dangerous in a garden except anemia."

For the hot, and sometimes dry days of August, we welcome *Paronychia canadensis*. While this is an annual, and comes up thickly from its dropped seed, it could not be easier to restrain. It does not drop its seed, to any extent, until early fall. It can be used to make a bowl full of intense lacy green for the house. It will look fresh and tender in the driest weather, and covers the space where early bulbs have bloomed. It does not appear in abundance until late in the season, and though its roots are so small as to look almost non-existent, this dainty, fragile plant appears to put weeds to flight. It sometimes appears in the seed list, and should be sprinkled as soon as received around the place where it is to grow. It is possible to transplant it, but it will present a scrawny appearance for that year. But this is an excellent way to get a good stand for the following year. It grows naturally in semi-shady places in our woods, but I have found only isolated plants, and never the luxuriant patches we encourage in our garden. This 8 inch plant is a true friend to the gardener who grows lazy in the hot weather of summer. It is a good cover for the space left by *Primula sieboldi*.

One of the finest trees for the edge of the rock garden is the Chinese dogwood, *Cornus kousa*. If the pocketbook is fat, buy one ready to bloom. If not, raise your own from seed, which often appears in the seed list. It is gratifying to see how fast they grow, and how soon they bloom. There is at least one wayside stand in Connecticut that sells 2 and 3 feet tall plants at reasonable prices. This is no doubt true wherever *c. kousa* will grow, for the plants come up of their own accord by the dozens under a blooming size tree. This tree blooms after our own dogwood, *Cornus florida*, has finished blooming, and makes a fine effect if underplanted and surrounded with the *Phlox divaricata* 'Fuller's White.' It is my ambition to edge this planting with *Phlox stolonifera* 'Ariane' and with myrtle, *Vinca minor*, of the unusual striking white variety.

HURRICANE RIDGE

Olympic Mountains State of Washington

By Gus N. Arneson

The Olympic Mountains, northernmost segment of the Coast Range that parallels the Pacific Coast, occupy most of the Olympic Peninsula at the extreme northwest corner of the United States. An irregular mass of deep, heavily wooded canyons and towering peaks, the Olympics are believed to have been formed during 120 million years of alternate subsidence, sedimentation, uplift, distortion, and erosion. Rising almost from the edge of the sea to elevations well over 7000 feet (of almost a hundred named peaks that form the jagged system, twelve rise to elevations ranging from 7,015 to 7,954 feet) they form a spectacular scenic wonderland easily accessible from Seattle, one of the host cities for the 1976 International Conference. They also constitute a vast arboretum and botanical garden of plants through the Transition, Canadian, Hudsonian and Arctic-Alpine Life Zones.

Easy to approach but not notably easy to penetrate, most of this labyrinth of glacier-carved canyons leading up to perpetual snows can be explored only by arduous although immensely rewarding back-packing. There is, however, one outstanding exception — Hurricane Ridge. This area, a mile above the level of the sea, can be reached by automobile over an excellently graded and paved road that winds its way for 18 miles from Port Angeles on the Strait of Juan de Fuca. The terminus of the road is a well equipped National Park Visitor Center at the 5,229 foot elevation on Hurricane Ridge. From this lodge is an unobstructed 180 degree panorama of glaciated mountain peaks and forested canyons; and behind and to left and right extend flower carpeted alpine meadows traversed by excellent walking trails. From this point, also, a relatively narrow but well maintained road permits automobile travel through high alpine country for twenty miles to Obstruction Point. It was at this Visitors Center that more than forty members of the Northwest Chapter of ARGS assembled on the morning of July 19, 1975 for a field trip and to sharpen up plans for part of the program to be offered participants in the 1976 conference.

Plant life of the Olympics is tremendously varied. It ranges from the mighty forests of the Transition Life Zone which includes the "Coniferous rain forest" where-in thrive such giants as *Picea sitchensis*, *Tsuga heterophylla*, *Pseudotsuga menziesii*, and *Thuja plicata*, sheltering lush ground covers of flowers, shrubs, ferns, mosses, and fungi, to the many-flowered meadows of the Hudsonian and Arctic-Alpine Zones of which the Hurricane Ridge Area is a magnificent example. Almost a thousand flowering plants are reported as native to the Olympic National Park of which not less than twenty are found no other place in the world. Of those that inhabit higher and colder elevations most are found at some season, along the Obstruction Point road and the trails that thread their way from the parking lot on Hurricane Ridge.



Typical view of Olympics from Hurricane Ridge.

Gus N. Arneson

The trails most frequently followed are wide and paved with asphalt. They are comfortable to walk, even for those of us whose rugged climbing days are past, and because little attention to safe footing is required more can be directed to the flora, fauna and scenery. Our party followed the one and a half mile trail to the summit of Hurricane Hill (Elevation 5,757 feet) and reveled in alpine glory.

The wish that we could tell our 1976 visitors precisely what they will see when they walk these trails is earnest but vain. The list would be too long but, under any circumstances, the exact time of flowering for any species is variable. Where spring, summer and fall are compressed into three months or less and the first flowering must wait the melting of last winter's snow pack, which may have been heavy or light, exact dates for the best display of a given species are impossible to predict. It can, however, be said with confidence that the meadows will be lovely and that many of the cherished species will be in bloom.

Certainly, someplace along the trail will be fields of *Erythronium grandiflorum* and *E. montanum* and there will be *Aquilegia formosa*, *Lilium columbianum*, charming cushions of *Phlox diffusa* on rocky slopes or chinks in rock ledges. There will be various *Penstemon*, quite surely there will be *Rhododendron albiflorum* in bloom. The probability is high that someplace

along a trail *Campanula rotundifolia* will be found and possibly, perhaps at a high point on the trail to Hurricane Hill fortune and the endemic *Campanula piperi* will be smiling. Those who venture out the Obstruction Point road may even see the rare white form of *C. piperi*. Even more rare but an alluring possibility along this road is the indigenous *Viola flettii*.

The meadows are enlivened by various *Alliums*, several *Polemoniums*, *Epilobium latifolium*, *Heuchera glabra*, and colorful yellow clumps of *Eriophyllum lanatum*. Displays of the deep purplish-pink *Phacelia sericea*, of *Saxifraga bronchialis* var. *austromontana*, *S. caespitosa* and *Erigeron compositus* var. *trifidus* are highly probable. So also are *Geum triflorum* var. *campanulatum* and *Synthyris pinnatifida* var. *lanuginosa*. *Petrophytum hendersonii* might be found forming garlands in the chinks of rock ledges and clumps of *Douglasia laevigata* commonly grace rock outcrops up near the summit of Hurricane Hill. There will be *Sedum divergens* and the rare but lovely *Collomia deblis* var. *larsenii*.

But enough. We cannot name them all and even if we could the printed list would make somewhat dull and uninspiring reading where as the flora of the fragrant windswept ridges of the Olympics is brilliant and glorious. Come to us in 1976 and we will show you.

OBITUARY

Dr. Carleton R. Worth

On the Saturday afternoon of May 24 about fifty friends, neighbors, academic colleagues and fellow-gardeners gathered at the rural cemetery near West Groton, New York for a graveside farewell to Carl Worth. From the cemetery knoll only one ridge and farmstead separated us from the Worth home, where lilacs in more than the usual variety reminded the passer-by that here had been a garden of renown, so admirably and appreciatively described by Mrs. Freeman in the Bulletins of October, 1973, and April, 1974.

The American Rock Garden Society's Award of Merit was given Carl Worth in May of 1966. His photograph and the citation appear in the July 1966 Bulletin. For a long period, October 1954 to October 1962, he edited the Bulletin of the American Rock Garden Society, and his wide interests aided in the growth of the society during that time. As space was available he shared with us from his notes made in Chile in 1938 on the University of California Botanical Garden's plant-hunting expedition. John Watson at the New Haven Winter Meeting of 1974 spoke of the help he had received from Dr. Worth in planning the Cheese & Watson Chilean Expedition.

Many plant societies, many gardening friends across the world must now adjust to the end of his contributions concerning the knowledge of and evaluation of some of the rarest and most interesting of rock plants.

B. H.

Review of Saxifrages of section *Porophyllum*

Drs. Radvan Horny, Jiri Sojak, Karel Webr

Prague, Czechoslovakia

Editor's Note: We reprint here from the Bulletin of the Rock Garden Club of Prague, January 1974, an important taxonomic study of the Kabschia saxifrages. The study was much needed. Now for the first time we can see where in the spectrum of species and cultivars (including hybrids) our own plants belong and whether varieties we may see in a nurseryman's list are radically different from whatever we may possess or merely minor variants.

The translation of the introductory text was provided by the authors. The color descriptions in the lists were translated with help of a dictionary by myself. Any risible ineptitudes derived from the difficulties of translating color words from one language to another and are not the fault of the authors, who obviously took great pains to be precise.

The lists have been somewhat simplified and lists four and five, unplaced cultivars and invalid names, have been omitted, as have the formal latin descriptions of new names. What is presented is the results of the authors work, not the reasons for those results. In any event the full explanation for specific assignment to categories must await the promised book.

What the gardener needs now is an evaluation for color, growth habit, and ease of cultivation (or should I say possibility of cultivation) of the cultivars within each hybrid group. H. Lincoln Foster, our leading expert and hybridizer of these plants, has promised to comment on this study and perhaps will help in this matter.

The letters following the name of each cultivar refer to the number of flowers on each stem. FF means few-flowered (5 to 10), MF many-flowered (more than 10).

Saxifrages of the section *Porophyllum* (*Kabschias*) are by far the most beautiful and the most popular rock garden plants. In Czechoslovakia they are particularly popular because the climate is suitable to most of them. They may be grown in every garden and even in pots and dishes.

Since the end of the last century, when these "dwarfs" were discovered for rock gardens, many hybrids and cultivars have been obtained from rare and not entirely hardy species. Many of them are even more beautiful than their parents. Most of them came from Great Britain and Germany; there are recent interesting introductions from the USA. Many have been properly described in special literature. However, many have been distributed without any proper description, frequently under incorrect names. The confusion is caused also by commercial interests; in more than few cases, nurseries sell ordinary quickly and easily growing hybrids under labels indicating rare ones.

Unfortunately no publication is available which would provide detailed information on this section from the horticultural viewpoint, including all species, hybrids, cultivars, their names, synonyms and incorrect names. After almost ten years' study obtaining and checking a plentiful living material, scanning foreign literature, which was not always easy to obtain, and long and tedious comparisons of foreign collections and herbaria, we have almost finished a publication including descriptions of all saxifrages belonging to

the section Porophyllum.

The book, which will be lavishly illustrated, will also contain all synonyms and incorrect names and an index. Special attention will be paid to the exact morphological description, to the differences between similar and related plants, to cultivation, propagation etc.

The lack of special literature in this country has resulted in a confusion; nurseries and professional growers as well as amateur gardeners offer bona fide incorrectly named plants. Members of the "Rock Gardeners Club Prague", who wish to have their plants correctly and validly named, for the purposes of international exchange and shows, especially of our yearly traditional Prague Rock Garden Show, have long demanded such publication which would remedy the situation.

We have decided therefore, together with the Club's Board of Editors, to publish at least short account of the prepared book. Owing to page limits, we list only correct names, basic data on the number of flowers per stem and colour of petals. A question mark indicates doubtful information. The number of flowers per stem is an average from different plants grown under different conditions for many years. There may be exceptions: "few-flowered" means 5-10 flowers per stem; "many-flowered" denotes a plant with more than 10 flowers per stem. The sign "x" following cultivar descriptions indicates that the information is taken from literature and has not been checked in living plants. There are several properly described plants which are likely to have disappeared from cultivation. The sign "k" denotes plants which are evidently cultivated in Czechoslovakia. It was not possible to substantiate and explain all the nomenclatural changes in this account; this will be done in the book. We believe that in the meantime this account will prove useful as a guide in the jungle of names.

Much attention was given to the nomenclature. That of the wild species follows the *Code of Botanical Nomenclature*, 1972, that of plants of garden origin conforms to the *International Code of Nomenclature of Cultivated Plants*, 1969. The wild species did not present any serious problems, so that it was possible for us to make use of the original sources, though unfortunately, sometimes obsolete. However, we had to construct a quite new system of cultivars, to comply with the requirements of the Code. Our purpose was to arrange the various cultivars into natural groups and to designate all the descendants of a parental combination with one Latin binomial. This name must comply with the rules of botanical nomenclature, particularly as far as the priority is concerned. This classification, based on parentage, real or putative, and genetic relationships, makes it possible to construct a natural system of this difficult section.

Obviously, cultivars, the parentage of which is unknown or ambiguous cannot be classified this way. In all 16 new binoms are proposed and validated for crosses not yet described or described invalidly. In full agreement with the requirements of the Code, it was necessary to change the names of some cultivars, since according to § 50 no name can be repeated in the same class of cultivars. Following § 19 of the Code we also had to introduce new names for cultivars denoted only by a binomial. Some changes were made to comply with § 31.

This procedure was duly considered in every case. The names were chosen to linguistic and cultural atmosphere and tradition of the countries where

the cultivars originated. British introductions were given English names derived from geographical terms, names of outstanding historical personalities, musical pieces, theatre plays etc. German introductions were named in the same way. The history of cultivars and names of their authors were also taken into account. Thus we have reconciled the difference between German and British classification of garden introductions elucidating also some problems which have caused much confusion among Saxifrages of the section Porophyllum.

To find out the oldest valid Latin name of a hybrid was often difficult. An exception is Sundermann's old hybrids. Later authors did not distinguish between cultivar names and Latin binomials. In these cases we suppose that names beginning in small letters and having Latin form were intended as botanical names for crosses; names beginning in capital letters are mostly derived from modern languages, have no Latin forms and endings and were obviously intended as cultivar names. Unfortunately, these reasons make it necessary to refuse several common names as, for example, *S. x riverslea*. It is difficult to decide who is the author of descriptions published in "Awards of Merit" in Gardener's Chronicle — is it the author or the "Floral Committee"? We suppose that the descriptions were compiled by the committee; they are unlikely to have been provided by the growers. Anonymous names are invalid; however, names in articles initialed "W.I." are considered valid because these initials clearly refer to W. Irving. Names mentioned in commercial catalogues and articles without clear diagnosis, containing only some features common with many other hybrids, e.g. "yellow", "caespitose", etc., are not accepted as valid by the present authors. A valid diagnosis can, of course, consist of one single word but this must have an exact meaning, a logical sense and a differentiating characteristic. Refusing these names we follow § 34/3 of the Botanical Code. Since 1935, no botanical name lacking a Latin description has been considered valid.

The list is divided into five parts:

1. *Wild species and natural hybrids*

For convenience three large geographical areas are adopted in our list: 1, Europe; 2, Caucasus and Asia Minor; 3, Central Asia, Himalaya, China. This part also includes natural hybrids and their nothomorphs, i.e. morphologically distinguishable forms of hybrids, denoted by separate names; abbreviated as "mn". In the absence of a natural subdivision of the section Porophyllum, the species are not ordered alphabetically within geographical areas. Following H. Smith, 1958, we also include Engler's section Tetrameridium. On the contrary, the Squarrosae group (*S. caesia*, *S. squarrosa* and crosses) was excluded from the list since we do not consider their relationships to the section Porophyllum sufficiently clear. There are features indicating relationship to the section Euaizoonia (see also H. S. Wachter, 1964).

2. *Cultivars of wild species*

arisen by selection from seedlings or selected from plants growing in nature. In many cases their origin cannot be proved. Some might have originated as hybrids of intraspecific variants and forms. Some natural forms with no taxonomic status, e.g. *S. burserana* 'Crenata', are here listed as cultivars.

3. Cultivars of hybrid origin listed under binomial names

Latin names of hybrids are arranged alphabetically, and so are cultivars under binomials. Parents are quoted in alphabetical order following each binom. For convenience, original names are given in parentheses. Attention should be paid to the orthography of names: Latin binomials in italics (for hybrids, the sign "x" is used), names of cultivars, cv., are capitalized and placed in single quotation marks. Provisions of the Code allow the use of cultivar names with the respective Latin binomials as well as without them, e.g. *S. x elisabethae* 'Boston Spa' or *S.* 'Boston Spa'.

4. Not-classified cultivars

are grouped separately; the parentage is mostly unknown or the published information is insufficient. We have not had the opportunity to study the majority of them on living material. We believe that by further studies this list will be gradually reduced.

5. Invalid, incorrect or doubtful names and plants

fall in the last group. The list is not entirely exhaustive; it was compiled with regard to the most frequent mistakes in the world literature (older and scarce botanical synonyms have been omitted) and to specific Czech errors and deep-rooted mistakes persisting in gardens and collections and, unfortunately, also in recent literature.

Latin diagnoses of new binomials are given in the appendix. A more detailed communication will be published in special botanical literature; herbarium specimens are consecutively deposited in the collections of the Botanical Department of National Museum in Prague/Museum of Natural History. The type material of the new binomials is also on deposit in that institution.

This list contains in all: 90 wild species and hybrids, 44 intraspecies taxas (subspecies, varieties, forms and nothomorphs) and 273 cultivars.

We are grateful to many foreign specialists and growers for providing living plants, literature, and expert advice. We wish to thank our Czechoslovak colleagues E. Bohmova, O. Duchacova, F. Holenka, K. Horakova, F. Kotek, K. Stivin and V. Stepankova.

I. Species and Natural Hybrids

Europe

- S. aretioides* FF golden-yellow
- S. burserana* 1 or 2 F white
 - var. *burserana* (minor)
 - var. *major*
- S. diapensioides* FF white
- S. jerdinandi-coburgii* F to MF
 - deep yellow
 - var. *herdinandi-coburgii*
 - var. *radoslavovii*
 - var. *rhodopea*
- S. grisebachii* MF purple
 - ssp. *grisebachii*
 - f. *grisebachii*
 - f. *lindtneri*
 - ssp. *montenegrina*
- S. x luteo-purpurea* (=SS *aretioides* x *media*) FF yellow, orange to pink

- S. luteo-iridis* MF pale yellow
- S. marginata* 1 to FF, white to near pink
 - var. *balkanica*
 - var. *borvi*
 - var. *coriophylla*
 - f. *bubackii*
 - f. *coriophylla* (f. *eucoriophylla*)
 - f. *grandis*
 - f. *rubescens*
 - var. *karadzicensis*
 - var. *marginata* (eumarginata)
 - var. *rocheliana*
 - f. *rocheliana* (f. *typica*)
 - f. *velebitica*
 - var. *subuniiflora*
- S. media* MF rosy purple
- S. x paxii* (=S. *luteo-iridis*)

- x *S. paniculata*) MF ?
- S. porophylla* FF purple
- S. sancta* FF yellow
- ssp. *sancta*
- ssp. *pseudosancta*
- var. *pseudosancta*
- var. *macedonica*
- S. scardica* FF white to near pink, purple
- var. *obtusa*
- var. *pseudocoriophylla*
- var. *scardica* (euscardica)
1. *erythrantha*
- f. *scardica*
- S. sempervivum* MF purple
- f. *alpina*
- f. *sempervivum*
- f. *stenaphylla* (*thessalica*)
- S. spruneri* FF white
- S. stribrnyi* MF purple or white
- var. *apiculata*
- var. *stribrnyi*
- var. *zollikoteri*
- S. tombeanensis* 1-3F white
- S. vandelli* FF white
- Caucasus and Asia Minor
- S. artvinensis* 3-5 F white
- S. carinata* 1 F golden yellow
- S. caucasica* MF yellow
- var. *caucasica* (*levieri*)
- var. *desoulavyi*
- S. colchica* MF yellow
- S. colomnaris* 1F white
- S. dinnikii* 1 F yellow
- S. iranica* 3-4F white to light purple
- f. *iranica* (f. *genuina*)
- f. *purpurascens*
- S. juniperifolia* F to MF yellow
- var. *brachyphylla*
- var. *cinerea*
- var. *juniperifolia* (var. *typica*)
- f. *brotheri*
- f. *juniperifolia* (f. *stevanii*)
- var. *kusnezowiana*
- S. koelzii* 1 to FF light yellow
- S. kotschyi* MF golden yellow
- S. laevis* FF yellow
- var. *laevis* (e)*laevis*)
- var. *pseudolaevis*
- S. scleropoda* MF sulphur yellow
- var. *abchasica*
- var. *scleropoda* (euscleropoda)
- var. *sommieri*
- S. subverticillata* FF yellow
- S. wendelboi* 3-4F white
- Central Asia, Himalaya and China
- S. alghanica* 1F white, flushed pink
- S. alberti* 4-5 F white
- S. alpigena* 1F white
- S. andersonii* FF white to rose
- S. brevicaulis* 1F white
- S. buceras* 1F yellow
- S. calcicola* 1F ? white
- S. chionophila* FF olive green
- S. cinerea* FF white
- S. clivorum* 1-3F white
- S. decora* 2F rose violet
- S. decussata* 1F white
- S. doyalana* 1F white
- S. duthiei* 1F pale rose
- S. elliotii* 1F yellow
- S. flavida* 1F yellow
- S. georgei* 1F white
- S. hypostoma* 1F white
- S. kansuensis* ? ?
- S. kongboensis* 1F yellow
- S. kumauensis* 1F white
- S. lamarum* 1-3F light to deep rose
- S. likiangensis* 1F whitish
- S. lilacina* 1F pale violet
- S. lolaensis* 1F creamy white
- S. lowndesii* 1F clear rosy violet
- S. ludlowii* 1F rose
- S. matta-florida* 1F white
- S. meeboldii* FF yellow
- S. micans* 3-4F white rose tinged
- S. mira* 1F white or rose
- S. monantha* 1F white
- S. mundula* 1F white or rose
- S. nambulana* 1F yellow
- S. nana* 1F white
- S. octandra* 1F white
- S. poluniniana* 1F white to near rose
- S. pulchra* FF purple
- S. pulvinaria* 1F white
- S. quadrijaria* 1F white
- S. ramulosa* 2F ?
- S. rhodopetala* FF deep rose
- S. roylei* 1-3F white
- S. rupicola* 1F yellow-green
- S. saxitilis* 1F white
- S. saxicola* 1F white
- S. saxorum* 1F white
- S. schneideri* FF ?
- S. sessiliflora* 1F white
- S. sherriffii* FF yellow
- S. staintonii* 1F white
- S. stoltzkae* FF white or rose
- S. subsessiliflora* 1F ?
- S. subternata* 1F white
- S. thiantha* 1F yellow or bright citron
- var. *citrina*
- var. *thiantha*
- S. unguipetala* 1F white
- S. vacillans* 1-3F white
- S. williamsii* 1F white

2. Cultivars of Wild Species

S. burserana

- 'Brookside' 1-2F white
- 'Clarissa' 1F white
- 'Coombe White' probably 1F white
- 'Cordata' 1F white
- 'Crenata' 1F white
- 'Crenulata' 1F white
- 'Delicata' ? a
- 'Falstaff' 1-2F white
- 'Gloria' 1-2(3) F white
- 'Grandiflora' 1 (-2) F white

'Magnifica' ? ?

'Rotundiflora' 1F white

'Speciosa' 1F white

S. grisebachii

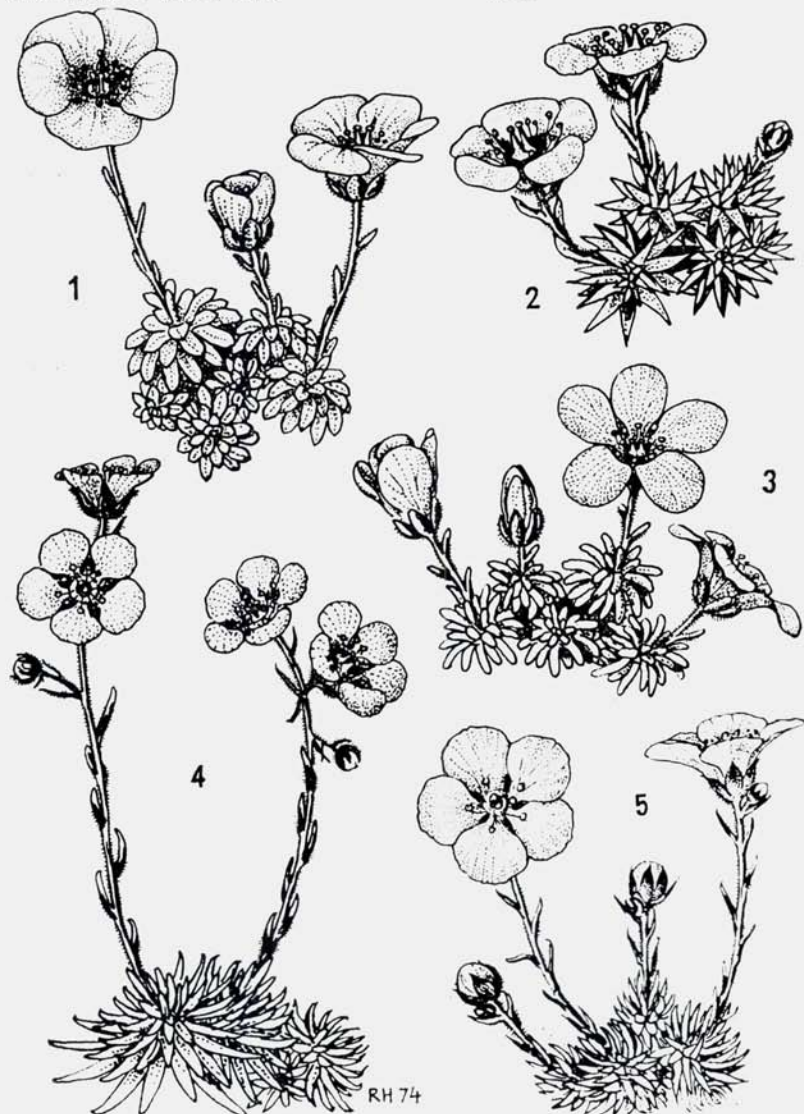
'Wisley' MF deep muddy purple

S. marginata

'Intermedia' (*S. rocheliana* var *intermedia*) FF white

'Jaroslav Horný' FF white

'Major' (*S. rocheliana major*) FF white



1. *S.x anglica* 'Clare,' 2. *S.x irvingii* 'His Majesty,' 3. *S.x anglica* 'Winifred,' 4. *S.x kellereri* 'Suendermannii', 5. *S.x boydii* 'Faldonside'

- 'Minor' (*S. coriophylla minor*) FF white
 'Purpur' (*S. rocheliana purpur*) FF white
S. sempervivum
 'Waterperry' (*S. thessalica* 'Water-

perry') MF dark dull purple

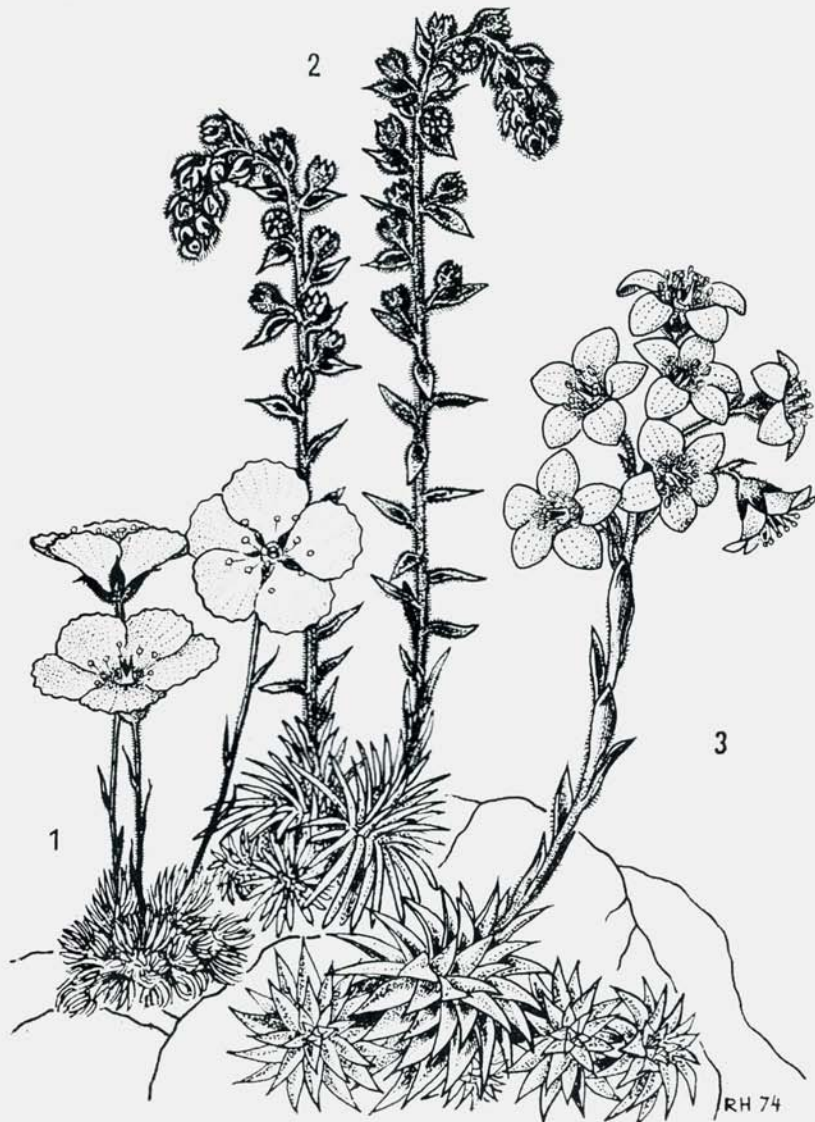
- S. stribrnyi*
 'Isolde' (*S. montenegrina alba*) F to MF whitish, green tinged
 'Tristan' (*S. montenegrina rosinae*) MF light rose

3. Cultivars of Hybrid Origin Listed under Binomial Names

- S. x anglica* New Name (= *S. lilacina* x *S. x luteo-purpurea*)
 'Arthur' 1F deep purple red
 'Aubrey Prichard' ? deep purple red
 'Beatrix Stanley' 1-2F deep violet red
 'Beryl' probably 1F rose
 'Brenda Prichard' ? clear rose
 'Brilliant' ? ?
 'Cerise Queen' (= 'Cerise Gem', 'Christine') 1-3F clear red
 'Clare' 1F pale violet rose
 'Cranbourne' (2-3) F deep rose
 'Delight' ? pure rose
 'Desire' ? ?
 'Elysium' ? delicate rose
 'Exquisite' ? ?
 'Felicity' ? rosy carmine
 'Glorious' (probably = 'Gloriosa') ? strong red
 'Grace Farwell', FF deep claret red
 'Myra' 1-3F rose red
 'Priory Jewel' ? rose
 'Sparkling' ? pure clear rose
 'Valerie Keevil' ? deep rose
 'Winifred' 1F deep claret red
S. x anormalis (= *S. laevis* x *S. stribrnyi*)
 'Gustav Hegi' (*S. anormalis*) MF orange yellow
S. x apiculata (= *S. marginata* x *S. sancta*)
 'Alba' MF white
 'Gregor Mendel' (*S. x apiculata*) MF light yellow
 'Primrose Bee' MF light yellow
 'Pseudo-pungens' MF yellow
 'Pungens' FF light yellow
S. x arco-valleyi (= *S. lilacina* x *S. marginata*)
 'Arco' (*S. x arco-valleyi*) 1F pearly rose
 'Dainty Dame' 1F pale rose
 'Hocker Edge' 1 (2) F pale rose
 'Ophelia' (*S. x arco-valleyi* 'Alba') 1F creamy white
S. x bertolonii (= *S. sempervivum* x *S. stribrnyi*)
 'Amabilis' FF carmine
 'Antonio' (*S. x bertolonii*) FF purple
S. x biaoletti (= *S. grisebachii* x *S. sempervivum*)
 'Crystalie' MF dull purple
 'Bohnmuellerei' MF dull purple
 'Phoenix' (*S. x biaoletti*) MF dull purple
S. x bilekii (= *S. ferdinandi-coburgii* x *S. tombeanensis*)
 'Castor' (*S. x bilekii*) 3-5F light yellow
S. x boeckeleri (= *S. ferdinandi-coburgii* x *S. stribrnyi*)
 'Armida' (*S. x boeckeleri*) MF dull orange
S. x borisii (= *S. ferdinandi-coburgii* x *S. marginata*)
 'Aemula' FF yellow
 'Faustus' (*S. rocheliana lutea*) FF light yellow
 'Josef Manes' FF yellow
 'Karlstejn' FF light yellow
 'Kyrillii' FF light yellow
 'Margarette' (*S. coriophylla lutea*) FF light yellow
 'Marianna' MF light yellow
 'Marie Stivnova' FF yellow
 'Mona Lisa' MF light yellow
 'Pseudo-borisii' MF light yellow
 'Pseudo-kyrillii' MF yellow
 'Sofia' (*S. x borisii*) MF light yellow
 'Vesna' MF light yellow
 'Vincent van Gogh' FF deep yellow
S. x boydii (= *S. aretioides* x *S. burserana*)
 'Aretiastrum' 1-2 (3) F pale yellow
 'Cherry Trees' 1-3 pale yellow
 'Faldonside' (1)-2F yellow
 'Hinhead Seedling' 2-3 (-5) F very light yellow
 'Luteola' (*S. burserana* 'Major Lutea') 1F light yellow
 'Mondscheinsonate' (*S. x boydii* alba) 1-(2) F white touched with greenish yellow
 'Old Britain' (*S. x boydii*) 1-3F yellow
 'Pilatus' 1-(2) F yellow
 'Pollux' 1-2F pale yellow
 'Sulphurea' (*S. burserana sulphurea*) 1F pale yellow
 'William Boyd' (*S. x boydii*)
S. x bursiculata (= *S. x apiculata* x *S. burserana*)
 'King Lear' (*S. x bursiculata*) 4-5F white
S. x clarkei (= *S. media* x *S. vandellii*)
 'Sidonica' (*S. x clarkei*) MF light

- rose
- S. x doerfleri* (= *S. grisebachii* x *S. sibirnyi*)
'Ignaz Dorfler' (*S. x doerfleri*) MF purple
- S. x edithae* (= *S. marginata* x *S. sibirnyi*)
'Bridget' F to MF pale rose
'Edith' (*S. x edithae*) Mf rose
'Pseudo-edithae' FF rosy or whitish
- S. x elisabethae* (= *S. burserana* x *S. sancta*)
'Boston Spa' FF yellow
'Carmen' (*S. x elisabethae*) 1-3 F clear yellow
'Elisabeth Sinclair' ? yellow
'Icicle' 1 (-2) F faint whitish
'Jason' 1-2F pale yellow
'L.C. Godeif 3 (-5) F clear yellow
'Lorelei' 1-5F yellow
'Midas' ? yellow
'Millstream Cream' 1-2F cream to near yellow
'Mrs. Lang' probably FF yellow
'Ochroleuca' 1-3F very bright yellow
- S. x eudoxiana* (= *S. jerdinandi-coburgii* x *S. sancta*)
'Eudoxia' (*S. x eudoxiana*) FF pale greenish yellow
'Haagii' FF deep warm yellow
- S. x finnisae* New Name (= *S. aizoides* x *S. x anglica*)
'Parcevalis' FF orange ochre
- S. x fleischeri* (= *S. grisebachii* x *S. luteo-viridis*)
'Buchholzi' MF pale yellow
'Mephisto' (*S. x fleischeri*) MF reddish orange
- S. x fontanae* (= *S. diapensioides* x *S. jerdinandi-coburgii*)
'Amalie' (*S. x fontanae*) 3F yellow
- S. x geuderi* (= *S. x boydii* x *S. jerdinandi-coburgii*)
'Eulenspiegel' (*S. x geuderi*) 1F (?) yellow
- S. x gloriana* New Name (= *S. lilacina* x *S. scardica*)
'Amitie' 1F pale purplish rose
- S. x grata* (= *S. aretioides* x *S. jerdinandi-coburgii*)
'Annemarie' (*S. x grata*) FF yellow
'Gratoides' FF rich yellow
'Loeflingii' probably FF yellow
- S. x gusmusii* (= *S. lutto-viridis* x *S. sempervivum*)
'Perluteiviridis' MF yellowish
'Subluteiviridis' MF reddish
- S. x hardingii* New Name (= *S. burserana* x ? *s. x luteo-purpurea*)
'Adela' ? ?
- 'Iris Prichard' 3-5F pale rosy orange
- S. x heinrichii* (= *S. aretioides* x *S. sibirnyi*)
'E. Heinrich' (*S. x heinrichii*) FF light rose
'Planegg' (*S. x heinrichii*) FF yellowish
- S. x hoerhammeri* (= *S. grisebachii* x *S. marginata*)
'Lohengrin' (*S. x hoerhammeri*) MF rose
- S. x hojmanii* (= *S. burserana* x *S. sempervivum*)
'Bodensee' (*S. x hojmanii*) MF dull pinkish
'Ferdinand' (*S. burserana* 'Ferdinand') MF light rose
- S. x hornbrookii* New Name (= *S. lilacina* x *S. porophylla*)
'Ariel' FF claret red
'Juliet' FF dull red
'Riverslea' 1-3(5) F deep claret
'Romeo' FF deep claret
- S. x ingwersenii* New Name (= *S. lilacina* x *S. tobeanensis*)
'Simplicity' 1-3F white tinged rose
- S. x irvingii* (= *S. burserana* x *S. lilacina*)
'Eliot Ford' 1F light rose
'Gem' 1F light rose
'Harry Marshall' 1F light rose
'His Majesty' 1 (-2) F white, slightly rose-tinged
'Jenkinsiae' 1F light rose
'Lusanna' probably 1F light rose
'Mother of Pearl' 1F clear pearly rose
'Mother Queen' 1F deep rose
'Rubella' 1F very weak pinkish
'Russel Prichard' probably 1F light rose
- 'Timmy Foster' 1F rose
'Walter Irving' (*S. x irvingii*) 1F very light rose
- S. x kayei* New Name (= *S. x boydii* x *S. x eudoxiana*)
'Buttercup' 1-3F detp yellow
- S. x kellereri* (= *S. burserana* x *S. sibirnyi*)
'Johann Kellerer' (*S. x kellereri*) FF rose
'Landaueri' FF very weak pink
'Pseudo-suendermannii' 1 (2-3) F rose
'Schleicheri' FF very weak pink
'Suendermannii' (= 'Suendermannii Purpur')
- 'Suendermannii Major' FF very weak pink
- S. x kewensis* (= *S. burserana* x *S.*

- porophylla*)
 'Big Ben' (*S. x kewensis*) 1-2 (-4)F
 light rose
S. x leyboldii (= *S. marginata* x *S.*
vandellii)
 'August Hayek' (*S. x leyboldii*) FF
 white
S. x malbyana New Namt (= ? *S.*
aretioides x *S. diapiensoides*)
 'Primulina' (*S. aretioides* var.
primulina) 3-5F pale yellow
S. x mariae-theresiae (= *S. burserana*
 x *S. grisebachii*)
- 'Gaertneri' FF rose
 'Theresia' (*S. x mariae-theresiae*) F
 to MF rose
S. x megaseaeiflora (= *S. burserana* x
 ? *S. x anglica*)
 'Mrs. Harry Lindsay' ? ?
 'Robin Hood' (*S. x megaseaeiflora*)
 1F rose
S. x paulinae (= *S. burserana* x *S.*
ferdinandi-coburgii)
 'Franzii' 3-5F yellow
 'Kolbiana' 1-3 (-5)F pale yellow
 'Paula' (*S. x paulinae*) 1-3 (-5)F



1. *S. burserana* 'Crenata', 2. *S. sempervivum* f. *stenophylla*, 3. *S. scardica* var. *scardica*

- yellow
 'Pseudo-paulinae' FF yellow
S. x petraschii (= *S. burserana* x *S. tombeanensis*)
 'Ada' 2-3F white
 'Affinis' 1-2F white
 'Dulcimer' 1-2F white
 'Hansii' 1-2F white
 'Kaspar Maria Sternberg' (*S. x petraschii*) 1-3F white
S. x pragensis New Name (= *S. x edithae* x ? *S. ferdinandi-coburgii*)
 'Golden Prague' FF orange yellow
S. x prossenii (= *S. sancta* x *S. sibirnyi*)
 'Regina' (*S. prossenii*) MF bronzy yellow
S. x pseudo-kotschyi (= *S. kotschyi* x *S. marginata*)
 'Denisa' (*S. x pseudo-kotschyi*) FF light yellow
S. x rosinae (= *S. diapiensoides* x *S. marginata*)
 'Rosina Sundermann' (*S. x rosinae*) FF weak white
S. x salmonica (= *S. burserana* x *S. marginata*)
 'Assimilis' 1-3F white
 'Boyd's Variety' FF white
 'Funkii' 1 (-2) F white
 'Grosser Prinz' 1 (-2) F white
 'Irvingiana' (= *S. uendernanii* in English tradition) 1-3F white
 'Jenkinsii' FF white
 'Kestoniensis' FF white
 'Marie Louisa' FF white
 'Melrose' (= *S. x bo-dii alba* in English tradition) 2-3F white
 'Obristii' FF white
 'Pichleri' FF white
 'Prospero' 1 (-2) F white
 'Pseudo-salomonii' FF white
 'Rosaleen' FF white
 'Salomonii' 1-3 (-5) F white
 'Schreineri' FF white
S. x schottii (= *S. luteo-viridis* x *S. sibirnyi*)
 'Perstribnyi' FF vermilion red
 'Substribnyi' FF dull yellow
S. x semmleri (= *S. x eudoxiana* x *S. laevis*)
 'Martha' (*S. x semmleri*) FF yellow
S. x smithii New Name (= *S. marginata* x *S. tombeanensis*)
 'Vahlil' FF white
S. x steinii (= *S. aretioides* x *S. tombeanensis*)
 'Agnes' (*S. x steinii*) FF creamy white
S. x stormonthii New Name (= ? *S. caucasica* x *S. sancta*)
 'Stella' (*S. x stormonthii*) MF yellow
S. x stuartii (= *S. x luteo-purpurea* x *S. sibirnyi*)
 'Lutea' F to MF pale yellow
 'Rosea' F to MF dull light purple or tea-coloured
S. x thomasinana (= *S. sibirnyi* x *S. tombeanensis*)
 'Magdalena' (*S. x thomasinana*) FF very light pink
S. x urumovii (= *S. ferdinandi-coburgii* x *S. luteo-viridis*)
 'Ivan Uromov' (*S. x urumovii*) FF yellow
S. x wehrhanii New Name (= *S. marginata* x *S. scardica*)
 'Hahnelore' FF white

Some Woodland Groundcovers for the Northeast

Edward B. Leimseider, Westport, Conn.

Ground covers, as used in our lower New England area, should fulfil certain minimum requirements. They should be evergreen, if possible. They should increase nicely, but not be rampant. It should be easily possible to remove them, if necessary (i.e., they should not be with long tap-roots, or thorns, etc.) They should be low-growing, in keeping with rock-gardening standards, and, to add my personal requirements, should not be gaudy. The flowers are welcome, of course, but the main interest is in the leaf form.

Every individual gardener would consider the use of ground covers on the basis of his own needs, based mainly on the extent of his garden, the light conditions, and the type of soil. My own garden is wide spread mostly in semi-shade, with ordinary clayey wood soil. My original use of ground covers, fifteen years ago, was simply to hide the ground. At that time, I had not restricted myself to American and Japanese plants.

Nor did I have any faith in my ability to grow herbaceous plants that I read about. So, Cotoneasters, and Ajugas and giant Hostas were planted, inspected and condemned, and callously removed, from time to time. As my requirements were refined, choicer plants were obtained, and instead of just covering ground, these plants were used as carefully as the gems that were being hovered over in the raised beds, in special soil mixtures.

All through this transition time, the scrub trees and shrubs were being removed, to let in light, and now there was a new problem — what to plant in the transitions from shade to sun. Also there were areas that had roots on or near the surface, and a thin layer of rocky soil. Here were the places for *Iris cristata* and *Phlox stolonifera*, and *Adiantum pedatum*, the maiden-hair fern.

At the start, I dug up an unhappy area of grass, then cleaned out Smilax, Japanese Barberry, Maples and Viburnums. All this area, in deep shade, was covered with *Liriope spicata*, which to my mind, is the most complete cover. The flowers, in August, are pink and purple, and there are white forms, and variegated leaf forms, assiduously developed by Japanese horticulturists. It has one minor fault — it thickens in three or four years and needs to be divided.

Close to *Liriope* in usefulness is *Galax aphylla*. This native is evergreen, or almost so, bronzed in the winter, with a fine and distinctive flower. *Gaultheria procumbens* is another beautiful Evergreen, with typical Ericaceous bells, and bright red berries that winter over. *Cornus canadensis* is lovely, but more stringent in its requirements for acid soil and moisture. The orange berries, the white bracts, and its slow growth make it a desirable part of the woodland garden. *Shortia galacifolia* is one of our most appealing Appalachian natives, with glossy leaves and white, elegant flowers. *Coptis groenlandica*, in between tree stumps and roots and rocks, is less than an inch high, with white flowers. *Mitchella repens*, the Partridge Berry, is prostrate with dainty pink or white flowers, and orange berries. It will completely cover the ground, choking out any weeds. Perhaps you may have seen the white-berried form at one of our plant shows.

Somewhere there may be somebody who uses *Epigaea repens* as a ground cover, but this seems to me to be almost sacrilegious. How nice it would be to have small and large leaved forms with the flowers ranging from white to red, and in mass.

Clintonia umbellata and *C. borealis* have leaves like Cypridium, with white flowers for *C. umbellata*, and yellow for *C. borealis*. Both have blue berries. The American Pachysandra, *P. procumbens*, is another attractive plant from the Blue-Ridge area. The leaf green color is quite individual, and its flowers in Mid-April, unusual.

Linnaea borealis, the twin-flower, has surprised me with its acceptance of my interest, and has spread widely, over good soil, and over unimproved soil. *Sedum ternatum* gets a little untidy, but has its own distinction. The Epimediums are all excellent, with flowers of white, of yellow, of pink, and lilac-blue.

The upside-down flower, *Vancouveria hexandra*, is related to the Epimediums, and has white flowers. *Waldsteinia fragarioides*, with strawberry-like leaves, has yellow flowers. This is an easy and useful plant. It spreads readily, but is easy to confine. We have previously mentioned *Iris cristata*,

a jewel, and there is a lovely white form. *Phlox stolonifera*, "Blue-Ridge" is an outstanding example of an all-around satisfactory plant and the Dwarf Hostas, perhaps a little too stylish for woodland conditions, are engagingly neat, with spikes of pale pink and purple.

In my mind, I lump Tiarellas, Heucheras, Mitellas and Tellima, into a group of useful landscaping plants, used in mass. All have good leaves, and *Tiarella wherryi*, particularly attractive flowers. The Uvularias have pleasant yellow flowers, seed about readily, and combine nicely with other plants.

For a sunnier exposure, there is *Chrysogonum virginianum*, with a long season of good yellow flowers. It may be divided every two years or so, and is almost infallible in flowering. It is a great transitional plant, to go from semi-shade to sun. This goes well with Antennarias, Coreopsis, and *Phlox pilosa*.

I limit the number of white violets that are allowed, and I will soon start on *Viola labradorica*, which is beginning to overwhelm me. Trilliums are a fascinating group of plants, with my two favorites *T. luteum*, with beautiful mottled leaves, and *T. hugeri*, with large plum flowers.

Way back when, I discovered that I was allergic to Hay-Scented fern, but I moved some clumps to the far edge of the garden, and the expanse of fern, now perhaps twenty feet wide, is breath-taking. Christmas Fern will grow in shallow soil, around roots, and is very handsome. I have started to use *Woodwardia aureolata*, Virginia chain fern in the same way, and while it is a late starter, it is a fine addition to the shade under tall trees.

The Japanese painted fern is late in reaching its attractive state, but the dark purple ribs are beautiful. The dwarf forms of Maiden-Hair fern are choice and ever-pleasing.

Some other plants that enter the category of ground covers deserve to be used in individual settings, also; these would include *Dicentra canadensis*, *eximia*, *D. cucullaria* and *D. oregana*. Blood-Roots, Houstonias, Polemoniums, *Primula sieboldi*, *Potentilla villosa*, *Gentiana andrewsii* and others.

All the above must be considered as the good news. Now for the bad news. I dug up an area that had been planted with the May apple, *Podophyllum peltatum*. I found that the roots of this apparently attractive plant were about a half inch thick, and arranged in strata, like excavations in an archaeological dig. Luckily, it was not near a wall or near delicate plants, so I was able to eradicate it over a period of years.

Now, to mention maintenance. Since we have talked about shade tolerant plants, we must face the horrible tangle of leaves that fall from the trees that cause this shade. These must be removed before the plants are smothered. Maybe the use of plants like Galax and Wintergreen is to be preferable to the use of *Cornus canadensis*, or the Epimediums, because these latter put out new and fragile growth, and the roughness of the clean up might be destructive. The second aspect of maintenance is weeding, that constant chore. The use of mulches is the answer. I use gravel, pine needles, sand and loam, and mixtures of all of these, as I see necessary. Chickweed and Oxalis will be with us forever, but a long trowel, with patience and determination, will overcome.

PLANTS OF JULIAN ALPS AND KARAWANKEN MTS.

Josef Halda, Prague, Czechoslovakia

Tourists visiting Yugoslavia usually spend their stay at the sea coast. But this country provides many other beautiful experiences for nature lovers, the most beautiful of which are certainly the mountains. Drivers travelling to Yugoslavia via Austria through Linz-Ljubljana-Rjeka must pass through the Loiblpass Customs Office by the Yugoslavian village of Jezersko. It is only a few steps to reach the Julian Alps from this eastern area of the Karawanken Mts, the so called Kamnik Alps. Those three mountain ranges are composed of dolomites and perhaps they belong to the most beautiful section of the Southern Alps. I have passed through those parts several times and I would like to draw the attention of Nature lovers planning to visit those places to the most impressive and handsome localities for plants. This contribution is only a small part of all the beauties of these mountains. A description of all the peaks and valleys would hardly be comprised even in a great monograph which certainly will be issued in the near future. But for the sake of amateur as well as professional botanists who may go to see only a few most outstanding species, the designation of the place where the plants occur can make their expedition easier.

As soon as we reach Jezersko, the highest range of Kamnik Alps — masif Grintavec — appears. Our first walk is upwards toward it. If you choose a car to travel you can go as far as a farm placed in the middle of cut meadows. Many of the good quality boards and tourist signs lead us to it. By the way, these three mountain ranges are all signposted quite well. Nevertheless we must go further on foot. The forest is most often composed of spruce, *Picea excelsa*, interrupted by beech-fir forests, *Fagus sylvatica-Abies pectinata* in some places with a richness of herbaceous plants of which the largest part is composed of various ferns from high species to the tiny *Aspleniums* and *Polystichums*. We sight even *Ruscus*



1. *Dianthus sternbergii*, 2. *Rhodothamnus chamaecistus*, 3. *Sax. crustata*, 4. *Daphne striata*, 5. *Gentiana clusii*, 6. *Globularia cordipolia*, 7. *Prim. wulfeniana*.

aculeatus in the lowest altitudes, which is typical in warm oak woods, great numbers of *Helleborus niger*, *Lilium martagon*, various *Symphytum* sp., and *Astrantias* with the most beautiful *Astrantia carniolica* among them. Plenty of *Dentarias* occur on lighter gravelly places. Most widespread is *D. trifolia*. Stony screes in sun are occupied as on our mountains — *Chamaenerion angustifolium* together with *Arabis alpina*. Wetter spots show us mighty clusters of *Ranunculus platanifolius*, purple *Prenanthes purpurea*, yellow-flowered *Senecio fuchsii*, many *Daucaceae*, grasses and in particular *Cypripedium calceolus* is quite plentiful in places. This trip takes almost 2 hours from the farm up to Czech cottage — Ceska koca — held by ropes which is at an altitude of about 1200 m. Almost the whole first half of the trip runs through the deep forest. The forest becomes thinner half way up and the spruces are lower and finally they become bushy. *Pinus mughus* appears between them and also vast pastures which witness to the *Pinus mughus* having created uninterrupted planes, which have been burnt by shepherds. Occasional stony places are occupied by small junipers — *Juniperus nana* with silvery blue needles and blue berries together with vast sheets of *Rhododendron hirsutum* whose purple red flowers dye the slopes from June til August. Under the rhododendrons *Erica carnea* will most often occur in great cushions covered by rose or white flowers and also very beautiful, tiny *Rhodothamnus chamaecistus*, creating very low, dark green carpets with disproportionately big flowers about 5 cm in diameter. The flowers are various shades of rose. Blue flowering carpets of *Globularia cordifolia* are also very striking and rose flowered *Daphne striata* emits its scent finely between them together with white *D. alpina* which is taller and deciduous. The most dry stony banks are decorated with golden yellow heads of *Anthyllis alpestris*. Yellow flowered *Viola biflora*, white flowered with high violet or white flowers and tiny *Myosotis alpestris* with azure blue flowers are inhabitants of wetter, shady places. Vegetation near the Czech cottage is very poor, because a numerous herd of sheep grazes around the house. Shrubs of junipers and rhododendrons, which sheep doesn't eat, dominate here in this place with almost no grass. Near the cottage the way forks. If we choose the left way we reach a waterfall which is not as big as the noise would suggest. The way leading right up takes us to the basin of Grintavec. It is in a very steep scree with an area of many acres and the surroundings are very dreary. Sportsmen ski here until the height of summer and sheep come here to cool off on sultry days. After about two hours walk we reach a terrace which is connected with a scree containing small gravel. Violet flowering *Linaria alpina* together with rose *Thlaspi rotundifolium*, yellow poppy *Papaver kernerii*, tiny *Hutchinsia alpina* native even in our country and small, yellow flowered *Alyssum oviense* are the most striking species among many others. We walk further with the help of irregular terraced paths around the cliffs holding ropes and chains when passing the North Wall. The rock which seems to be desert and bare provides home for plenty of plants, some tiny. Among them are cushions of *Silene acaulis*, *Cherleria sedoides* or rose flowered *Petrocallis pyrenaica* are native also in our mountains. We can see in some places plants which we might regard as nettles if not in flower, but they are *Paederota lutea* with clusters of yellow tubular flowers. *Soldanella minima*,

Ranunculus traunfellneri and *Viola biflora* are here, there and everywhere together with *Gentiana terglouensis* whose light blue flowers shine sadly a long way off. *Rhodothamnus chamaecistus* creates tiny cushions with long stemmed shell rose flowers. On the small outcrops grows one of the most beautiful plants of the Southern Alps — *Potentilla nitida*, the rose flowers of which shine on thick cushions of silvery-hairy leaves. *Dryas octopetala* is here there and everywhere. Climbing up the cushion plants disappear and are exchanged by bunshaped plants. *Eritrichium terglouense* is one of the tiniest and occur at Millers' saddle which we cross in climbing the top of Grintavec. The saddle makes a connection between the top of Mt Skuta which is a few tenths meters lower than Grintavec. Legendary *Eritrichium* is a tiny plant creating small cushions of silvery hairy leaves covered by azure blue flowers with a yellow eye. The plants are difficult to grow in gardens. There are a few Saxifragas. Four species mount to the highest levels. *Saxifraga caesia* and its smaller fellow *S. squarrosa* have given us a natural hybrid called *S. x tyrolensis*. *Saxifraga crustata* is a species with long, narrow leaves having small pits on their brim with lime incrustation. It flowers like our *S. aizoon*. *Saxifraga oppositifolia* grows even at the top of Grintavec creating tightly packed cushions covered with great purple flowers. As soon as we reach the South slopes the character of the landscape and plant species are quite different. The steep, bare slopes of the North side are replaced by vast planes of scree moraines and the slope of the South and West side is not so sharp. We can see small grass interrupted by many small snow fields. There are carpets of *Gentiana pumila* there with a great number of blue flowers and spiral shaped petals together with violet flowering *Saussurea pygmaea*, *Soldanella minima*, *Viola biflora* and *Ranunculus oreophilus*. Grasses include mainly tiny, cushion *Sesleria sphaerocephala* with small blue ears and yellow anthers. *Carex firma* creates uninterrupted planes at the altitude about 2000 m. which are called "firmetum" providing home for many beautiful species. The most handsome is *Primula wulfeniana* with big rose flowers placed tightly above the succulent leaf rosettes. I must name *Gentiana froelichii*,



1. *Phyteuma comosum*, 2. *Thlaspi rotundifolium*, 3. *Ranunculus seguieri*, 4. *Linaria alpina*, 5. *Prim. auricula*, 6. *Viola zoysii*, 7. *Gentiana froelichii*, 8. *Erica carnea*, 9. *Arctostaphylus alpina*, 10. *Rhodo. hirsutum*.

endemic to East Karawanken Mts. and Kamnik Alps which is one of the two *Gentians* belonging to the frigida section with azure blue flowers which seem to be made of glass. It is in full bloom in August and September but we can see its flowers also in June. It is one of the rarest plant species. Further species — *Viola zoysii* — is a tiny, small leaved plant with big yellow flowers. Its close relatives are native in West China. The species is very rare and grows only here in East Karawanken Mts. *Ranunculus hybridus* which seems to be a smaller form of our *R. thora* grows most often in cushion of other plants together with *Gentiana clusii* and *Helianthemum alpestre*. Rock outcrops in grass are decorated by *Primula auricula* which is seen from far away along with *Saxifraga crustata* and *S. squarrosa*. It is an exciting experience to see small cushions of *Campanula zoysii* with tabular flowers shut on their end by white lace. It is a tertiary relic and is endemic to the South Alps. It lives here along with *Campanula caespitosa* and they have produced a great number of interesting natural crosses. *Androsace hausmanii* is not often seen and its small flowers are not too striking. *Ranunculus seguierii* which is like our *R. glacialis* is an actual jewel of the lime rocks. The adpressed rosette of the ornamentally lacinate leaves is handsome in contrast with great, white, waxen shiny petals. In the centre of grassy screes orange flowers of *Lilium carniolicum* shine far away. The height of the plant is hardly 50 cm. The flowers are usually two or three on a plant. In spite of the fact that the bulbs are at a depth of 30 to 50 cm, boars eat them in lower altitudes. This lily is seen in the neighborhood of *Soldanella alpina*, *Trollius europaeus*, a few species of *Aconitum* and many other species of mountain meadows. On the way back we go again through the spruce forest mixed from time to time with beech and fir. There grow *Aposeris foetida* and *Homogyne discolor* in the shade. Big, a few-storied Zoysii cottage, provides very cheap night rest on the South of Grintavec and we can knock out back next day by another way, for example over the Skuta range.

The ridge of the Julian Alps ranges in the North-West direction from Ljubljana. The composition of the plants is in many ways similar to the plants of Kamnik Alps and Karawanken Mts. but some typical plants of those areas mentioned above are absent and in contrast we can see other representatives of this mountain range which attract alpine gardeners from all over the world. Drivers can reach the saddle Vrsic 1600 m. by car and walkers can choose a bus from Ljubljana. We can lodge in Ticarjev dom Tchicharyew house built on the top beside the road. We can undertake our walks or tours on surrounding peaks the nearest of which is Prisojnik. Its Alpine part is very similar to the one of Grintavec. We can see many eritrichiums, saxifragas, *Gentiana terglouensis*. *Potentilla nitida* covers whole stony terraces together with *Campanula zoysii* and *Silene acaulis* and *Petrocallis pyrenaica*. Wet rocks are full of carpets of *Salix serpyllifolia* with tiny glossy leaves, white flowered *Pinguicula alpina*, *Saxifraga stellaris* whose rosettes are handsome. *Thlaspi rotundifolium* and *Linaria alpina* as well as *Alyssum ovirense* and rose ragged *Dianthus sternbergii*, white *Cerastium carniolicum*, low, yellow *Doronicum glaciale*, white flowered *Anemone baldensis*, rose flowering *Valeriana supina*, beautiful *Geranium argenteum* with big rose flowers and blue flowered *Linum julicum*. Vast planes of *Erica carnea*,

Rhododendron and *Arctostaphylos alpina* with white barrel shaped flowers and deciduous leaves occur under the zone of screes together with various species of willow and *Pedicularis rostrato-capitata*, red flowered *Armeria alpina*, yellow-red *Chamaebuxus alpestris*, many species of *Pyrola*, small fern *Botrychium lunaria*, *Heliosperma alpestre* with white, laciniate flowers and many others. Different species flourish in the places with a high layer of humusy soil from which all calcium has been removed by water. Small carpets of *Loiseleuria procumbens* are especially striking when shining with rose starry flowers in close proximity to *Senecio abrotanifolius* with yellow individual flowers, big cushions of *Primula minima*, silvery leaved *Senecio incanus* ssp. *carniolicus* and blue and yellow *Campanula barbata* (*C. spicata*) bearing ears of closely packed flowers. Wet, acid soils are occupied with thick turfs of *Salix herbacea* which often occurs with *Salix reticulata* and can be seen also on bare lime rocks. Acid snow fields can be characterised by the typical *Saxifraga moschata* ssp. *carniolica*, *Oxyria digyna*, *Rumex nivalis* and so on. We here and there find typical lime hater *Rhododendron ferrugineum* with big decorative rose flowers. *Rhododendron* x *intermedium* which we can see very often is a natural hybrid of *Rhododendron hirsutum* and *R. ferrugineum*. We also find interesting plants on rock walls in lower altitudes. Legendary *Phyteuma* (*Physoplexis*) *comosum* occurs here in great quantity. Its leaf rosette is formed from rounded, petioled, toothed leaves from which a stem appears with long petioleless, leaves and a head of barrel-shaped, longly tubular pale violet flowers. Adpressed shrublets of *Rhamnus pumila*, clinging to the surface of the rock flower in spring and are covered by small bunches of black berries in summer. Wetter crevices in which a certain amount of soil permits a bit of plant growth are occupied by saxifragas of which *S. burseriana* is one of the most beautiful. Its leaves are glaucous, spiny and acuminate. Yellow, white rose or more often white flowers with five petals appear in their centre on short stems. *Saxifraga hostii* is a species which belongs to the same group as our *S. aizoon*. It is more robust, the leaf rosette is 15 cm in diameter, and the height of flower stalk is over 50 cm. *Asplenium seelosii* is rare on these rocks. Rocky terraces and the brims of grassy screes are full of plants native in our mountains. There grow e.g., *Leontopodium alpinum* — Edelweis, *Aster alpinus* with violet flowers, *Nigritella nigra* and *N. miniata*. *Gentiana clusii* occurs here in a different, soft leaved form. We can find carpets of *Arctostaphylos uva-ursi* here growing on sunny outcrops and flowering by rose flowers. It is covered by red berries in summer. *Primula auricula* occurs in lower altitudes very often in great quantity. If there is *Primula carniolica* in close proximity on wet, shady rocks they make indiscriminate mutual crossings, mostly violet-flowering, called *P. x venusta*. They are often developed artificially in our gardens and are among the most popular rock garden plants. Almost in the centre of the Trenta valley, a monument of mountaineer Julius Kugy, who was one of the most famous experts on the Julian Alps, is built. This man, together with the Swiss aristocrat, Earl Albert Bois de Chesne, has founded here an alpine garden "Juliana" in 1928 which is one of the most beautiful in Europe. The plants are grouped into models of natural plant communities and the whole garden gives a very natural impression. This garden is well worth seeing.

BOOK REVIEW

RUN, RIVER, RUN, by Ann Zwinger. 279 pp. plus 27 pp. of small print notes, plus index. Harper & Row, U.S. and London, 1975. Illustrated by maps and numerous drawings by the author.

This is a generous book! It has been inspired by the author's engrossment with the 730-mile long Green River, which originates in a glacier high in the Wind River Mountains. It courses for about 300 miles in western Wyoming, loops into a corner of Colorado, and proceeds down eastern Utah nearly 400 miles to its confluence with the Colorado River above Glen Canyon Dam. The book is based on study of seemingly every possible source, from the Spanish Jesuits who traversed the area in 1776, through the nineteenth century writers preoccupied with westward exploration and migration, to the most recent publications of geologists, historians, the U.S. Geodetic Survey, guide books, and whatever else may be pertinent. But more importantly it is written from the knowledge which could only come from acutely sensed personal experience of the river — on foot in its precipitous upper reaches, by canoe, inflatable raft and wooden Green River raft, and at various seasons of the year.

Ann Zwinger has learned to guide a boat through hair-raising rapids, has climbed the steep hills through which the river cuts its way; she has listened to its murmur in the night, has watched the flight of its birds and the activities of small animals occupied with their affairs along its banks. Bone-chilling cold and breathless heat have not diminished her enthusiasm, and she expresses extraordinary tolerance for all its creatures, even the torturing gravid mosquitoes. Her explication of the rock formations and natural history along the river is somehow invested with gripping interest.

Mrs. Zwinger's description of the big dams along the river, Flaming Gorge and Fontenelle is dry and understandably unenthusiastic. Those who planned hopefully to irrigate "farm" land beside the river failed sufficiently to take into account the difficulties of terrain and the alkalinity of the soil.

In the tumbling beginnings of the river, fresh specimens of Rocky Mountain wildflowers sat for their portraits, drawn in spare moments along the way. But the river is very soon down to cutting its way through rocks and an interesting assortment of fossils in near-desert; and from there on the charming flower drawings are of those plants which seem so important just because they occur in such inhospitable surroundings, more sparse than the life of moist tundra, and therefore at least as much to be cherished. For readers of this *Bulletin*, the reviewer feels bound to murmur one word about those common names of plants. The drawings are identified by scientific names, but not the plants only mentioned in the text.

Considering the desolate area through which it flows, the river's banks have at times been populated by a remarkably lively succession of humans — the Indians; the fur trappers who rendezvoused at Brown's Park along the north flank of the Uintah Mountains; Nuttall and Townsend; Dr. Marcus Whitman removing an arrow from Jim Bridger's shoulder; the ominous advent of the first women, Narcissa Whitman and Eliza Spaulding; the

later homesteaders and the problems they had to cope with; the cattle rustlers; the railroad builders. Not very much is said about present dwellers, but some have stretched barbed wire across the river — a bit of a hazard to the canoeist.

Those who have read *Land Above the Trees*, that extraordinary cyclopedia of information on alpine plants and the conditions they grow in, by Ann Zwinger and Dr. Beatrice E. Willard, will know what to expect in the way of felicitous phrase. Ann Zwinger writes from the interest of a naturalist, the eye of an artist, and with the words of a poet.

— Dorothy Metheny

REQUESTS BY MEMBERS

Will the members who are able to fulfill any of the requests below please contact directly the person making the request!

M. Albert Benoit, Av. Theo Sevens #102, B-8500 Courtrai, Belgium, wishes seed of the genus *Silphium*.

M. Pierre Rosset-Klopfenstein, Clochetons #9, 1004 Lausanne, Switzerland, requests seeds of *Viola cotyledon* (Andean sp.)

Mr. B. J. Salter, 33 Stradbroke Ave., St. George, Bristol, BS5 8PJ, England would like seed of *Primula suffrutescens*.

Please send your requests for seed, plants, books, slides and information to Mrs. Sallie D. Allen, 18540 26th Ave. N. E., Seattle, Wash. 98155.

AMERICAN PRIMROSE SOCIETY

offers

Quarterly publications beautifully illustrated, an international seed exchange of approximately 100 different Primulas and a culture chart to assist in the growing of species Primulas.

U.S.A. \$5.00 per year

Mrs. Thelma Genheimer, Trea.

7100 S.W. 209th, Beaverton, Oregon 97005

THE AMERICAN PENSTEMON SOCIETY

Cordially invites you to join its growing list of enthusiastic members.

If you are interested in Penstemons, you will be interested in the activities of the society.

Write to the Secretary,

Howard McCready

1547 Monroe St.,

Red Bluff, Calif. 96080

for Particulars

ROCK GARDEN PLANTS & GROUNDCOVERS

"plants for dry sunny areas
and those shady corners"

Easy things for beginners,

Also some Alpines and Primroses.

Send 25¢ with request

for list to:

Woodland Rockery

6210 Klam Road

Otter Lake, Michigan

48464

THE FERN GUIDE

by Dr. Edgar T. Wherry now available
as a paperback reprint, \$3.00 postpaid.

Quantity discount to dealers.

MORRIS ARBORETUM

9414 Meadowbrook Avenue

Philadelphia, Pa. 19118

CH-7-5777

**SUNSHINE SEEDS
WYOMING, ILL. 61491**

seeds of rare prairie
wildflowers and western
alpine plants. \$.50
and \$1.00 per packet.
stamped, self-addressed
envelope brings our list.
RICHARD CLINEBELL, PROP.

ALPENFLORA GARDENS

17985 - 40th Ave., Surrey, B.C., Canada

Six miles north of U.S. border, off Pacific
Highway. Two miles south of Cloverdale.

Floriferous rockery plants, choice perennials
and alpines, some dwarf shrubs.

Quantity discounts; mail orders welcome
Plant list available.
Open weekends and holidays only.

SUCCULENTS

Hundreds of fascinating varieties.
Something for everyone. Send 25¢
for Illustrated Catalog & Price List.
\$5 for Introduction Special of 8 Dif-
ferent Varieties (Labeled) and help-
ful and exciting information about
each, free catalog, postpaid. You'll
be more than pleased.

HOLLOW HILLS SUCCULENT FARM
Rt. 2, Box 883G Carmel, Ca. 93921

WATNONG NURSERY
The place to get the
"HARD TO FIND" PLANTS

Gaylussacia brachycera

Leiophyllum — Kalmiopsis — Vaccinium

Dwarf Rhododendrons and Conifers
600 Named Varieties

By Appointment, at the Nursery Only

Hazel and Don Smith

201 — 539-0312

Morris Plains, New Jersey 07950

Cold Climate Cactus and Succulents

Plants which live through
below zero winters

List .40 Cents

Pictorial Book \$3.25 ppd.

**Also Succulents from South Africa
and other Cactus**

all of which are frost tender

List \$1.10 extra

BEN HAINES

Dept. 75RGB

1902 Lane, Topeka, Kansas 66604

**STONEHURST
RARE PLANTS**

**DWARF AND UNUSUAL CONIFERS
(OVER 600 VARIETIES)**

DWARF SHRUBS

DWARF RHODODENDRONS

LIST AVAILABLE

1 Stonehurst Court, Pomona, N.Y. 10970
914-354-4049

ORCHID GARDENS

Over 150 Native Plants, Ferns, Club-mosses
Shrubs, Ground Covers, offered in our
Copyrighted Wildflower Culture Catalog.

Send 25¢ for your copy

All plants carefully dug and expertly
packed to arrive in top condition

Mr. and Mrs. Clair Phillips

Route 1, Box 245

Grand Rapids, Minnesota 55744

Sorry we cannot accept foreign orders

**WILDWOOD GARDENS
CHOICE ALPINES**

Rock Plants Bog Plants
Alpine Rhododendrons
Dwarf Conifers

10 Cents For List

Anthony Mihalic

14488 Rock Creek Road

Chardon Ohio 44024

"SORRY, no Canadian or Foreign Shipments"

**URGENTLY NEEDED—BACK ISSUES ARGS BULLETINS
FROM MEMBERS PLANNING TO DISPOSE OF COPIES**

Vols. 1 thru 10, Any and all numbers	Vol. 23, No. 3
Vol. 11, No. 3	Vol. 24, No. 1
Vol. 12, No. 2	Vol. 26, No. 1
Vol. 13, Nos. 1 & 2	Vol. 27, No. 3
Vol. 14, No. 2	Vol. 28, No. 3
Vol. 16, Nos. 1 & 2	Vol. 29, No. 3
Vol. 17, Nos. 1, 2, 3 & 4	Vol. 30, No. 3
Vol. 18, No. 1	Vol. 31, No. 4
Vol. 21, Nos. 1, 2 & 4	Vol. 32, No. 2
Vol. 22, No. 2	

If you have no further use for your copies, your contributions of any of the above will be most welcome additions to the Society's reserve stocks. Please send to the Secretary, (90 Pierpont Rd., Waterbury, Ct. 06705), who will also entertain offers on extensive "runs". Many thanks to past donors; many more are needed to meet demands.

GARDEN ROCKS FOR SALE

Wholesale & Retail

at location in the
ILION GORGE, ILION, NEW YORK 13357

Calcareous Tufa, also called "Horsebone"

The proper kind of stone for rock gardens and
Religious Grottos. Large variety in size, shape
and appearance.

In large quantities—\$25.00 per ton

In small quantities—\$2.00 per Bu.

2¢ per lb.

Selected specimens somewhat more

Depending on size and appearance

JOSEPH T. FERDULA

300 Litchfield St., Frankfort, N.Y. 13340

TOM THUMB NURSERY

Dwarf and Exotic

CONIFERS

South Blvd. at the Big Red Mailbox
Upper Grandview, Nyack, N.Y. 10960

914—358-3269

Open Weekends and by
Appointment

List 35 cents

Announcing—

THE JEWELS OF THE PLAINS

BY

CLAUDE A. BARR

To be published in 1975, the awaited work
by "one of the great plantmen of our
time."

Pre-Publication Offer: \$10.00

REPRINTS

Farrer, *My Rock Garden* [1907] \$8.50

Bowles, *My Garden in Spring* [1913] \$12.50

Gabrielson, *Western American Alpines*
[1932] \$10.00

Hornibrook, *Dwarf and Slow-Growing
Conifers* [1938] Pre-Publication \$8.50

Albertson, *Nantucket Wildflowers*
[1921] \$10.00

Kingdon Ward, *The Land of the Blue
Poppy* [1913] Pre-Publication \$10.00

THEOPHRASTUS P.O. 458 Sakonnet Point, Little Compton, Rhode Island 02837

Colorful

SEMPERVIVUMS

10 Varieties (labeled)

Prepaid \$7.00

Over 100 Different Varieties

MacPherson Gardens

2920 Starr Ave.

Oregon, Ohio

43616



Announcing: **Jewels of the Plains**, distinctive native flora descriptions, now in hands of publisher:

Regional, geological and climatic basis of hardness and adaptability to be detailed; plus culture. Amply illustrated in color and black and white. Publication date will be announced.

No plant shipments in '75, please.

CLAUDE A. BARR

PRAIRIE GEM RANCH

Smithwick, South Dakota 57782

SPECIALIZED HOLIDAYS FOR FLOWER AND MOUNTAIN LOVERS

A small selection of summer and fall departures is outlined below, all with a common theme — the pleasure of studying and photographing wild plants and flowers in their natural habitat. Details will be airmailed on request.

THE WESTERN HIMALAYAS — a walking holiday

31 May to 17 June: £415

This expedition has been specially mounted for botanists and wild flower enthusiasts happy to sleep under canvas and accustomed to high level walking (climbing, as such, is not entailed). We start from over 6,000 ft. at Manali, head of the Kulu Valley, and continue in very easy stages along the Jugatsukh Nullah, a side valley renowned for the great profusion and variety of its flora which are at their best in June. Four or five days are allowed to reach the base camp at the foot of Mount Deo Tibba in view of dramatic peaks, waterfalls and glaciers. Here, at 12,000 feet, alpinists abound, and we should find many species of potentilla, anemones and primulas and, with some luck, the *meconopsis latifolia*. *The trek is accompanied by Miss Theresa Atkins and a local expert.*

KASHMIR — a pony trek

17 July to 4 August: £506

Those who enjoy the peace and beauty of the high mountains, will find this an ideal holiday. The first few days are spent on board charming, old-world (but modernised) houseboats on the Dal Lake at Srinagar, acclimatizing, before the trek begins; and during the next ten days we climb on pony-back from Thajiwas, at 8,500 feet in the Liddar Valley, to the base camp on the shores of Lake Gangabal at 11,600 feet. The trek is taken in slow stages, camping for one and sometimes two nights at lovely places en route to enjoy the scenery, look for flowers and, perhaps, fish for trout. The highest altitude encountered is 14,000 feet at the summit of the Poshpathri Pass from which there is a glorious view of the Great Harmukh range above, and three great lakes, including Gangabal itself where we stay for three nights. *The trek is led, for the seventh season, by Mr. Oleg Polunin, M.A., F.L.S.*

SOUTH AFRICA — Spring in Cape Province

19 September to 12 October: £675

The Cape Province of South Africa is renowned as being one of the world's richest areas for wild flowers. Spring begins in mid-September and from then onwards appears a wealth of flowers, unequalled in colour, variety and profusion. The whole itinerary has been purposely confined to within 100 miles of Cape Town, where the first eight and the final three nights are spent at the gracious and distinguished *Mount Nelson Hotel*, from which daily visits are made to nearby places of botanical and scenic interest. In between, we tour a wider area by coach, and stay at Citrusdal, Worcester, Swellendam and Hermanus for altogether ten days. *This holiday is accompanied for the second time by Mr. Michael Upward, Secretary of the British Alpine Garden Society.*

ALL TOURS BEGIN AND END IN LONDON

FAIRWAYS & SWINFORD

(Travel) Ltd (ARGS)

**18 Saint George Street, Hanover Square,
LONDON W1R OEE, England**

Members of the American Society of Travel Agents

YOUR ARGS STORE

DO YOUR HOMEWORK—NOW—for Seattle '76—and Northwest

1. ALASKA-YUKON WILDFLOWER GUIDE—Helen A. White (Ed.) and Associates—almost all ARGS members; see Review, next Number—paper only—color plates with b & w plant-habit sketches \$6.00
2. TITLES, as advertized herein—by LARRISON, PAYNE, CHIPMAN & THEOPHRASTUS—**order these direct**
3. BULLETIN **Back Issues**—for relevant articles & other titles reviewed and/or advertized (see **back cover** for availability)

REFERENCE—What to Do & How to Do It

4. FOSTER, **ROCK GARDENING**—a **must** for all, old & new\$3.00
5. KOLAGA, **ALL ABOUT ROCK GARDENING & PLANTS**—well worth \$2.50
6. EMERY (Comp.), **SEED GERMINATION REPORT**—data on selected species & forms\$1.00
7. THE ROCK GARDENER'S HAND BOOK—The 1965 re-issue of selected articles from back numbers of the ARGS Bulletin; hard cover\$1.50
8. BULLETIN—Back issues—don't neglect the gold mine

MISCELLANY

9. LIBRARY BINDERS—each holds 8 **Bulletins**—neat\$2.00
10. EMBLEMS (both safety-clasp & lapel types—specify)\$3.00

All orders except #2 above, available from your Secretary—address on back cover (Order #2 items **direct**, per ads.)

All orders prepaid, via check or PMO, to ARGS; overseas payments in U.S. \$'s please. Surface mail, postpaid; air mail, billed at cost.

All U.S. destinations **must** show "Zip."

RHODODENDRONS — SPECIES and HYBRIDS — Over 600 varieties available. Informative catalog, 25¢

JAPANESE MAPLES — Over 150 named cultivars available. Also other rare maples including named cultivars of Japonicum, campestre, Shirasdwannum, Sieboldianum, mono, and truncatum. Grafted plants shipped. Complete list, 10¢

KALMIOPSIS — 3-4", \$5.25 postpaid in continental U.S.

WE SHIP ANYWHERE.

GREER GARDENS

1280 Goodpasture Island Rd., Dept. R, Eugene, Ore. 97401

ALPINES
DWARF CONIFERS
HEATHERS
RHODODENDRONS

Cash and Carry Only

FAMOSI NURSERY

138 Concord Road
Westford, Mass. 01886
692-8900

THE ROCK GARDEN

Maine Hardy Plants

Choice Cultivars — Uncommon Species

Grown and Mailed in Peat-lite

New Varieties Annually

Seedlings from Several Exchanges
and other European Sources

Mail Order Catalog Free to ARGS Members

LITCHFIELD, MAINE 04350

**"PLANT JEWELS
OF THE HIGH COUNTRY"**

Sempervivums — Sedums

by Helen E. Payne

The first book written and published in the U.S. on these two fascinating plant types—A handsome 7 x 10 design with 158 pages and 111 color plates—covering 187 species hybrids, varieties, etc. A book every rock gardener should have—or anyone interested in the exotic, beautiful and amazing "Hen and Chicks."

\$15.00 Postpaid



ALSO AVAILABLE

**"Wildflower Trails of the
Pacific Northwest"**

by Art Chipman

156 pages — 236 color pictures
6 x 9 hard back — \$15.00



Pine Cone Publishers

2251-A Ross Lane, Medford, Oregon 97501

**THE ALPINE GARDEN SOCIETY'S PUBLICATIONS
OFFER OUTSTANDING VALUE IN ILLUSTRATIONS AND LETTERED WISDOM**

THE GENUS LEWISIA By R. C. Elliott

The only monograph in existence on this fascinating American genus.

DIONYSIAS By C. Grey-Wilson

The first English monograph of this exciting family, with drawings of every known species.

SAXIFRAGES By Winton Harding

This authoritative and readable guide should be on the bookshelf of every rock gardener.

Price \$1.50 Postpaid

ILLUSTRATED GUIDES FOR THE PRACTICAL GARDENER

PROPAGATION OF ALPINE PLANTS — ALPINES IN POTS — BULBS UNDER GLASS
ERICACEOUS AND PEAT-LOVING PLANTS — A GARDENER'S GUIDE TO SEDUMS — SILVER-FOLIAGED PLANTS

Price \$0.80 Postpaid

A.G.S. Publications are available ONLY from:

M. H. DRYDEN, Distribution Manager, 30 Sheering Lower Rd., Sawbridgeworth, Herts, England

SISKIYOU RARE PLANT NURSERY

Our catalog offers an unrivaled selection of the world's most unusual and desirable alpine, native and rock garden plants.

50 cents brings our catalog. Cost refunded first order.

Sorry we cannot accept Canadian or Foreign orders.

L. P. Crocker

B. C. Kline

522 Franquette Street, Medford, Oregon 97501

We specialise.
HARDY CYCLAMEN
BULBS—CORMS—PLANTS
HARDY ORCHIDS
CYPRIPEDIUMS—PLEIONES

We have a marvellous collection including many rare and fascinating varieties. New items added each year.

Catalogue free on request.

J. A. MARS of HASLEMERE
(Mars & Kettle)

HASLEMERE SURREY ENGLAND GU27 3DW
We are known world-wide

READ'S NURSERY

Growers of

Rock Garden Plants

ALPINES — DWARF CONIFERS

388 FOREST AVENUE
PARAMUS NEW JERSEY

SEDUMS and SEMPERVIVUMS

Pink, Red, Purple, Blue and Green

Hardy Named Varieties

10 for \$7.00 Postpaid

OAKHILL GARDENS

Helen E. and Slim Payne
Rt. 3, Box 87J Dallas, Oregon 97338

PLANT JEWELS OF THE HIGH COUNTRY

Sempervivums and Sedums
by Helen E. Payne

111 Full Color Photographs
Autographed Copies \$15.00 Postpaid

Grower of
ROCK PLANTS, HERBS
PERENNIALS
ANNUALS

Large Selection, Field Grown

No Catalog

All Plants for Sale at Nursery Only
SAMUEL F. BRIDGE, JR.
437 North Street
Greenwich, Conn. 06830

Rock Plants, Alpines, Dwarf Conifers,
Dwarf Shrubs etc. Many Rare.
"Get Acquainted Special"

6 named hardy Sedums labeled \$2.50
Postpaid. Descriptive Rock Plant
Catalog 25¢

RAKESTRAW'S PERENNIAL GARDENS
G 3094 S. Term St., Burton, Michigan 48529

DWARF CONIFERS, ALPINE PLANTS
SEMPERVIVUMS, HOSTAS,
BAMBOOS, ORNAMENTAL
GRASSES, EXOTIC MAPLES

Large illustrated Catalog 50¢
Plants also available at the nursery

Telephone: 215-536-4027

PALETTE GARDENS
26 West Zion Hill Road
Quakertown Pennsylvania 18951

DWARF and PYGMY CONIFERS

MINIATURES FOR THE
ROCK GARDEN AND BONSAI
JAP MAPLES

DWARF RHODODENDRONS
Other Rarities for the Connoisseur
Send 50¢ for Latest List

JOEL W. SPINGARN
1535 Forest Ave., Baldwin, N. Y. 11510

THE WILD GARDEN

Box 487, Bothell, Washington 98011

Alpines for Collectors

Tiny Plants for Container Landscapes

Hardy Ferns

Flowering Plants for Sun and Drought

Flowering Plants for Shade

Under these headings my new catalog, (\$1.00, deductible) lists 240 plants, including many alpines at 80 cents, Airmailing included.

WILDFLOWER SEEDS

Collected from the Midwest or Great Lakes Region.

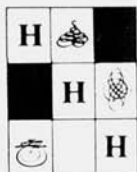
Facts, Folklore, and Cultural Instructions in illustrated 26 page

CATALOG—25¢

MIDWEST WILDFLOWERS

BOX 64R

ROCKTON, ILLINOIS 61072



Almost
EVERY
HORTICULTURAL
BOOK IN PRINT
IN ENGLISH

Free List

HHH

68 Brooktree Road, Hightstown, NJ 08520

RARE PLANTS and SHRUBS

Dwarf slow growing conifers that stay dwarf and other shrubs all suitable for Bonsai culture.

Large collection of Alpines as well as unusual plants are listed in our catalogue.

ALPENGLow GARDENS

13328 King George Highway
Surrey, B.C. Canada

BY POPULAR DEMAND

Annual

Horticultural, Botanical & Rock Garden

Tour of the

SOVIET UNION

Departure — Mid-June, 1976

Five Cities

Fifteen Days

\$1000 min.

For Brochure Contact:

THOMAS DRISCOLL

Swedesford Road, R. D. #1, Ambler, Pa. 19002 U.S.A.

DIRECTORATE

AMERICAN ROCK GARDEN SOCIETY

President Emeritus

HAROLD EPSTEIN, 5 Forest Court, Larchmont, New York

President ...HARRY W. BUTLER, 2521 Penewit Road, R. R. #1, Spring Valley, Ohio 45370
Vice-PresidentRICHARD W. REDFIELD, P.O. Box 26, Closter, N.J. 07624
SecretaryM. S. MULLOY, 90 Pierpont Road, Waterbury, Conn. 06705
TreasurerANTON J. LATAWIC, 19 Ash St., Manchester, Conn. 06040

Directors

Term Expires 1976

Mrs. D. S. Croxton

Carl A. Gehenio

Roy Davidson

Term Expires 1977

Margaret Williams

Donald Peach

Robert Woodward

Term Expires 1978

Mrs. Edward (Fran)

Frederick W. Case, Jr.

James A. Minogue

Lubera

Director of Seed Exchange

WILLIAM C. DILGER

25 Neimi Rd., Rte. 1, Freeville, N.Y. 13068

Director of Slide Collection

ELMER C. BALDWIN

400 Tecumseh Road, Syracuse, N.Y. 13224

CHAPTER CHAIRMEN

NorthwesternCLIFFORD G. LEWIS, 4725 119th Ave. S.E., Bellevue, Wash. 98004
WesternMRS. DONALD S. CROXTON, 6309 Green Valley Road, Placerville, Cal. 95667
MidwesternMRS. LILLIAN M. LEDDY, Box 612A, R.D. 3, Mena, Arkansas 71953
AlleghenyJOHN J. KOVALCHIK, R.D. 2, Box 27, Leachburg, Pa. 15656
Potomac ValleyJAMES A. MINOGUE, 704 So. Overlook Drive, Alexandria, Va.
22305 (In Winter)
Box 33, Browntown, Va. 22610 (In Summer)
Delaware ValleyMRS. WILLIAM M. FLOOK, JR., Box 3748, Wilmington, De. 19807
New EnglandMRS. MAISIE GRANT, Brunswick Rd. R. 1A, Gardiner, Maine 04345
Great LakesEARL R. ROBERTS, 5809 Rahke Road, Indianapolis, Ind. 46217
Wisconsin-IllinoisIZA GOROFF, 622 Wellington St., Chicago, Ill. 60657
Columbia-WillametteMR. FLOYD W. McMULLEN, 5420 S.W. Alfred St.,
Portland, Ore. 97219
ConnecticutDR. HOWARD W. PFEIFER, Beech Mountain Road, Willimantic, Ct. 06226
Long IslandWILLIAM E. BROWN, 4 Wellsley Ct., Coram, N.Y. 11727
Hudson ValleyMR. THOMAS BUCHTER, Skylands, P.O. Box 192, Ringwood, N.J. 07456
MinnesotaMRS. BETTY ANN MECH, 1315 66th Ave., N.E., Fridley, Minn. 55432
SiskiyouMRS. LEROY BORDER, 11747 Meadows Rd., Central Point, Ore. 97501
Western-No. CarolinaMR. RICHARD O. ROBLIN, 204 Browning Rd.,
Hendersonville, N.C. 28739

Statement of Ownership etc.

1. Title of Publication: American Rock Garden Society Bulletin.
2. Date of Filing: August 25, 1975.
3. Frequency of Issue: Quarterly.
4. Location of Known Office of Publication: 90 Pierpont Road, Waterbury, Conn. 06705.
5. Location of the Headquarters of General Business Offices of the Publishers: Same as above.
6. Names and Addresses of Publisher and Editor: American Rock Garden Society, 90 Pierpont Rd., Waterbury, Conn. 06705 — Editor: H. N. Porter, 158 Whitfield St., Guilford, Conn. 06437.
7. Owner: American Rock Garden Society, 90 Pierpont Rd., Waterbury, Conn. 06705. There are no stockholders.
8. Known Bondholders, Mortgagees and Other Security Holders owning or holding 1% or more of Total Amount of Bonds, Mortgages or Other Securities: None.
9. Statement signed by Milton S. Mulloy, Secretary.
10. Not applicable.
11. A: Total number of copies printed averages 2625 each issue during preceding 12 months and was 2600 for issue nearest to filing date.
B: Paid circulation by mail subscriptions averaged 2349 each issue during preceding 12 months and was 2429 for issue nearest to filing date.
C: Total Paid Circulation: Same as above.
D: Free Distribution: None.
E: Total Distribution: Same as B.
F: Office Use, Left-over, Unaccounted, etc.: Averaged 276 each issue for preceding 12 months and was 171 for issue nearest to filing date.
G: Total Sum of E and F: Averaged 2625 for each issue for preceding 12 months and 2600 for issue nearest to filing date.

THE ALPINE GARDEN SOCIETY invites you to join its band of enthusiasts who enjoy a *Bulletin* every quarter, have opportunities to buy specialist publications, have tours to see alpines in their natural habitat, have a panel of experts to call upon to advise on alpines and their cultivation, and can participate in the distribution of the seed of more than 4,000 distinct alpines each year.

Home Members £2.50 Overseas Members £3.00

Secretary: E. M. Upward

Lye End Link, St. John's, Woking, Surrey, England

THE SCOTTISH ROCK GARDEN CLUB

Offers you . . .



its twice yearly *Journal*, well illustrated in black & white, and containing authoritative articles on all aspects of rock gardening, rock plants, and their world wide haunts.

Its excellent annual scheme for the distribution of rare & unusual seed, amongst its international members.

for £1.50 per year (\$3.75)

R. H. D. Orr, C.A. 70 High Street, Haddington
East Lothian, Scotland will be glad to send particulars.

BACK ISSUES OF THE BULLETIN

While they last. The following are available in some quantity, priced as shown:—

Vols. 1 thru 10 — scarce, incomplete,
\$2.00 per issue.

The following are \$1.00 per issue.

Vol. 11, Nos. 1, 2 & 4

Vol. 13, Nos. 3 & 4

Vol. 14, Nos. 2, 3 & 4

Vol. 15, No. 3

Vol. 16, Nos. 3 & 4

Vol. 18, Nos. 2 & 4

Vol. 19, No. 4

Vol. 22, No. 3

Vol. 23, Nos. 1, 2 & 4

Vol. 24, Nos. 3 & 4

Vol. 25, No. 4

Vol. 26, Nos. 2, 3 & 4

Vol. 27, Nos. 1 & 4

Vol. 28, Nos. 1, 2 & 4

Vol. 29, Nos. 1, 2 & 4

Vol. 30, Nos. 2 & 4

Vol. 31, Nos. 2 & 3

Vol. 32, Nos. 1, 3 & 4

NUMBERS NOT LISTED

From Vol. 11 onward, some available in small quantities @ \$1.00 each — inquire.

“BARGAIN PACKAGE”

Large stocks of certain numbers permit ½-price offer — 10 nos. at \$5.00, Society's selection, but your stated preferences will be observed, if possible.

Orders for numbers containing articles cited by volume and page in the Index will, if available, be accepted.

Please remit with order; overseas orders in U.S. funds, please. All orders, except air mail, sent postpaid. Airmail charges billed at cost. Please make checks or postal money orders payable to:

American Rock Garden Society

90 Pierpont Road

Waterbury, Conn. 06705