

American Rock Garden Society Bulletin



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BULLETIN

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AMERICAN ROCK GARDEN SOCIETY BULLETIN

Albert M. Sutton, Editor

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JANUARY, 1972

No. 1

DWARF WILLOWS

REGINALD KAYE, *Carnforth, England*

When the spring gradually stirs after a long winter, one begins to look for signs that another yearly parade of beauty is on its way; reassurance that the rhythm of the seasons goes on bringing renewed hope and anticipation of joys to come in a world not particularly improved by human activities.

Apart from such delights as the spring bulbs, hepaticas, saxifrages, winter-flowering heaths and so on, to me some of the high spots of the early year are provided by resurgence into growth of the dwarf willows. It is a real thrill to see the densely silken-clothed leaves of *Salix lanata* unfurling in the spring sunshine, the twigs already glorious with fat, fluffy, golden catkins. Then there are the glistening, silvery white catkins of *S. wehrhahnii* adorning the bare branches—not that this species is a dwarf. Some of my readers who attended the International Rock Plant Conference at Harrogate may have noticed a fine specimen not far from the entrance to the alpine show tent. This was well over six feet high and seven to eight feet through—a magnificent sight but perhaps too large for the purpose of these notes.

Another joy is the truly dwarf *S. reticulata*, whose spring foliage of palest green is richly clothed with glistening silver hairs. That these hairs should disappear as the leaves age is a phenomenon not confined to dwarf willows. Later the leaves become polished and dark green, deeply veined in a close network and always a welcome sight throughout the summer. There are hundreds of willow species and hybrids but there are few of a stature fitting them for rock garden planting.

Indeed the tiniest of high alpine willows which never exceed a spread of three or four inches in their native heights take to the fleshpots of cultivation with enthusiasm and may need watching in case they overrun neighbors. I think it is correct to say that all willows thrive best on basic soils. To keep the dwarfs near to their native stature they are best treated as pot plants as the root restriction keeps them in their true alpine character, maintaining their dwarf habit. They make splendid specimens for exhibiting on the show bench.

Propagation is fairly easy from cuttings and layers. Cuttings may be made from half ripe shoots taken with a heel, or from fully ripe shoots after leaf fall. Kept close, they usually root quickly but they should be hardened

off well before disturbing. An exception is *Salix apoda* which I find difficult to increase from cuttings. These root fairly easily but the cuttings collapse before they can be potted, and in fact I seldom manage better than 10% of successfully established plants of this species. Layering is easy enough but limits the number of plants one can raise. Seed, if used, must be sown fresh off the plant or stored in a refrigerator until sown, as the seeds do not remain viable very long. The seedlings probably will vary considerably as willows very easily hybridise.

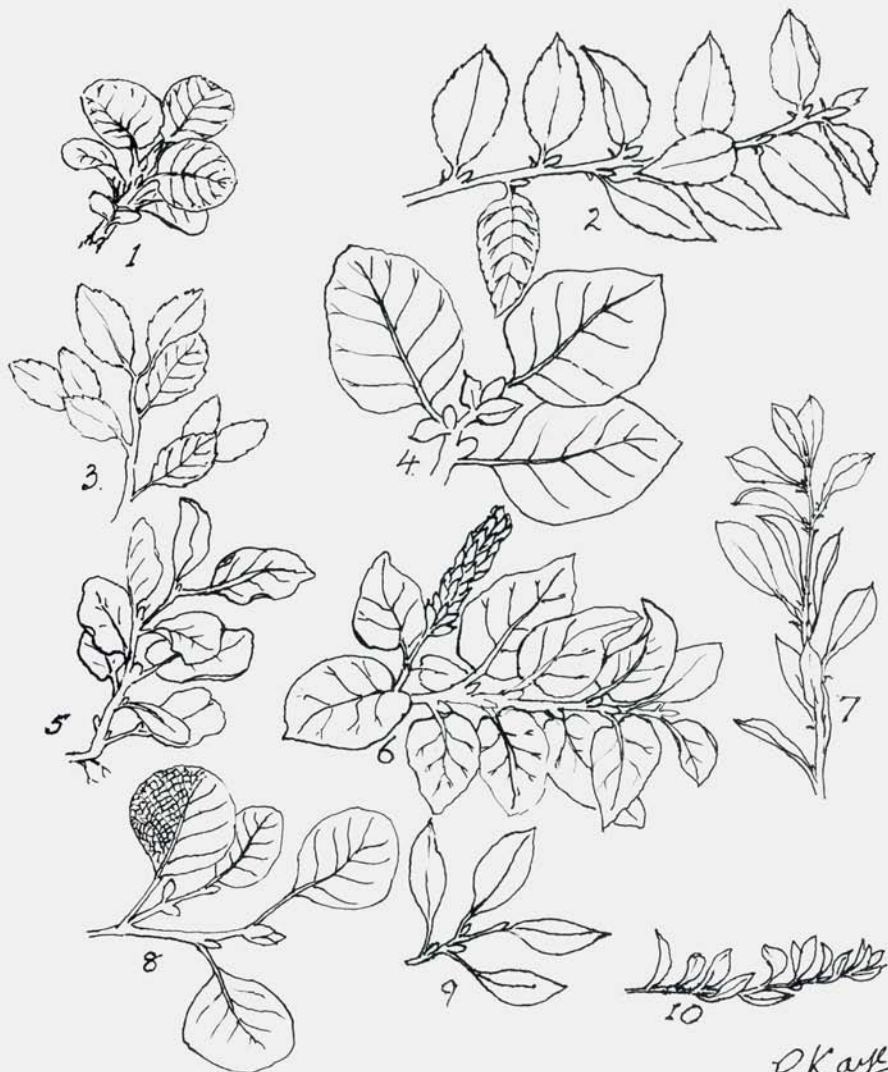
Most willows are dioecious, that is male and female organs are borne on different individuals. From the gardener's point of view the male plants are the more desirable for their catkins are much more showy and attractive than those of the females. In the animal kingdom this state of affairs is the rule. It is only man, and possibly spiders, where the male gives way to the female in display. There may be a moral somewhere in this state of affairs. In the vegetable kingdom honours are about even.

Here is a list of the dwarfed willows which may be tried as rock garden plants.

Salix apoda, from the Caucasus, is a 'must' for all rock gardens. There are two or three forms, one a very slow-growing form which has not come my way yet. My plant, after ten years, has made a plant about three feet in diameter and not more than three inches high. Every spring the branches push forth many fat, upright catkins about two inches high, at first a delightful purple-mauve becoming yellow as the stamens mature. They are followed by the unfolding of the narrowly ovate leaves to make a close verdant carpet though the individual leaves are not particularly attractive.

From the mountains of Europe and Siberia comes *Salix arbuscula*, a variable species which may be anything from one to four feet high. The variety I grow is *S. arbuscula humilis* which I collected originally in Scotland. This is quite prostrate and has covered an area five feet across in about five years. It is a useful shrub for ground cover, the bright green, cheerful foliage is pleasant, though the catkins are of no great value. The leaves are oval to obovate, faintly toothed, bright green above, paler to glaucous below. The last point helps to differentiate this species from *S. myrsinites* in which the leaves are bright green on both upper and lower surfaces. The leaves are set at various angles to the glossy shoots though most willows have their leaves set pointing towards the shoot tip.

Undoubtedly the best rock garden willow is *S. X boydii*, a natural hybrid found by the late Dr. Boyd in Scotland and grown by him at Faldonside for many years. This hybrid has not been found again so that the entire stock of this plant in cultivation has been vegetatively propagated from the original clone. It has been described as a hybrid between *S. lapponum* and *S. reticulata*, but there is a strong body of opinion that *S. lanata* X *S. reticulata* might be the correct parentage. Whatever this may be, the fact remains that this plant is by far the best of the willows for the garden. Plants I have had for forty years or more have not exceeded thirty inches in height, fifteen inches through. It is so slow growing that it is admirable as a tree for miniature trough gardens. The small, ovate, pilose leaves are of firm texture, slightly waved, gray-green and closely set on the short yearly growths gradually building up into a small tree of gnarled and ancient appearance. The short, up-



R. Kaye

1. *Salix* X *boydii*—2. *S. arbuscula* 'humilis'—3. *S.* X *grahamii*—4. *S. lanata*—5. *S. herbacea*—6. *S. ovata*—7. *S. myrsinites jacquiniana*—8. *S. reticulata*—9. *S. retusa*—10. *S. serpyllifolia*. All drawn from living material—about one-half natural size.

right male catkins are fluffy and pale yellow. Apparently all the plants in cultivation are males. I have never seen a female catkin develop.

Salix cascadenensis is a new name to me mentioned in a letter from Merle Sutton. I have no idea what it looks like but am taking steps to acquire plants. It is not mentioned in any literature available to me.

Salix X *grahamii*, according to some authorities, is a natural hybrid between *S. herbacea* and *S. phylicifolia*, and was found originally in Scotland. It makes a pleasant dwarf, twiggy shrub seldom reaching three feet in height.

The leaves are firm in texture, obovate and pilose when young, becoming glabrous later. I have no information about catkins except that both male and female trees are known. I have not had this plant myself.

Salix herbacea grows in most temperate mountain districts in Europe and Britain. It is very common on the mountain tops of our English lakeland where in autumn the ground is silvery with the ripe seed heads. This tiny shrub seldom exceeds two inches in nature but rises up to four inches in cultivation, from a ramifying mat of underground shoots. The broadly oval to orbicular leaves are deep green with conspicuous midrib, and a faintly toothed margin. The male catkins are finely fringed with hair and are pale yellowish in colour. It is not a very distinguished plant yet I have an affection for it for it is so easy to grow and never becomes a nuisance—just a quiet carpet of greenery.

Salix lanata, however, is one of the stars of the *Salix* caste. Perhaps it is a little large for the average rock garden, yet it is to my mind indispensable. A sturdy, stout-branched shrub rarely exceeding three feet high and through, the young foliage is exquisite and when gray and old it is a shrub full of character. The conspicuous golden, male catkins mentioned earlier are perhaps the showiest of all willows. It is a native of the mountainous districts of Europe and Asia in their northern regions. It is fairly widespread though a rare plant in Scotland. *S. lanata sadleri* is a distinct dwarfer variety or possible hybrid of unknown parentage in N. Scotland.

Salix lapponum produces its silky, male catkins before the leaves appear. Leaves are variable, oval to narrowly lanceolate, covered with cottony hairs when young, set on dark brown, downy shoots which may not exceed two feet in some plants while others may get up to four. The hairy covering is lost as the leaves age. A rather gaunt habit compared with *S. lanata*.

The Whortle Willow, *Salix myrsinites*, comes from the mountains of northern Europe. The catkins are erect with a purplish hue. When not in flower, the green mats of foliage resemble *S. arbuscula* except the bright green leaves are equally bright green on the lower surface. Male plants are rarer than female unfortunately. Seldom exceeding one foot high, it spreads readily into a wide carpet of greenery. There are several good forms as it is rather variable. *S. myrsinites jacquinii* found in the Tyrol is a most attractive variety with narrower entire leaves on chestnut brown stems. The male catkins are deep purple. If grown as a pot plant it remains quite compact and flowers freely. In the open ground it spreads as quickly as the type. Much resembling *S. myrsinites*, *S. myrtilloides* is a variable species from N. Europe. It differs, however, in the leaves being dull olive green above, blue-green to purplish below. This species varies from a small, densely twiggy bushlet of three inches or so to a spreading bush of three feet high. There is a North American form with narrower leaves named *S. m. pedicellaris* which I have not seen. The leaves may be up to 2½ inches long, twice as long as those of the type. I have a variety which I believe to be allied to *S. myrtilloides* under the name *recondita* though I have been unable to verify the name. It spreads rather too quickly for the rock garden but has an engaging habit of dropping its leaves in autumn all with the lower surfaces on top, displaying the glaucous blue, even richer in autumn, in a veritable

blue carpet. For this reason I continue to grow what I had thought one of the less interesting species.

Recently I acquired a new dwarf willow from Nepal which without being able to confirm came to me as *S. nepalensis*. This really is a great addition to the family, absolutely prostrate following closely the contours of the ground and in spring adorned with bright red catkins standing upright about $\frac{3}{4}$ inch. In a year it has grown one foot across. The foliage is distinctive, more like that of a pernettya than a willow. The highly polished leaves are narrowly oblanceolate, almost linear, with faint teeth near the apex, bright green and about an inch long. As they age they turn reddish copper.

A few years ago the late Willie Buchanan gave me cuttings of *S. ovata*, another name I have been unable to verify but if the name was good enough for Willie it is good enough for me. Unfortunately, my plant is a female and I have no idea what the male catkins may be like. In seven years it has made a mat, glaucous, yellowish green, slightly pilose, four feet across and about nine inches high. The leaves are tough in texture, wavy edged, ovate and deeply veined. Not as easy to propagate as most willows, but usually I get about a 40% strike. I hope I shall always grow this species which I value as a gift from a fine man and a good friend.

Salix polaris is an Arctic species on the lines of *S. herbacea*, quite prostrate but with smaller leaves with entire edges. The seeds are even more hairy than those of *S. herbacea*. It grows following the contours of the ground very closely.

Salix pyrenaica closely resembles *S. retusa* and indeed has been regarded as a variety of that species. But the leaves are ovate, acute, pilose, and the catkins are cherry red. It grows rather slowly with me and slowly makes a mat three inches high and a foot or so across.

The best rock garden species, apart from *S. X boydii*, definitely is *S. reticulata*. It is a joy in spring when the glistening silver-haired, pale green leaves first unfold, evidently the work of fairies. The leaves vary in size and shape, usually about $1\frac{1}{2}$ inches long, broadly ovate to orbicular, ageing to dark polished green above, glaucous white below. I have seen a tiny form with leaves no more than $\frac{3}{8}$ inch in diameter. The male catkins are yellowish and not particularly conspicuous, but all the year round this prostrate shrub is one of the most attractive shrubs in the rock garden. It is from the mountains of N. Europe, Britain and Labrador.

The last species of dwarf willow with which I can claim acquaintance is *S. retusa*, a variable plant from the mountains of Central and E. Europe. Usually the leaves are blunt or rounded at the apex but they may be pointed, as is the form I have here. Bright green and a neat small shrub in nature, in the garden it runs away with itself. Catkins are small, about $\frac{1}{2}$ inch long. Usually regarded as a variety of *S. retusa*, though sometimes raised to specific rank is *S. r. var. serpyllifolia*, a pygmy form in its mountain haunts no more than three or four inches across and an inch high. In the garden this variety tends to run away into quite a wide mat of one or two feet across. The leaves are variable but usually narrowly lanceolate, and may be obtuse or acute. The petioles twist so as to bring all the alternate leaves into more or less one plane so as to present their upper surfaces to the light. It is a densely

twiggy little shrub especially when confined to pot culture and well worth growing in any rock garden.

I have a real affection for these fascinating shrublets which have a character all their own independent of what colour display they may compete with. However one admires masses of vivid flowers, one comes back with satisfaction to contemplation of the dwarf willows. I hope, however inadequate my knowledge of these plants may be, that I have succeeded in arousing some interest in these truly mountain plants.

A DAY TO REMEMBER AN ALPINE ADVENTURE IN ICELAND

OLAFUR B. GUDMUNDSSON, *Reykjavik, Iceland*

"What a beautiful Icelandic morning!" Don Havens* stated while we were waiting for the bus to take us on a short botanical trip with some members of the Icelandic Natural History Society. Surely the weather gods had been merciful to Don and his charming wife during their four week stay in Iceland in the summer of 1971. Actually, this was the best spring and summer in Iceland for many years. But it would be a sin to say Don did not know it. "If you have difficulties with the weather in the future, just let me know," was his prompt answer when I wondered about his weather-luck. Maybe it is worth considering.

Well, good friends, we are inviting you to join us "this beautiful Icelandic morning" on our tour to have a look at some Icelandic native plants in their natural surroundings. We hope you may be able to catch some of the charm and beauty of the clean and untouched nature we met and enjoyed so much.

Our route is going through the wild and volcanic area south of Reykjavik, the Reykjanes, covered with lava streams of various ages and strewn with lakes, mountains and hot springs. Just outside the little town of Hafnarfjordur, Don notices some blue patches on a nearby hillside.

"What is that?" he asks.

"A lupine, *Lupinus nootkatensis*, imported from Alaska some years ago. Seems to be happy in its new home."

"And what do you call it in Icelandic?"

"Alaska-lupina."

"Alaska-lupina," Don repeats, "I have learned an Icelandic word. Your language seems not to be so difficult after all."

Our first stop is made where two lava streams meet. The older one—somewhere between five and ten thousand years old—is almost completely overgrown with the low Icelandic Birch, *Betula pubescens*; various kinds of Willow, *Salix glauca*, *S. lanata* and *S. herbacea*; Crowberry, *Empetrum nigrum*; Bearberry, *Arctostaphylos uva-ursi*; *Calluna vulgaris*, and a wide variety of deciduous plants.

The younger lava—some thousand years old—is a bleak contrast. Here we have a good opportunity to study the advancement of growth into this rough sea of extinct fire. At some distance little sign of life is to be seen

*Don Havens is the Chairman of the Wisconsin-Illinois Region of the ARGS.

except the thick velvety cushion of gray moss covering most of the surface, here and there broken by black and ragged teeth of lava blocks. But coming closer we suddenly observe this sea of death spring to life. This is no "Terra incognita" any longer. The pioneers have come to take over. At our feet, spread widely in the vast wilderness of rocks and gray moss, lie their little settlements. And they seem perfectly happy. It has taken them a thousand years to gain this foothold—and they are going to stay. These pioneers are some of the hardiest and most adaptable of the Icelandic native plants, such as: *Armeria maritima*, *Cerastium alpinum*, *Alchemilla alpina*, *Oxyria digyna*, *Saxifraga caespitosa*, *Rhodiola rosea*, *Salix lanata*, *Salix herbacea* and *Empetrum nigrum*, to name a few of these daredevils.

Turning to the older lava again we notice a wide variety of plants. Ferns are inhabiting the deep cracks and crevices in the lava, and we recognize *Cystopteris fragilis*, *Dryopteris linneana*, *D. phegopteris* and *Athyrium filix-femina*. *Dryopteris filix-mas*, a very good fern for the garden, should be here, too, although we did not find it at this time.

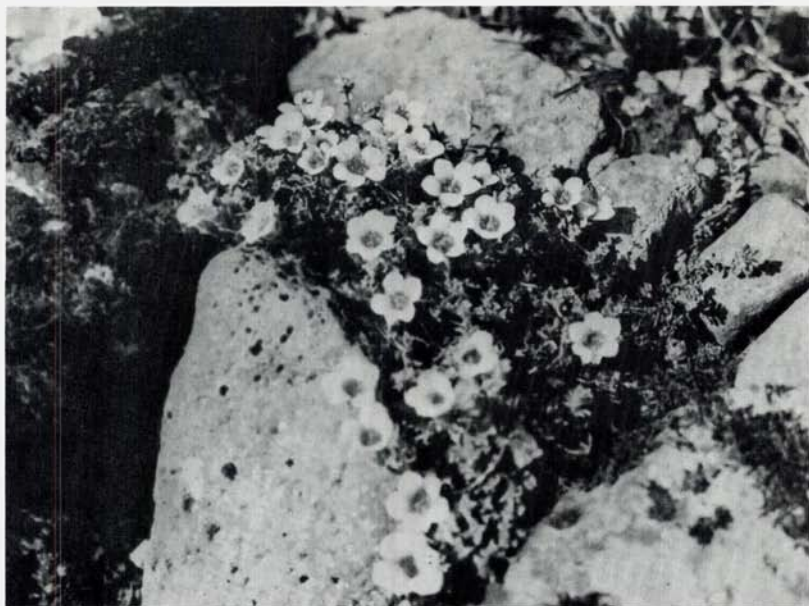
Hugging the ground is a little member of the Rhododendron family, *Loiseleuria procumbens*, with its starry pink flowers. The leathery, evergreen leaves of the Bearberry, *Arctostaphylos uva-ursi* cover wide areas, trailing over the sun-warmed rocks, sheltering the sweet cups of flowers from sun and strong winds. The Crowberry, *Empetrum nigrum*, is everywhere with its fresh and sweet-scented, evergreen leaves, just now beginning to show blackening berries to the children's delight. *Vaccinium uliginosum* is bountiful here, too.

On the moist, clayey bottom of the many depressions between the rocks and ridges, a tiny plant is staring at us with its pink-red, starry eyes. It is sparkling like some still glowing embers from the long extinct stream of fire. Don is fascinated. "What a sight!" he exclaims, "What a sight!" This is the biennial *Sedum villosum*, in Icelandic called "Meyjarauga" meaning Maiden's Eye (too red-eyed for my taste), a very common plant here.

Our party is busy photographing, collecting, or just admiring and studying plants everywhere. Our guide and botanist, Mr. Eythor Einarsson, is pointing out and explaining plants, answering questions of all kinds.

Next stop is made at Lake Kleifarvatn, a volcanic lake, surrounded by craters and hot springs, lying in a cleft, or crater—very deep—very cold. Here the road is following a steep and rocky mountainside, creeping between the lake and some perpendicular tufa cliffs, cut and eroded by hard frost and heavy winter gales, but housing a multitude of alpiners. This is an interesting spot. The steep cliffside is a natural and well-assorted rockery. Saxifrages are prominent. Had we been here two months earlier we would have seen the rocks draped with rosy garlands of *Saxifraga oppositifolia* (in Icelandic, *Vetrarblóm* meaning Winter-bloom or Winterflower), the first of the native flowers to open in spring, usually in April—May. Now we meet here *SS. caespitosa*, *nivalis*, *hypnoides*, *stellaria* and the very beautiful, yellow *S. hirculus*, a true gem for every rock garden. Close by its side *Parnassia palustris* proudly raises its white head. And how they fit each other!

Little fresh-green cushions of *Silene acaulis* are clinging to outcrops in the rocks and though long out of flower, they are still a pleasure for the eye. Here *Draba cinerea* and *Erigeron alpinus* share a narrow fissure and almost seem to be growing out of the bare rock. From a grassy ledge higher up some

*Saxifraga oppositifolia*

Olafur B. Gudmundsson

flowers of *Geranium silvaticum* are nodding their blue heads in our direction.

From underneath a shady overhang, our guide fishes out a botanical rarity, *Bryoxiphium norvegicum*, Sword-moss. This species grows nowhere in Europe except in Iceland. By some misunderstanding, the wise men who named the plant thought they were dealing with a specimen from Norway and named it *B. norvegicum* instead of *B. islandicum*. On the other hand we can see here, in the moist clay at our feet, a little plant bearing the name of *Koenigia islandica*. In Icelandic it is called Naflagras. It is an annual member of the Polygonaceae, seldom reaching more than an inch in height, usually robin red all over, but sometimes emerald green.

After a short drive we stop on "The Nose", a low ridge between two little lakes called "Augun" (The Eyes). Our guide is eager to show us some submerged water plants growing here. (*Isoetes* and *Potamogeton*).

While we sit down on a grassy slope, lined with *Empetrum* and *Calluna*, to enjoy our beer and sandwiches, we take a better look at the surroundings. Although they look rough and barren, they house a surprisingly rich alpine flora. The sloping screes of sand and grit are dotted with bold patches of *Thymus*, and *Dryas octopetala*, *Silene acaulis*, *S. inflata*, *Armeria*, *Empetrum*, *Calluna* and various kinds of *Salix* and *Saxifraga*. *Dryas* and *Silene acaulis* are already out of flower and Thyme is now the dominant plant. Its rosy cushions are subject to our constant admiration. The green domes of *Silene acaulis* are covered with seedpods and the seed will be ripe in about two weeks from now. The dark green, glossy leaves of *Dryas octopetala* are closely carpeting the gritty ground and gaily nodding their fluffy seedheads in the fresh and perfumed mountain breeze. Here is certainly something for the seed exchange people!

Under a steep, south-facing mountainside, at the edge of a vast lava

field, is where we next stop. The mountainside is half covered by very low-growing Birch and here we make acquaintance with an endemic plant only to be found here on the southwest corner of this country. This is *Anthyllis vulneraria*, growing in gay yellow patches on sunny ledges and also down in the lava.

Three sisters of the Rubiaceae have been faithfully following us on our route from the very beginning. These are the white *Galium boreale* and *G. pumilum* and the yellow *G. verum*. Another faithful companion is the beautiful, glowing yellow Alpine Cinquefoil, *Potentilla crantzii*, equally at home in the garden and in this vast wilderness.

Here, among the Birch, we find some wild strawberries, *Fragaria vesca*, and the little wild flax, *Linum catharticum*, so delicate that you hardly dare touch it. Higher up the slope some Angelicas pop their stout heads out of the low Birch.

We now turn south to the coast near the little fishing village of Grindavik. Here we once again leave the bus. Walking down to the beach we are fascinated by some very small and dainty gentians, the sky blue *Gentiana nivalis*, together with *GG. aurea* and *campestris*. Here in the ever-moving sand dunes, *Potentilla anserina* is growing in bold, yellow patches, making a pleasant combination with the ever-present Thyme.

The beach itself is here white-washed and windswept, heavily battered by the unbroken waves of the North Atlantic. One little plant is making a stand against these rough elements, bravely spreading its waxy, gray-green leaves between the clean-washed, surf-polished boulders and smothering itself with blue, red-tinged flowers. This is *Mertensia maritima*, the pearl of the barren beach, and equally at home in the sheltered city garden. Indeed an adaptable plant!

We strain our eyes to the southern horizon where sea and sky melt together. Some fishing boats are seen heading for the harbour with the day's catch.

"Where would we land if we headed due south from here?" somebody asks. The answer comes promptly.

"Antarctica."

But now our little tour is coming to an end. We turn our backs to Antarctica and head north towards Reykjavik.

The day is done. A day among friends and flowers—studying, exploring, admiring, wondering. A positive and a happy day. A day to remember.

* * * * *

A GARDEN MESSAGE—In the Seattle garden, woody and delightful, of Mr. and Mrs. Thomas O'Brube (Helen is an ARGS member) a small and attractive steel sign about fifteen inches high is well placed along one of the curving paths—the only sign in the entire garden. It carries the following beautiful message ascribed to Dorothy F. B. Gurney:

The kiss of the sun for pardon
 The song of the birds for mirth,—
 One is nearer God's heart in a garden
 Than anywhere else on earth.

PLANTS FOR THE WHERRY MEMORIAL GARDEN

Neglected native rock plants of the middle Atlantic states will become the residents of this garden now becoming a reality under the watchful eye of Dr. Edgar T. Wherry, our favorite botanist. These are the native plants which he has been instrumental in introducing or popularizing.

This garden has been a life-long dream of Dr. Wherry. He has chosen the slope. It is on the grounds of the Arboretum of the Barnes Foundation at Merion, Pennsylvania, under the able direction of Dr. John M. Fogg, Jr. As of this writing, the rocks in the slope have been "planted," and are "settling in" for the winter. When spring comes, the planting begins.

Many of the plants for this garden will naturally be the Phloxes. They have always been one of Dr. Wherry's favorites. The Morris Arboretum's Monograph No. III, *The Genus Phlox*, 1955, by Dr. Wherry is our authoritative book for this section.

Morris Berd, of Media, Penn., is the President of the Wherry Memorial Garden. He has been collecting Phloxes for this garden under the direction of Dr. Wherry, for about three years. It is quite a collection. They have arrived as cuttings or plants from all over.

The purpose of the Wherry Memorial Garden is to have all these plants growing together where interested persons may study and enjoy them. The plant material will be propagated and distributed from time to time to horticultural groups, clubs, and other arboreta.

The list of plants to be included is listed in the 25th Anniversary issue of the American Rock Garden Society *Bulletin*—Vol. 17, No. 2 (April), 1959, plus a few obvious additions. We still need many of these plants. We sincerely hope, if any of the readers have these plants, that they will share them with us for inclusion in the Wherry Memorial Garden. For more information write to Mrs. John S. Kistler, Secretary-Treasurer Wherry Memorial Garden, 1421 Ship Road, West Chester, Penna. 19380.

Plants as listed in the 1959 issue—Only starred plants are needed now!!

- | | |
|--|---|
| * <i>Cymophyllus fraseri</i> | * <i>Sedum telephioides</i> |
| * <i>Tradescantia rosea</i> var. <i>graminea</i> | * <i>Heuchera pubescens</i> |
| <i>Allium stellatum</i> | * <i>Heuchera longiflora</i> cv. <i>Begonia</i> |
| * <i>Clintonia umbellulata</i> | <i>Heuchera villosa</i> |
| * <i>Streptopus roseus</i> | <i>Heuchera villosa</i> cv. <i>Purple Robe</i> |
| * <i>Trillium nivale</i> | * <i>Spiraea corymbosa</i> |
| <i>Eriogonum allenii</i> | <i>Pachysandra procumbens</i> |
| * <i>Paronychia argyrocoma</i> | <i>Viola appalachiensis</i> |
| * <i>Stellaria pubera</i> | * <i>Eriogenia bulbosa</i> |
| * <i>Anemone caroliniana</i> | * <i>Dodecatheon amethystinum</i> |
| * <i>Delphinium tricornis</i> | * <i>Amsonia ciliata</i> |
| <i>Stylophorum diphyllum</i> | * <i>Lithospermum canescens</i> |
| * <i>Cardamine douglassii</i> | * <i>Monarda russelliana</i> |
| * <i>Draba ramosissima</i> | <i>Conradina verticillata</i> |
| * <i>Cunila origanoides</i> | * <i>Aster oblongifolius</i> |

- | | |
|--|-----------------------------------|
| *Campanula divaricata | *Coreopsis auriculata |
| *Chrysopsis mariana | *Marshallia grandiflora |
| Chrysogonum virginianum | *Senecio millefolium |
| Additional neglected natives for the garden: | |
| *Dicentra eximia cv. Purity | Tiarella cordifolia |
| Gaylussacia brachycera | *Tiarella cordifolia ssp. cordata |
| Meehanian cordata | Tiarella wherryi |
| Silene caroliniana | *Trillium vaseyi |
| Silene wherryi | Viola walteri cv. Shenandoah |

USEFUL SHRUBS FOR NORTHERN GARDENS

G. K. FENDERSON, *South Acworth, New Hampshire*

It is always a source of temptation and frustration to read of the many species of smaller trees and shrubs which are available to gardeners in a climate milder than that of central New England. As it is considered that the general good appearance of any well-balanced garden depends upon the vigor and good health of its specimen trees and shrubs, these plants must be of sorts considered dependable. This is held to be as true in the rock garden as in the foundation planting or shrubby border.

Any gardener who incorporates woody plants in his planting scheme should concentrate his attention on that material which is of interest during more than one period of the growing season. This aspect of the selection of plant material is perhaps the easiest to neglect, especially if the individual involved is an ardent plant collector. For that reason I am suggesting a few shrubs and low woody plants which I have found to be dependable, interesting, and appropriate to the large rock garden or as background material for the small one.

What about the climate of central New England where I do my gardening? Most gardeners could consider our climate severe. It is one in which temperatures can be expected to drop to minus twenty with predictability during December, January, and February. Such periods of cold are usually of short duration and almost always the effect is somewhat tempered by a heavy snow cover of 18 to 24 inches. In the deeper valleys and further north, mid-winter temperatures will dip into the minus thirty range and snow can regularly accumulate three and four feet deep. As a result it is those shrubs which protrude above the snow cover which suffer from the extremes of temperature.

Another factor which limits our choice of plant material is the length of the growing season. We usually expect our last frost at the end of May and similar temperatures return in early September. As a result it is not easy to grow the earliest of spring bloomers or those plants which are slow to harden off in autumn. I have found that favorable sites can extend the useful growing season by a full month and well-chosen sites can properly harden tender plants. Now the plants that I wish to suggest:

Rhus copallina, the shining Sumac, a native in this area is an admirable shrub for garden use where the Japanese maple is not reliable. *R. copallina* matures at eight to ten feet, a lesser height than the more familiar *R. typhina*.

In contrast to the later, *R. copallina* has very shiny dark green leaves, which like those of the latter, turn a bright scarlet in the fall. Sexes are separate, so to secure the fuzzy red fruits a female clone must be used. A warning should be given of the invasive habits of all Sumacs and it is good to remember that it is possible to grow other things in the light shade that they cast. *R. aromatica*, a still smaller relative, is seldom over two feet tall with brilliant autumn foliage and is supposed to have good red berries. Many broad-leaved evergreens are not strictly reliable in this climate but a fortunate exception is *Pieris floribunda*. This American native has proven to be very hardy in the most exposed positions. The terminal clusters of upright buds are formed in late summer and are decorative throughout the winter months. They expand into long Lily-of-the-Valley-like blossoms in mid-spring. *P. floribunda* proves to be a restrained grower in this climate but if it does come to require control it can be successfully rejuvenated by a severe pruning in early spring. There is a dwarf form reported but I have had no experience with it.

Another small broad-leaved evergreen which has proven dependable is *Rhododendron laetivirens*. The foliage is particularly handsome, resembling that of its larger relative, *Kalmia latifolia*. I have seen it remain compact and attractive in very dense shade. All that would make it more desirable would be a more pleasing color of the blossoms. I hold the same objection to the extremely hardy and much praised *Rhododendron* 'P. J. M.' Both are a strong pinkish purple. A plant with better pink flowers which friends nearby report as being hardy is *R. 'Windbeam'*.

Another Ericaceous plant suitable for inclusion in the rock garden is our native wintergreen, *Gaultheria procumbens*. As it grows in the wild it can adapt to very dry, sandy banks and on such sites its leaves turn a deep rich maroon, which is even more pronounced in colder months. In such a sunny location it is profuse with its waxy white flowers in terminal bells and the bright red fruits that follow. Generous watering is a prerequisite to its successful establishment, after which it will tolerate rather dry situations. I have found it to be intolerant of dry shaded conditions, where it grows weaker, seldom flowers, and finally disappears. At its best it is about 2" high.

Continuing with the Ericaceae I suggest another native, *Vaccinium angustifolium*, the low bush blueberry which will not grow over eight or ten inches tall in dry poor soil. *V. angustifolium* is tolerant of the harshest conditions. All it requires is sun, and with that it will produce its inconspicuous flowers, delicious blue-black fruits, and scarlet autumn color. If the garden is large enough, *V. corymbosum* should be given a permanent position. Individual plants will vary, the better forms having large leaves, showy flowers, and colorful twigs.

Leaving the Ericaceae, the Rose family provides some interesting subjects. I have found one of the prostrate large-leaved Contoneasters surprisingly hardy. *Cotoneaster* 'Herbstfeuer' has two-inch, deeply veined, elongate, evergreen leaves, which remain in good condition after a winter on an exposed southwestern slope. It is a vigorous plant and I suspect it owes some of its vigor to *C. salicifolia*, whose leaves are similar. *C. 'Herbstfeuer'* hugs the ground very closely, at no point arching more than three inches above it. The stems are of an attractive reddish brown and the red fruits are borne in

clusters on previous year's growth. I consider this a most distinctive and attractive evergreen.

Another member of the Rose family which will add a season of multiple interests to the rock garden is *Sorbus reducta*. It should produce the typical fuzzy, cream-colored blossoms and the orange-red berries of the arborescent Mountain Ash while remaining under two feet tall. Its pinnate leaves are small and attractive and turn a good red in autumn. With me it has survived in a very unfavorable planting site.

The Rose family also provides a woody *Rubus* which I find attractive and useful. The plant, which I think is *Rubus calycinoides*, forms a restrained ground cover in the partial shade of an Apple tree. The plant grows close to the ground with stiff trailing branches and rough, pebbly-surfaced, semi-evergreen leaves with scalloped edges. The leaves take on reddish tones with sun and frost. It has not blossomed for me but as a foliage plant alone it would be assured a place in my garden.

Caryopteris clandonensis, the Blue Spiraea, a member of the Verbena family, is a complete change in form from the latter and is suited to an equally different site in the garden. The fuzzy, light blue flowers are borne in August on the slender new growth. Much of the plant's growth is winter-killed each season but a severe pruning each spring keeps it attractive and does not affect the flowering. The foliage is a light gray-green and is distinctly scented if crushed. I feel that the delicate foliage and subtle flowers of this tender shrub are much more appropriate to associate with rock garden plants than with the coarser perennials and shrubs with which it is usually seen. My specimen is planted in a sunny location in an enriched sandy soil.

In other gardens with less severe conditions I am sure that other more exciting selections could be made, and in areas of assured snow cover the many low-growing plants considered tender by those to the south of us could be tried. However, I have found the plants I have mentioned dependable and would not hesitate to recommend them to other gardeners in situations similar to mine.

* * * * *

DISTRIBUTION AND DISPERSAL — SPECULATION THEREON —
Should this heading be applied to native and alpine plants and result in a Bulletin article, would you be interested? The following is an excerpt from the rough notes that might later be developed into such an article by one of our fine contributors:

"The study of plant life, the distribution and similarity of related species and genera, leads to day dreaming about their past. Where did they originate? What did the early ones look like? How did they come to appear as they do now? How did they get to where we now find them, often widely separated? Presumably we must believe in the evolution of species, in natural selection and survival of the fittest (which implies that ability to adapt to changing conditions as the years roll by and the centuries unfold) in order to have such daydreams, and to speculate with any degree of wisdom. To do so it is necessary to know something of plant geography as well as of the plants themselves. There seems to be clear-cut evidence that the ice age, with its intruding and receding glaciers played a very great part in the distribution of many plants. . . ." Perhaps such an article will be forthcoming.

SYNTHYRIS TODAY

ROY DAVIDSON, *Seattle, Wash.*

Among good western American plants for gardens, the several members of the genus *Synthyris* have been almost neglected or only slightly regarded. Many are unknown. This group of precocious flowers is of value not only for the blossom, often produced in a balmy midwinter break in the weather, but the foliage offers handsome adornment to shaded, mossy woodlands and a few to sun-drenched alpine screes. They are of bonded quality comparable to *Lewisia*s and *Phlox*es of western mountains, though perhaps not quite so splendid in flower.

Synthyris should be in every good collection of rock plants, and their cultivation presents no problems. The shade-lovers, with handsome, largish leaves,* want a cool place in some good light, but must have ample drainage. A soil rich in humus and filled with gritty materials suits them all. None would seem to be sensitive to soil acidity, though a strong alkaline reaction would doubtless prove toxic. The sun-lovers have smaller, lacinate leaves and flourish in the open, their roots well sheltered from baking by stones buried for the purpose, or in the trough, where the thick walls serve the purpose. Though constant moisture is a requisite, no excess should accumulate, yet they must never suffer parching, for permanent damage will result, not immediately apparent perhaps, but even well-established colonies may diminish and dwindle following such an experience. Propagation is by seed, easy but quite slow, and by division of the crown, the only way, of course, to increase a choice form. The several *Synthyris* are among the finest of winter and early spring flowers of North America, or anywhere else, for all that.

WORLDWIDE *SYNTHYRIS* RELATIVES

The genus *Synthyris* is one of several closely allied members of the *Veronica*e tribe of *Scrophulariaceae*, and particularly close to the Himalayan *Picrorhiza*, the Eurasian *Wulfenia* and *Lagotis* of Asia, Alaska and the Yukon. There are as few as eight or nine species in *Synthyris*, or as many as a couple of dozen, depending on what interpretation one chooses. Pennell¹⁵ allowed fourteen plus an additional four subspecies, of which no less than ten were new, three more being revised concepts of prior taxa. (One additional species was to follow, *S. platycarpa* Gail & Pennell 1937). In this treatment nine others were taken as constituting *Besseyia*, erected as a separate genus by Rydberg (1903).¹⁷ Cronquist⁸ was not so confident they should be thus segregated, and Kruckeberg & Hedglin¹² were inclined to a like opinion, following a study of one natural hybrid population (*Synthyris missurica*-*Besseyia rubra*), and the creation of the same combination in controlled conditions, also the induced (*S. missurica* X *S. reniformis*) and (*S. missurica* X *S. platycarpa*). Behavioristic patterns seemed to them to indicate that certain

*The leaves of many of the species have been oftenest described as "reniform," when in actuality they are but remotely or inconsistently so. The term is qualified or avoided altogether by the present author.



Synthyris reniformis, called "Spring Queen", may have a profusion of powder-blue flowers from January to May.

A. R. Kruckeberg

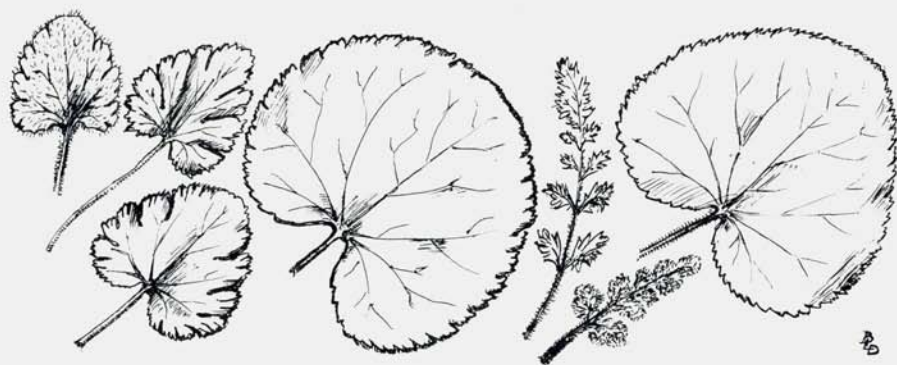
Besseyia were more nearly allied to certain *Synthyris*, while at least one of the latter was rather poorly related to all other of its genus. Thus a more realistic representation might well be resultant were they to be considered as a single generic unit, with subgeneric separation perhaps; lopping such an alliance at any given point presents an illogical discontinuity. Most members of the genus *Besseyia* are hardly attractive as garden plants however, though they may have a degree of curiosity value; their "kitten-tail" inflorescences are oddly furry.

Both *Synthyris* and *Besseyia* consist of low, fibrous-rooted, perennial herbs and subterranean, rhizomatous rootstocks, with leaves basal, long-petioled, rather broad bladed; inflorescence a scapose, terminal raceme of but few to very many smallish, bracted, complete flowers, with calyx of four partly united sepals, and a corolla of four usually quite unequal petals, united basally (or only rudimentary to totally absent in most *Besseyia*), blue to violet-purple, or (infrequently) orchid, lilac, pink or white (yellow in some *Besseyia*).

THE SUBGENUS *PLAGIOCARPUS*

Pennell¹⁵ bisects his genus *Synthyris* into two subgenera, taken on morphological and ecological bases. The first was called *Plagiocarpus* and consisted of only the single species, *S. reniformis*, characterized by widely spreading carpels, each of the pair with but two dull brown seeds, and of occurrence only in the relatively mild and humid Pacific Slope, from just north of the mouth of the Columbia River southward to the proximity of San Francisco Bay. The remaining species were put together into *Eusynthyris*, with many small, yellowish-brown seeds, the capsule a flattened oval, to be found in montane situations mainly, and away from the moderating influence of the Pacific.

Synthyris reniformis occurs in cool shade with ample moisture, usually



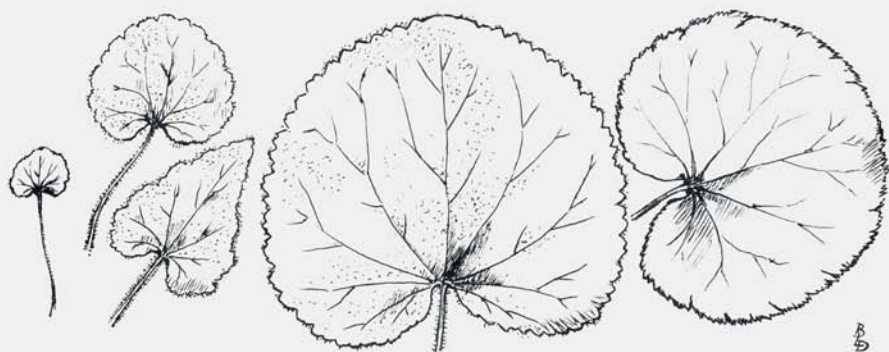
Most *Synthyris* species may be recognized from their distinctive leaves. From L to R, *SS. borealis*, *canbyi*, *laciniata*, *missurica*, *pinnatifida* and its var. *lanuginosa* and *S. platycarpa*.

Roy Davidson

in close association with the coniferous forest. Floral color is ordinarily lilac-blue, pale to deeper, sometimes pink or white, the southern form, from the Siskiyou area southward, tending toward a pallid grayish hue or "whitish," and to a leaf twice to three times as long as broad, rather than the more oval-reniform of the type. This austral form has been designated *S. reniformis* var. *cordata*, and has also been cataloged as *S. rotundifolia* var. *sweetseri* (then described with flowers of deep blue). The corolla of this species in both forms is unique in that the four segments are almost of equal size, all others being distinctly zygomorphic. The entire plant may be quite evidently pilose, even to the upper leaf surfaces, and the undersides are quite commonly colored a rather bright purple. The flowers are rather few and borne on slender and weak scapes which become quite lax on maturity; others are densely flowered on strongly and persistently erect scapes. The local name of "Spring Queen" refers to its heralding the vernal season. A clonal selection was named "Regina" by Carl English.

THE SUBGENUS *EUSYNTHYRIS*

The remaining species, Pennell's subgenus *Eusynthyris*, are to be found in more harsh climates, from Alaska-Yukon ranges southward in the Rocky Mountains (though not in the Canadian Rockies), and as far south as southern Nevada, then west to Washington's Olympic range. They are plants exclusively of high valleys and slopes to the topmost talus screes, where the lacinate-leaved members repose, in the most severe of arctic alpine conditions. As the first discovered, *Synthyris missurica* might be considered the most important of this subgenus; certainly its greater ornament makes it so for gardeners. It was named from the Lewis and Clark plant taken in 1806 along the Nez Perce Indians' Lolo Trail in the Clearwater drainage of present Idaho. It is the one species to have a really wide range, north as far as the extremities of the Selkirk range in northeastern Washington, south of the



All leaves are approximately $\frac{1}{2}$ natural size except *S. stellata* which is $\frac{1}{4}$. From L to R, *SS. ranunculina*, *reniformis* and its var. *cordata*, and *SS. schizantha*, and *stellata*.

Roy Davidson

Clearwater drainage somewhat into the Salmon, the Sawtooth and Seven Devils ranges, west into the Wallawas of Oregon, the Blue Mts. of Oregon and Washington, and into an extreme southwestern discontinuity in inland northwestern California and adjacent Oregon. As the wandering member, it displays a greater degree and manner of variation, but is essentially glabrous, with rather oval and cordate leaves, thick, shiny and turgid, of a rich green, coppery of tint when young and often vinous or bronzed in decline. The margins are shallowly lobed, each of the fifteen or twenty lobes incised into several usually rather blunted teeth, like a dull saw. Such details would seem to be of minor importance, yet most *Synthyris* species can be readily identified from the foliage alone, and certainly from the standpoint of adornment, those of *S. missurica* are second to none in attraction, well worth garden space the year around, and rather reminiscent of waxed Galax.

A large proportion of this total population is especially lush, with leaves upward to six inches in diameter, sometimes with a whitish pubescence (except on the upper surface). These have on occasion been designated as variety *major*** , and they remain in character when brought into the garden. Cronquist⁸ has noted that they "probably warrant recognition"; Pennell¹⁵ ranked them as subspecies, followed by Abrams¹ but Davis⁵ gave varietal status. In view of the fact that the other extremes, the concise, dwarf forms, and the nearly glabrous, are to be found, it would seem to be all a part of the inherent variation of the species. The so-called "alpine forms" from the extremes of elevation at ca. 4-5,000 ft., often in crevices in the rocks, remain dwarf in cultivation, though of slow growth and scarcity of flower. The usual color in the species is a strong blue, from a steely to electric intensity, tending to violet; albinos have been recorded, and St. John's forma *rosea* was found by Dr. Ownbey and established in cultivation, the original collection having been enshrined in the herbarium case. A local common name for this

**As this is being written, a new cytological study has revealed that this species exists at both the diploid and tetraploid levels, which may explain this.

species is "grape hyacinth," which gives a very good mental picture of its effect in flower.

The subspecies *hirsuta* was named from a single collection made fifty years earlier by Howell. In view of the fact that it has never been refound, and that no other of its alliance occurs in any proximity, it is not a name to be perpetuated, though it is, of course, quite possible that such might have perished in the devastation of logging, etc. (Errors in recording of collections have been perpetuated before). This was uniquely brown-pubescent on immature growth, if indeed it had not altered itself while reposing in dried oblivion.

There is some difference of opinion over acceptance of *Synthyris stellata* as a good and distinct species, separate from *S. missurica*. Following Pennell's¹⁵ original publication, it was accepted by Abrams¹ but Cronquist⁸ noted (under *S. missurica*) that it might constitute a "rather weak variety" of that species. Peck¹⁴ followed Pennell, but not many others have done so. Whatever its proper place in phylogeny, it has found wide acceptance in horticulture, and in fact, must be treated as a synonym in part of *S. missurica* of horticulture, for in gardens that species has often been called *S. stellata*, innocently enough, considering there is little enough to distinguish the two. *S. stellata* is disposed in the wet, lower portion of the Columbia Gorge, and might be thought of as a more compact version of *S. missurica*, with leaves more sharply dentate. The floral color is the "heavenly blue" of the spring skies, and a very fine white form is in distribution. Technically (very much so) there is a tell-tale pair of leaf-like bracts below the inflorescence, seeming to set it apart to the taxonomic worker.

FRINGED SYNTHYRIS SPECIES

Obviously related, though geographically separated, are the two with the fringed flowers. *Synthyris schizantha*, the first to be known, is from moist, shaded cliffs on the Pacific side of the Olympic Peninsula and was given recognition by Piper (1902); it is so very distinct in several respects as not to be confused with any other. It may well be the largest of its genus, with leaves well over six inches broad on record. These leaves are unique in being thin and deciduous, falling with the early autumn. Thus the flowers emerge from bare earth, a startling purple, the four unequal petals deeply slashed into soldanella-like fringes. There is a pair of large leafy bracts beneath the inflorescence, giving the effect of green foliage, but the true leaves emerge only later.

The very comparable *S. platycarpa* is widely remote to its sister in being endemic to some of the unglaciated areas (nunataks) of central Idaho, where it is surrounded by *S. missurica*, though disposed above and apparently isolated by conditions of moisture and temperature. Except for being smaller in flower as well as in all other parts, it is much like the Olympic plant only the leaf is firm and persistent through the winter. Although this leaf is reminiscent of that of *S. missurica* found below it, it is lacking the rich wax-like luster of that, and is in fact a dullish garden subject by comparison. The undersides are rather hairy, especially on the nerves; leaf outline may be oval to remotely reniform, strongly cordate, lobed and dentate, the teeth not decidedly sharp. Certainly its present range indicates it to be one of the ancestral species of *Synthyris*, having survived glaciation *in situ*.



The prize species is probably *Synthyris missurica*, with handsome, shining leaves around the calendar and rich blue flowers in early spring.

A. R. Kruckeberg

FROM THE EXTREMES OF CLIMATE

There is one species from Alaska and adjacent Yukon which Pennell¹⁵ demonstrated in his distribution chart as found only northward of the arctic ice sheet, whereas all others are to be found entirely southward. It is rather absorbing to ponder the numbers which must have once grown between in the great expanse that is now western Canada. None of them survive there apparently, nor have others replaced them in the aeons since the ice receded for the last time. The little-known *Synthyris borealis* Pennell (1933) was described from the type plant photographed prior to its collection near the base of Mt. McKinley; the photo shows a hairy huddle, profuse with flowers stems, and a further illustration in Hulten¹⁰ depicts a subject of considerable appeal, very floriferous, flowers the rich blue of the genus, and habit of obvious charm to gardeners. The leaf is rather oval in outline, but lobed rather deeply, the teeth of the margin blunt; its flower is reminiscent of some *Besseyia* species in being trilobed on the lowermost segment, and with toothy bracts conspicuously adorning the lower scape.

The charming little *Synthyris ranunculina* seems to be, as far as is known, confined at present to the cool seepages in the northwest-facing canyons of the Spring (Charleston) Mts. of Nevada, and thereby surviving in the light shade of pines, whereas in an ancient period of time, it must have found favorable habitation on the many ranges intervening; times before the upthrust of the Sierra Nevada and Cascade ranges converted the Great Basin to desert. (Today the perimeter of this basin is rimmed with populations of no less than four species, *SS. missurica*, *pinnatifida*, *laciniata* and *ranunculina*). It is a plant to delight those who are mesmerized by the most miniature, for it clearly shows in its diminutiveness the evidence of struggle for survival; the plant is quite glabrous, the long, slender pedicels present leaf blades about a half-inch broad and roughly oval to more or less reniform, and distinctly though shallowly palmate-lobed into five or seven parts, each with about three small, sharp teeth. It would be, therefore, much like a tiny *S. missurica*, and in fact much resembles some of the "alpine forms" of that species. It was said by Heller (who first collected it in 1913) to be "a new species," but it was not to be so recognized until twenty years hence.

THE ALPINE LACINIATE SPECIES

The remaining three *Synthyris* species are mostly from the highest summits of the Rocky Mountain ranges, ordinarily above timberline, and among the rare few flowering subjects of those extreme elevations. The one exception is from Washington's Olympics, still at the tops, however. All have their leaves reduced to being deeply cleft or lobed into "skeletons." They are variously attractive as subjects of appeal to those who dote on observing effects of the most severe alpine conditions and in the garden are suited to the crevice or scree, or to the trough where their delicacy is perhaps best appreciated, appressed amongst lichened stones. They are not easily flowered in cultivation and do not flaunt a showy inflorescence when coaxed into performing, yet have an appeal to alpinest gardeners such as other plants from such heights. Dr. Kruckeberg would call attention to their ability to blossom beneath the snow, a curious but not unheard of phenomenon amongst the denizens of the highest peaks.

Synthyris canbyi is endemic to the Mission Range of Montana, which lies as the barrier that prevented further southern advancement of the glacier which gouged out the Flathead Basin westward from Glacier National Park. It is doubtlessly correct to regard it as a relict endemic left marooned by post-glacial warmth and unable to migrate further. It was first recognized by Pennell¹⁵, having been regarded by Rydberg¹⁷ as conspecific with the similar *S. laciniata*. In leaf it is broad-ovate and cordate, cut about half its depth into toothed lobes, the entire plant glabrous except in the inflorescence, which is densely compact and blue-flowered. Cronquist⁸ says of the near related pale-violet *Synthyris laciniata* that it differs in a more distinctly and shallowly cleft leaf; it is from the Wasatch Range of central Utah. Pennell¹⁵ segregated some few individual collections from the disjunct Deep Creek Mts. of western Utah as subspecies *ibapahensis*, with foliage more sharply toothed and thicker and with flowers of deeper blue, certainly minor distinctions.

The best known of the laciniate, high-montane species of *Synthyris* is the wide-ranging and somewhat variable *S. pinnatifida*, with leaves, as the name

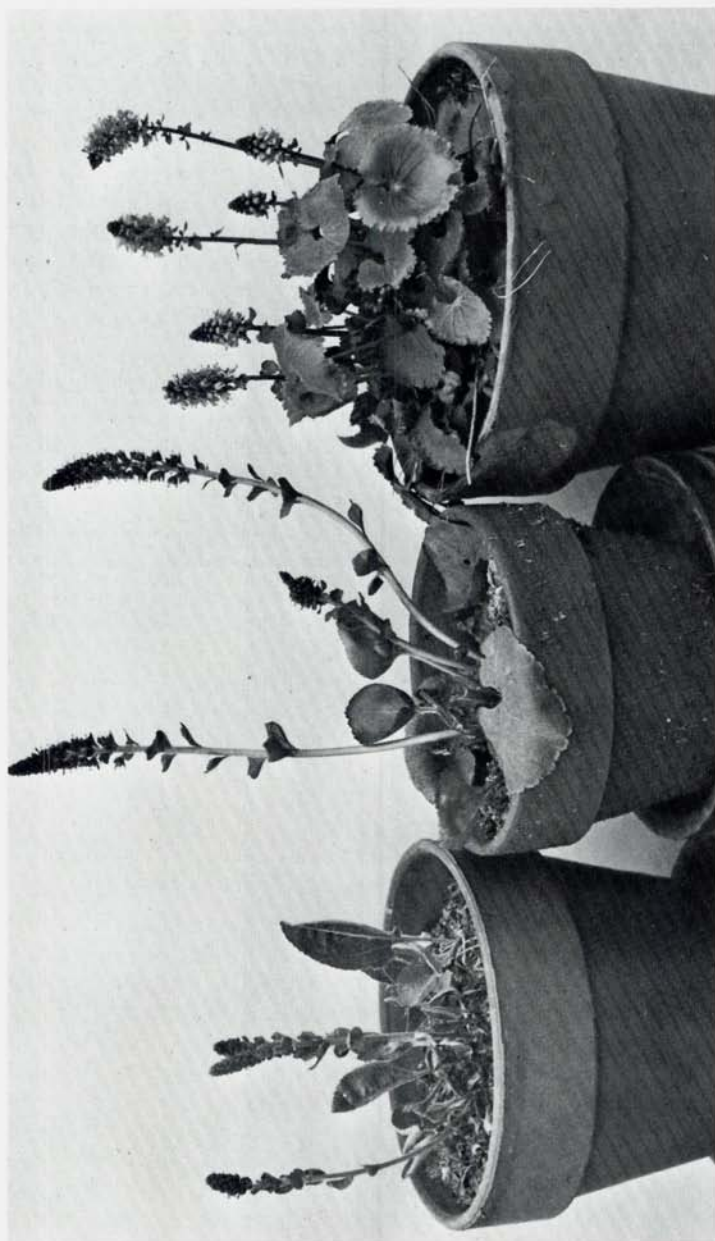
would indicate, cut deeply in a pinnate manner. Cronquist⁸ condenses seven of Pennell's taxa into three varieties of Watson's (1871) *S. pinnatifida*; the type specimen was of Watson's own collection (1869) from a 9,000 foot summit at the head of the American Fork Canyon in the Wasatch Range in northern Utah, from whence it extends to cliff and crag and scree in all directions, variable to the degree Pennell's splinter treatment reflects. The variety (or subspecies, if one chooses) *pinnatifida* ("the typical phase," as interpreted by Cronquist) includes those individuals only slightly villous, if at all, with bracts of the inflorescence more rounded, to obovate, the capsule glabrous. As thus described, those from the northern Wasatch and Bear River Mts. of Utah, those from adjacent Wyoming, and likely those from the Bitterroot Range on the Idaho-Montana border conform. Two additional varieties (or subspecies) might be separated one from another only with some difficulty were they ever to occur together, both differing from the type in the more acute and angular bracts and in being more hairy, to densely so, the petioles no more so at the base than they are above.

The variety *canescens* may be subglabrous to villous to tomentulose, becoming glabrate with age, the capsules either hirsute or glabrous. Pennell's *S. cymopteroides* ssp. *canescens* was taken by Cronquist as the type for this phase of the species, as found in the headwaters of the Salmon River in central Idaho, from whence it ranges northward into southwestern Montana. The var. *lanuginosa* might at some seasons of the year be taken as resembling the above. This phase, densely and permanently white-tomentulose throughout, even to the capsules, is based on Piper's (1902) species, *S. lanuginosa*, from the high Olympics of Washington. Its disjunct and restricted range, so far west of others of its ilk, is another of those mysteries unexplained, but surely it, too, must have been deposited there in survival of glaciation. It is a real treasure in the garden and might be likened to a pygmy Dusty Miller; its very bright blue, though infrequent flowers belong to the skies themselves and to alpine lakes reflecting them. These alpine species of *Synthyris* will slowly spread to colonize a fortunately suitable place in the garden, to be prized indeed.

CONFUSION OF NAMES CORRECTED

Identities of *Synthyris* species have been rather muddled, due in part to what amounts to "false synonymy," and what on the surface would appear to be an intergradation of species. Dr. Pennell's specific nomenclature gives a false impression, too. In reality they are remarkably distinct, and some misconceptions as to significant variation can be blamed to taxonomic errors of prior times. However, as within any genus, there are greater similarities between some, and then again, great gaps in continuity otherwise. Confusion in the nomenclature must be laid to a series of events which led to the lumping of two very distinct members as conspecific. Now that this is understood, the plants are gaining in favor with plantsmen and gardeners alike. The muddling of names has long ago been set to rights, but it often takes some little time for such wisdom to trickle down to garden label level.

The genus *Synthyris* was founded by Bentham (1846) to include four species, three of which were later removed to *Besseyia*; it was based on *S. reniformis* as the type of the genus. Here, however, lurks a bit of uncertainty,



The Kruckeberg-Hedglin hybrid of "bi-generic origin", center, flanked by the apetalous seed parent, *Besseyia rubra*, left, and the pollen parent, *Synthyris missurica*, right. The hybrid has the blue corolla of the latter.

A. R. Kruckeberg

for Bentham's description was based, as was Hooker's prior text and illustration (1840), on two distinct individuals, one in flower, the other in fruit. The former was after the specimen taken by David Douglas, March 1827, "mountains of the Grand Rapids of the Columbia River", and described (1835) as *Wulfenia reniformis* by Bentham, later to be interpreted by Asa Gray (1878) as *Synthyris rotundifolia*. The fruiting portion of the Hooker plate was after a further Douglas collection from the Blue Mts., itself interpreted by Dr. Gray as the "true" *S. reniformis*, but which was actually what we now know as *S. missurica*! Pennell¹⁵ has called attention to the fact that either of these two could be taken as the type of the genus (or both rejected). Although this detail has little bearing on their horticultural merit or distinction, which is certainly our main concern here, the retelling of the chain of events does recall the clay feet of even the most astute, as well as helping to understand how error crept into interpretation; corrections come more easily with a full, clear picture.

But further complications arose when another specimen, that of Lewis and Clark, taken June 1806 on Hungry Creek, a minor tributary of the Lochsa River, part of the Clearwater drainage system, was described by Pursh (1814) as *Veronica reniformis*, and credited, in error, to "banks of the Missouri." This was later to be described (1818) as *V. missurica* by Rafinesque, and also once again, as *V. purshii* by Don (1838). It is readily understandable how it came to be confused with both *Veronica reniformis* of Rafinesque (1808; an entirely distinct plant) and *Synthyris reniformis* of Bentham (the Douglas plant from the Columbia, originally called *Wulfenia reniformis*). Thus was the state of the nomenclature until the publication (1933) of Dr. Pennell's revision in which were separated the several species as *Besseyia*, and also was liberated the Lewis and Clark plant as *Synthyris missurica*, although the specific epithet still credits the plant to the wrong river system. (It could conceivably have been named "*S. kooskooskiensis*," for the name of the river was Kooskoosky)!

It was a request for clarification of yet another Columbia River species, *S. stellata*, which led Dr. Pennell to discover this appalling confusion and to the study which was to bring about order, but as the weed-seeds of error had been sown, so they continued to produce their annual crop of doubt. The splitter interpretation which Dr. Pennell published has been considerably lumped by latest interpretations of the genus. Yet the subjects remain unchanged themselves and are just as beautiful as ever both in nature and in the garden.

FINDING LIST OF TAXA WITHIN THE GENUS *SYNTHYRIS*:

borealis Pennell 1933.

canbyi Pennell 1933.

cymopteroides is *pinnatifida* var. *canescens*

cymopteroides canescens is *pinnatifida* var. *canescens*.

dissecta is *pinnatifida* var. *canescens*.

hendersonii is *pinnatifida* var. *canescens*.

ibapahensis (possibly a "weak form" of *laciniata*) Pennell 1933.

laciniata (Gray) Rydberg 1900.

lanuginosa is *pinnatifida* var. *lanuginosa*.

major is *missurica* var. *major*.

missurica (Rafinesque) Pennell 1933.

missurica hirsuta (little known and uncertain) Pennell 1933.

missurica var. *major* (Hooker) Pennell 1933.

missurica var. *stellata* is *stellata*.

paysoni is *pinnatifida* var. *pinnatifida*.

pinnatifida:

var. *canescens* (Pennell) Cronquist 1959.

var. *lanuginosa* (Piper) Cronquist 1959.

var. *pinnatifida* Watson 1871.

pinnatifida laciniata is *laciniata*.

platycarpa Gail and Pennell 1937.

ranunculina Pennell 1933.

reniformis (Douglas) Bentham 1846.

reniformis var. *cordata* A. Gray 1876.

reniformis major is *missurica* var. *major*.

rotundifolia is *reniformis*.

rotundifolia var. *sweetseri* is *reniformis* var. *cordata*.

schizantha Piper 1902.

stellata Pennell 1933. Some garden plants of this are *S. missurica*.

EXCLUDED SPECIES; the following 9 taxa are generally considered within the allied genus *Besseyia*, not an opinion held by all:

alpina. Very strongly resembles a *Synthyris* species.

arizonica.

bullii. Also called *Wulfenia bullii*.

cinerea is *wyomingensis*.

flavescens is *ritteriana*.

goodingii.

gymnocarpa is *wyomingensis*.

houghtoniana is *bullii*.

oblongifolia.

plantaginea.

reflexa is *ritteriana*.

ritteriana.

rubra. Of apparent relation to *Synthyris* (also called *S. rubra*).

wyomingensis.

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BOOK REVIEW

LOB'S WOODS by Elizabeth Lawrence. Order from Mrs. Leonard Minster, 947 Edwards Road, Cincinnati, Ohio 45208. \$2.25.

Thirty-two years ago in the American Rock Garden Society Year Book, 1939, where of our present Directorate (inner cover of the Bulletin) there appear only the names of Dr. Wherry and Mrs. Roberson, the membership list includes Miss Elizabeth Lawrence (Raleigh, N. C.) and Mr. Carl H. Krippendorf (Milford, Ohio).

In 1957 Elizabeth Lawrence, now gardening in Charlotte, N. C., had published a book, *The Little Bulbs*, which she sub-titled, *A Tale of Two Gardens*—her own and Carl Krippendorf's. Now in 1971 a memoir of Mr. Krippendorf, "a portrait of a gardener," is published for us by the Trustees of the Cincinnati Nature Center entitled *Lob's Woods* by Elizabeth Lawrence. Developed, as it is, by family anecdote, by quotations from correspondence and by personal reminiscence, the personality of a gardener emerges through this chronicling of his gardening activities, his discerning choices of bulbs, flowers and woody plants for the large scale natural style of gardening which fitted his 175 acres of wood and meadow.

Now a word about this book of 76 pages; it is 5¼ x 7½, the two covers are handsome photographs in color, one of daffodils naturalized in a meadow, the other sunlight on the woods. There are six handsome photographs of some of the important constituents of the plantings of Lob's Woods. Miss Lawrence has eight chapters that relate the development of the garden, its inception, its years of pleasure to Mr. Krippendorf and his gardening friends and its happy ending as a community garden to be preserved. A checklist of new and old plantings is a valuable record. The quotations and bibliography are all touches of the literary excellence that we have come to recognize as Miss Lawrence's mark.

Bernard Harkness, *Geneva, N. Y.*

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ERRATUM NO. 1—Unfortunately, some of the copies of the *Bulletin* for October, 1971, were mailed out with pages 122, 123, 158 and 159 entirely innocent of ink—pure and shiny white. How many copies with these inkless pages were mailed out is not yet known. The editor's copy, mailed by Mr. Redfield in the general distribution, was one and several others have been reported in the Seattle area. It seems proper that the victims of this unprecedented error should notify either Mr. Redfield or the editor so that, if possible, they may be supplied with copies that are properly printed.

A SUCCESSFUL COLLECTING TRIP

TAGE LUNDELL, *Ramlosabrunn, Sweden*

(Editor's Note)—A sequence of events that brought the following article to our ARGS readers exemplifies the interest that our members take in keeping the editor supplied with worthwhile material. Mr. Tage Lundell, who lives in Sweden, went on a dwarf conifer collecting trip into Norway. His account of the trip was published in the *Tradgards Amatoren (Amateur Gardener)* in 1970. Mr. Harry Elkins of Grosse Pointe Park, Michigan, who has visited Mr. Lundell and his garden in Sweden, suggested to Mr. Joel Spingarn of Baldwin, N. Y. that he send a copy of this magazine to his friend, Gustav A.L. Mehlquist, Professor of Plant Breeding at the University of Connecticut, and request a translation of the article into English. This was done and in due course the translation reached the editor of our own *Bulletin* from Mr. Elkins, with permission to reprint. We appreciate the thoughtfulness of these men and wish to thank Mr. Lundell for writing the article, Professor Mehlquist for the time spent in translating and Mr. Spingarn and Mr. Elkins for acting as intermediaries. It should be mentioned that all are members of the ARGS except Prof. Mehlquist.

The urge to collect dwarf conifers can hit anybody but most often, perhaps, it is likely to occur during the later part of the developmental sequence which a garden enthusiast undergoes. At any rate so it is with me. A contributing reason is probably the fact that one gradually realizes that one simply cannot make room for so many of the larger trees on that part of his native land which constitutes his garden. Well, some lucky people, of course, might have space for many big trees.

If one so desires, one can get together a rather remarkable assortment by limiting one's choice to the various forms of the three native conifers.

Of the common juniper, *Juniperus communis*, there are more than enough types; yes, since in a native stand scarcely any two plants are alike, anyone can find types or forms more suitable for the garden than others. It is difficult to "collect" junipers in the sense in which this word is used by conifer enthusiasts. This does not deny the fact that selected types of our native juniper can be most decorative elements in the garden.

The spruce, *Picea abies* has during the years produced hundreds of named forms; regrettably though, nobody seems to be able to determine the correct name for most of them nowadays. Most of the dwarf spruces are, with age, likely to become rather sad looking, lumpy and uninteresting, but some are first class and a few are even better.

The aristocrat among the Swedish conifers, however, is the pine, *Pinus sylvestris*, which must be regarded as one of the most beautiful of all conifers, though one may never give this fact a thought. There are not many dwarf forms of this pine and the supply of those that exist is not plentiful, as one cannot mass propagate a clone of it by cuttings. It must be grafted (I believe).

This was to be about a trip. Yes, yes, shortly the trip begins.

When I went through an old issue of the *Gardners Chronicle* which in

the old days used to be worth reading for an amateur, I came upon an article by R.S. Corley, an English specialist on dwarf conifers. It dealt with dwarf forms of *Pinus sylvestris*, and he described ten or so; quite a feat. He lamented that people who had the opportunity did not bother to seek out new forms worth cultivating, something which must have been possible, if one had tried. He recommended a small pamphlet issued by a Norwegian forestry institute which described abnormal forms of pine growing in the Skjak area and in other places in Norway. But it was regrettable, he said, that these interesting forms were not taken care of so that some of the best could find their way into our gardens, in the way Americans have preserved their many dwarf forms of *Tsuga canadensis*. He did not have a very high opinion of the forestry industry, which seemed interested in little but the production of high quality timber.

One can hardly imagine a more attractive incentive for an exploratory collecting trip. When the vacation travel on the roads could be considered over, I took off on one of the last days of August.

En route, I made a stop at Alingsas to leave some plants for Thor Svantesson. It turned out he was prepared to jump into the car as soon as Mrs. Sonja had had a quarter of an hour to pack his gear.

In Oslo we made a flying visit with a Norwegian member of S.T.A. who has a beautiful collection of alpine plants. We also stopped at a nursery which was said to have collected and propagated native conifers. There were many fine forms of *Juniperus communis*, but no pines.

North of Oslo are the Norwegian mountains. During the whole trip we could see that they were beautiful on the outside as well as on the inside.

Several places where road construction cut into the mountain sides one could see fantastic patterns of form and color, and the rear of the car was gradually weighted down with the stones which we collected for my projected new stone wall. For safety reasons (and because it was getting dark) we had to stop and rearrange the load.

The next day we found ourselves on Jotunheimen, although it is doubtful whether anyone could have found us in the typically Norwegian fog which lay over Valdresflya and the surroundings. When the fog lifted we took a break at a steep scree which we climbed. We collected among other things perfectly beautiful platters of *Loiseleuria procumbens* and *Phyllodoce coerulea*. We lifted from the rock crevices some *Polystichum lonchitis* that had roots in so little humus that it almost appeared as if they were living off their own root systems.

At an enchanting place in the Sjo Valley we made an excursion and collected material of some dwarfish, slender, beautiful pines that grew there, probably the subspecies *lapponica*, with shorter and broader needles than the typical form. There were also colonies of *Pulsatilla vernalis*, *Saxifraga aizoides* many forms of compact junipers with attractive needles, etc.

By way of Lom we reached one of our objectives, Skjak, at a branch of Gudbrandsdalen. It was an extensive area, and only after getting advice from a Skjak native could we find our way to a pine grove which met with our expectation. There was really a playground of bizarre pines; narrow cypress-like pines, broom-like pines, umbrella-like pines, creeping pines, pillow-like forms and pines very closely branched on which the annual shoots had a

tendency to branch. Many had cones, but not all looked like typical pine cones. We identified as the most peculiar one that had slender gray annual shoots with very short, distinctly space needles. It was more unusual than beautiful, in reality just as peculiar as unattractive; in other words, a great attraction only to a pine buff. The scions we took we shall naturally try to root, but it is by no means certain that these forms can be transferred without change to ordinary gardens. The Skjak area is having the least precipitation in Norway (though not the day we were there), but the soil is poor and the climate severe; all factors which may be significant.

Satiated with experiences, we rolled on toward Andalsnes, a road which a friendly native recommended as one "which all Swedes ordinarily take." The road sign we encountered before we came to Geiranger, "Curves 14 Km", was no exaggeration. It turned out that we would drop about 1,000 M (3,300 feet) in these 14 Km (about 9 miles), which had to be negotiated as an uninterrupted series of hair pin curves. White-painted stakes edged the side towards the abyss of the narrow road and they were perhaps better than nothing. Thor spoke all the time of the splendid views which rolled forward during the descent, and I believe him.

We came down to Geiranger at dusk and stopped at Hotell Utsikten (Utsikten = the view). It was an appropriate name. I am no collector of views, but I find it difficult to believe that this could be surpassed. It had everything. Breath-taking chasms, blue-shimmering mountains, snow-clad peaks, verdant woodlands, mirror-like waters, bubbling waterfalls, pastoral meadows, snaking roads and an unbelievable collection of picturesque dwellings, all arranged in masterly fashion. Recommended.

After we had slept in this superb setting, we felt ourselves more than recovered and hurried along Trollstein by way of Dombas towards Trondheim. We stopped for a short visit at the alpine botanical garden at Kongs-vold.

I cannot refrain from mentioning that in Trondheim I bought the last copy of *Lids Flora*, which nowadays takes in the whole Scandinavian peninsula and has illustrations of practically all the plants found there. Recommended.

Our next goal was As near Ostersund, where the S.T.A. member Evert Nilsson has a nursery which, despite the northern latitude, contains a surprising number of things that would be desirable even for exacting gardeners much further south. Evert has also a private garden, a hobby collection containing, among other things, many conifers.

I had learned through correspondence that he had located two conifer witches'-brooms in the area one on a pine and one on a spruce. The latter, judging from evidence I had gathered earlier, had to be something very special.

We arrived in the morning at As and we found Evert ready to leave. After a hearty breakfast we again headed toward the Norwegian border and after 4-5 miles (25-30 eng. miles) we arrived at Mattar. At the edge of the woods we recognized the dark characteristic silhouette of a witches'-broom in the top of a pine. The owner was found to have "fled" to Stockholm, so we proceeded without hesitation toward the place. The object was located about 10 m (about 33 feet) above the ground. The lower portion of the tree was

without branches. My suggestion to procure a ladder was turned down with contempt by Evert, after which he, without any other means than a phenomenal technique, proceeded toward the top in about no time at all. A number of branchlets soon dropped; Evert followed without any sign of breathlessness.

The growth was similar to that which I had observed on a couple of pine witches'-brooms seen previously: short needles, narrow branch angles, reduced annual growth and cone production.

Another couple of miles took us to Ottsjo, where after a little wandering in the woods we came to a tree of about the same height, this time a spruce, with a witches'-broom in the top. The branches that were thrown down filled us with pleasure. The appearance was somewhat like the much sought *Picea abies pachyphylla*, about which H. J. Welch writes in his book *Dwarf Conifers* that it probably is the most characteristic form of all. In my opinion this is still better. The needles in both types are thick and meaty but a brighter green in the witches'-broom and much closer together. The annual growth is in both 1-2 cm. The shoots are stiff and thick and of a remarkable reddish brown color.

With so many exciting things in our luggage we began to feel the call of home again. Despite the fact that Evert had more interesting things to show, both in his garden as well as in the surroundings, we set course toward the south.

We took the time to look at a beautiful garden in Skultorp and Ake Stadig's unbelievably well assorted and well kept alpine nursery. From both places we brought back souvenirs.

After the return home to Halsingborg, "green-thumb" Hilding Nilsson on Luleastreet took over one half of the conifer material, which he grafted with the usual expediency. Despite the fact that the season was not the best for grafting, the results do not look too bad now about two months later. But much can happen during the winter.

The rest of the branches I put in the refrigerator. They will remain there until February—March, which should be the appropriate time for grafting.

When I emptied the plastic bags the small tufts of mixed surface vegetation, so inviting to lift when nothing special was within sight, fell out. There was *Diapensia lapponica*, *Tofieldia pusilla*, *Thalictrum alpinum*, various *Carex* and many others.

I sent two sample branches of our collection to the above mentioned Mr. Corley, who by his article had provided the impetus for the trip. He answered that he could not recall that he had ever received anything more interesting. Our trip, thus, must have been successful.

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ERRATUM NO. 2—There is a strange mix-up on page 133 of the October issue of the *Bulletin*. It is assumed that the line juggling will leave the reader somewhat skeptical of the proofreading ability of both the editor and the printer. Even the printer can not account for it. To correctly read the first two paragraphs of Mr. Heep's article on this page, read lines 6 and 7 of the 2nd paragraph as lines 8 and 9 of the 1st paragraph.

OMNIUM-GATHERUM

More awards for ARGS members! At the 144th Annual Meeting of the Pennsylvania Horticultural Society on October 21, 1971, the year's Distinguished Achievement Medal was awarded to Dr. Edgar T. Wherry, the Editor Emeritus of the ARGS *Bulletin*. The citation follows:

Some know him as our foremost authority on ferns, phlox and wild-flowers. Others would contend that his outstanding service has been his tireless effort to open our eyes to the virtues of our native plants. Though a few might not recall his geological research on crystals, no one would overlook his contribution to the study of soils and ecology. And no horticultural library would be complete without his books and monographs and the journals he has edited.

But these achievements, remarkable though they may be, are not the full story. Through them all, Dr. Wherry has found time to teach and to talk to two generations of horticulturists and to convey to them a sense of joy in the world of plants.

With admiration and gratitude, the Pennsylvania Horticultural Society presents to Edgar T. Wherry its Distinguished Achievement Medal.

At this same meeting Doretta Klaber was honored with the Plant Society Award. The citation:

In the world of horticulture, it is generally true that "talkers are no great doers." Those who grow plants rarely find time to set down their skills in black and white, and all too often horticultural writers find their material in the library rather than in the earth.

Doretta Klaber is an exception—a writer who draws on her own practical experience. For eighteen years her nursery at Cloud Hill was the Mecca of rock gardeners, a place where they could find rare plants, beautifully grown in an attractive setting, and garnished with wise suggestions on the cultivation of each. In 1959, at the age of 70, she wrote her first definitive text on "Rock Garden Plants," followed by "Gentians for Your Garden," "Primroses and Spring," and the soon-to-be-published "Violets of the United States." All of these contain thorough and reliable information set forth in straightforward words. And all of them are embellished with drawings—at once accurate, informative, charming—from the pen of Doretta Klaber.

Mrs. Klaber is uniquely qualified to be the first recipient of the Plant Society Award given by the Pennsylvania Horticultural Society on the nomination of the American Rock Garden Society.

A note from Betty Jane Hayward tells us that in June, 1970, she was given a citation by the Garden Club Federation of Maine at the Annual Meeting at Bangor, Maine. Previously, she had received the Award of Merit of the ARGS. She comments, "Rock gardening has brought so much reward and joy to me, and having so many kind friends has been a part of it."

At Chicago, in mid-September, at the annual meeting of the American Association of Botanic Gardens and Arboreta (AABGA), Mr. Joseph A.

Witt, Asst. Director of the Arboretum of the University of Washington, assumed the presidency of the AABGA for a two-year term. At the same meeting, the Director of the U. of W. Arboretum, Mr. Brian O. Mulligan, was given an Award of Excellence in recognition of services to horticulture.

Three days later, at Milwaukee, at the 1971 Congress of the American Horticultural Society, Mr. Carl S. English received a Professional Citation of that Society. It is reported that the 1972 Congress of the American Horticultural Society is to be held in Seattle and that Mrs. Pendleton Miller will be the Chairman in charge and will be calling on the ARGS for help.

All four of these people are members of the ARGS and residents of Seattle.

Excerpts from a member's letter: "Recently I was asked to speak on Rock Gardening to a local Garden Club, and wrote to Elmer Baldwin for slides to supplement my own. They added a great deal to my talk. Elmer has done a tremendous lot of work on the slide library, but most members, I fear, seldom think of it, use it, or think of contributing slides. He wrote me that of all the people who went to Harrogate, not one thought to send a single slide to the library. It is a good collection now, but could become a great deal better. Elmer is a very orderly and methodical librarian, and makes the receiving and returning of slides as easy as possible."

Why is this slide library not used? It is one of the services which our Society provides for its members and under Elmer Baldwin's directorship has become something of which to be proud. However, just as our *Bulletin*, or any other publication for that matter, is useless, regardless of merit, unless widely read, so is the library unless properly utilized. Our members are wonderful in the way they contribute to the seed exchange, and from it request seeds, and they are more than wonderful when it comes to contributing material for use in the *Bulletin*, so why this two-way neglect of the slide library to which they neither contribute nor use?

We have just returned from a short walk in the gloaming. In the little time Eileen and I were away, not more than an hour, we called on an ARGS member and found what seems to us the ultimate in a residential garden. In our springtime touring of Great Britain where we were privileged to visit many of the best in gardens, both great and small, we saw nothing that approached the loveliness of this quite new garden right here in Seattle. We looked down on it from a second story picture window in the outside lighting that had been provided, for by then darkness was descending. It was not fairyland, for it was not as "busy" as fairyland must be—it was not formal, far from it—and it was neither overgrown nor under planted; just a garden that from that viewpoint was wholly satisfying and made one grateful to those responsible.

I dare not attempt to describe it for that must be the prerogative of an artist and a poet. I am hoping that the creator of this garden will be willing to undertake its description for use in a future *Bulletin* for he has already proven himself an artist and I am hoping that he is a poet, as well, and it would help were he a good photographer. To think that this beauty spot is but three blocks from your editor's home is astonishing. Beauty is all about us if we will but search and be receptive!

VEGETATIVE PROPAGATION IN SITU

DR. DANIEL C. WEAVER, *Hamden, Connecticut*

Despite increasing availability of seed from alpine and other rock plants, there remain difficulties of seed germination and 'growing on.' Continuation of choice forms may be impossible or unpredictable. Establishing difficult choice plants, particularly in continental northeastern United States, is also unpredictable. Maintaining plants grown in an alpine house may be impossible in summer, although refrigerated 'air conditioning' seems promising for survival of choice specimens.

Acquisition of choice plants is unpredictable. Some mortality is inevitable. Too, often lost are those plants one most treasures. Ergo, propagation and sharing of plants must be a way of life for rock gardeners.

Much has been written about propagation methods requiring considerable non-garden space and equipment. Several transplantings may be necessary, with careful 'hardening off' and constant attention to watering.

Rock gardeners with limited or envisioned propagating facilities should consider vegetative propagation from established plants, planting directly in their gardens. Although direct propagation may not always succeed, even a low percentage of successes can mean continuation of a favorite plant . . . or establishing a major planting! When propagation is successful, stronger plants often result, without further concern about hardening and transplanting. Adaptation seems more complete and more rapid than with pot-grown plants or plants transplanted from flat or frame.

First enumerated are some guides basic to success with plants suitable for propagation in the 'Northeast Corridor.' Some of these may be thought self-evident but should not on that account be disregarded. All suggestions are based on an expectation of permanent planting, recognizing that some plants cannot safely be moved when established.

1. Obtain three plants when possible, if the species is difficult to obtain, grow or propagate. Disturb only one plant for purpose of propagation. Make first attempts with plants you consider less choice.
2. Time of receiving plants may determine whether plants should be held for future planting.
3. Attempt propagation at time of original outdoor planting. Know something about plant—genus, if not species—*first*. If all cuttings are not rooted, place a portion of unrooted cuttings in sand or other medium. Use rooting hormone for only part of your stock.
4. Direct propagation in the garden should be done well before or after hot weather, particularly if the site chosen does not have shade. Plants which are not evergreen should be propagated in spring several weeks after green reappears.
5. Use several sites and several soil conditions. Your plant may succeed in a microecology seemingly quite dissimilar to its native habitat. Consider not only soil, drainage, wind pattern and snow cover but also rock shelter and permanency, (Will other plants overrun? Can plant be readily moved if necessary? Can surrounding undesirables

- be moved without disturbing your newly-established choice plant?). Creation of depressions and elevations should be considered. Create microclimates extensive enough to accommodate mature plants.
6. If difficult (reputedly) plants are to be propagated, don't move them until successful propagation is certain. (This admonition may be interpreted correctly to mean any number of sad experiences with loss of magnificent specimens).
 7. Plan for extremes of weather threatening your new plant propagations. All gardeners know, but tend to forget, soils heave as a result of rapid temperature changes, leaving air spaces and fractured roots. *Prevention of heaving is essential.* Attempted *treatment* after heaving can be hazardous to critical periods of development. To minimize danger of heaving, direct propagation planting is most successfully done in established planting areas where heaving is less likely. Consideration of freezing depth, as influenced by soil and temperature moderation by rocks, is important. (Gardeners fortunate enough to have prolonged snow cover cannot completely ignore this particular problem. Thawing and refreezing can occur before and after a prolonged snow cover). Therefore, root habits in a given site should be included in your planning.

PLANTS PROPAGATED DIRECTLY IN THE GARDEN (Representing personal favorites but excluding plants generally considered easy)

Listed are successful propagations from potted plants and from plants established in the garden. Unless otherwise noted, plants have been propagated from rooted and unrooted cuttings. Particular considerations for individual plants are included.

Month indicated is appropriate for one Hamden, Connecticut garden, approximately six miles from Long Island Sound at an elevation of 200 feet. Gardeners new to the Northeast should beware years with a 'late spring.' By the time there are consistently comfortable working conditions, hot weather may be imminent.

There is minimal moderation of temperatures by the Sound but the climate is slightly warmer than five miles farther inland. Winter temperatures often reach zero F. (occasionally minus 10 degrees F.) and summer temperatures are often in the 90's. Reliable snow cover is not expected.

This garden is subject to unpredictable, brisk, multidirectional winds atop a ridge. When present, these 'breezes' can be helpful in counteracting excess humidity and can be exceedingly drying at all seasons.

Arabis androsacea—Before or after blooming. April-May or early autumn.

Arabis bryoides var. *olympica*—As with *Arabis androsacea*.

Draba bryoides var. *imbricata*—After blooming, April-May.

Arenaria tetraquetra and *Arenaria nevadensis* (? syn. *tetraquetra* var. *granatensis*)—April. In Connecticut it may be very hot if cuttings are taken after blooming.

Draba olympica (syn. *bruniiifolia*)—Most any time will do.

Silene acaulis var. *exscapa*—May, or as soon as fully green. Scree or moraine

conditions not essential with cultivated forms.

Globularia bellidifolia, *bellidifolia nana*, *incanescens*, *repens* (syn. *nana*)—More predictably successful if *rooted*. May-June.

These *Globularia* species can be propagated easily but not maintained easily in the garden indicated. Success is greatest in a flat or depressed topography, nestled against a rock. Their sub-shrubby character is ignored initially except insofar as Guides 5 and 7 above pertain. Essential is good drainage and support for woody stems. Full sun is satisfactory except for *Globularia repens* (not predictably hardy, although a recent microecology seems more promising). If lime is considered essential, add later when plants are established.

Sagina glabra 'Aurea'—May, or as soon as foliage color re-appears. Full sun but appreciates topography described for *Globularia*.

Propagate often; winter frequently brings demise.

Erysimum kotschyianum—*Rooted*. April-May-June and try early fall, if cool. Survives winter best at ground level in moderately heavy soil with imbedded 'trap-rock'.

Herniaria glabra—Treatment suggested for *Erysimum* works well.

Saxifrages, mossy — April-May-June. September-October-November. Divide often to prevent browning and plant closely. Partial shade.

PLANTS NOT CONSIDERED *HARDY* AT LATITUDE AND LONGITUDE HERE INVOLVED (These plants require a microsituation. Some seed themselves, an added bonus).

Lysimachia japonica var. *minutissima*—*Rooted*. Partial shade, spring and summer, is desirable, not only for survival but for attractiveness. Will not tolerate extreme drying or, especially, heaving (roots are 0.5 to 1.5 cm long). Early spring.

Viola minuta formerly *V. yakusimana*?—See *Globularia* for habitat. My first (and lasting) success was in a depression created between two low planting ridges, paved with rocks set at least four inches deep in non-friable soil.

Parahebe canescens—Late spring to mid-summer. Partial shade, moderate moisture. More 'canescent' in full sun, tricky in southern New England.

Jasminum parkeri—*Layer*. Separate branch from parent plant the following year, leaving roots and layering rock undisturbed. Mulch well initially and add *heavy* mulch for several winters. Also advisable to have roots covered by sizable rocks for moisture retention and temperature moderation. (Much new growth does not survive winters in the present plant's exposed situation so I layer about one half the distance on the branch).

GENERAL CULTURE

Plant as early as possible, when soil won't freeze and well in advance of consistently hot weather (ideally, with complete cloud cover or light rain).

Use small cuttings and place in moist, settled sandy soil, preferably at base of rock (exceptions have been noted above). Rock can be, except as noted with individual plants, in elevated scree. Firmly settle all disturbed soil and carefully press in rock chips for a six-inch radius to depth of surrounding soft soil.

Layer more rock chips (if you dislike chips, esthetically, this can be

remedied when plant is established). Take precautions to prevent soil, gravel or chips from later covering foliage (a small rock adjacent to the plant may be helpful). If chips are properly placed, rosettes can be slightly below chips (one is often working with very short stems). Support foliage from below with chips. Continuing care, as with most alpine and cushion plants, involves debridement of dead foliage and careful replacement with gravel or small stone chips (as occurs in natural scree).

Mulch heavily before fall freezing but observe continuously for heaving. (Rocks resting on chip mulch may be indicated).

Watering is perhaps the most difficult aspect of this undertaking. Adequate moisture is obviously necessary, perhaps slightly more so with unrooted specimens. Yet, too much means sure death. Surface water, not mist, is suggested unless misting and shading can be carefully controlled and are already part of the propagator's experiment. In any case, rooting hormone will be lost with excessive watering. Moisture *below* the cutting is probably ideal. Timing is critical; surface water must soon be decreased to force deep root development.

With proper rock placement and generous chip mulching, regulation of water available to the plant is relatively simple. Excessive rain on foliage is undesirable but will not, with proper planting, be a problem except with persistent heavy rain and heat.

Necessity for artificial shading will vary with planting site and season. Temporary shading in direct sun may be advisable. Direct covering is done at the propagator's risk!

Similar plants to those listed should succeed with these planting techniques. *Gypsophila aretioides* is one of several I shall attempt. For those who seek a greater challenge, unrooted cuttings of plants more difficult to propagate vegetatively may succeed, e.g., *Eriogonum ovalifolium*, *Armeria caespitosa*, *Acantholimon venustum* and *A. echinus*. My treatment of these plants will be as for successful propagation out of the garden: excessive drainage; minimal soil; rooting hormone; absolute support of foliage; minimal water, infrequent, from below and *never* in contact with stem.

Since several of these plants root very slowly, water control in these instances may be a limiting factor to direct propagation in New England gardens.

Editor's Note.—Communication of similar experiences to the editor will be appreciated.

ROCK GARDEN FERNS: *CETERACH OFFICINARUM*

JAMES R. BAGGETT, *Corvallis, Oregon*

To choose one best fern among the many that are desirable rock garden subjects would be a difficult task indeed. However, for a good one to begin what is hoped to be a series of articles, I do not hesitate to choose *Ceterach officinarum*, the Rusty Back Fern or Scale Fern of Europe. Several of the general qualifications of a good rock garden fern are easily met by our subject: it is small, unique and attractive in appearance, adaptable as to planting site, and reasonably easy to grow. Botanically it stands alone, with no relatives to share our attention.

*Ceterach officinarum*

James R. Baggett

The distinctive appearance of this little fern comes from the unusual shape and extremely scaly characteristic of its leaves. The blunt, rather large segments of the pinnatifid leaves are alternate in arrangement. The upper surface is dark green and glabrous, but the underside is densely covered with light brown scales which are nearly white when the leaf is young. The leaves tend to be slightly curled or cupped when young or when under the stress of heat or drought, giving a glimpse of the scaly underside around the margins. The sori, which are borne abundantly, are completely hidden by the scales until they are nearly mature, brown, and have nearly coalesced.

My 2-year-old plants vary in leaf length from 2 to 6 inches. The leaves tend to be flat, lax, and large when grown in the shade with a generous supply of water, but tend to be narrow, more upright, stiffer, and generally more attractive when exposed to the sun.

Ceterach officinarum comes from many parts of Europe, North Africa, and extends into certain areas of Asia. It is reported to always occur in rocks, and is sometimes abundant on rock walls, especially where there is old lime mortar. In the garden, the logical site, from the standpoint of both appearance and well-being, is a rock crevice or cavity, though it probably need not be in a vertical face if a porous soil mix is used. In spite of its apparent affinity for lime mortar, it thrives in my very light mix of peat, sand, gravel, and soil, with a little ammonium phosphate, super-phosphate, and potassium sulfate added initially. Gypsum is also included to assure that there is a supply of calcium. This same mix is used on all of my ferns in the rock garden, as well as on many other kinds of plants. The usual procedure

is to dig out a pocket behind the planting site and fill it with soil mix so the roots of the fern may grow into it. The ferns are almost always sporelings in small plastic pots or bands and can be squeezed into the open spaces between rocks. Or, the root system may be pressed between two rocks with soil mix, sandwich style. Feeding with a liquid fertilizer preparation for several years after planting helps ferns of any kind to become established.

An open, well-ventilated site with considerable exposure to the sun will produce a more compact plant with less chance of loss through decay of the crown. Under such circumstances normal summer watering and winter wetness do not seem to cause trouble. Of 23 young *Ceterachs* established for two years in a variety of situations in my garden, only one plant has passed away, and this one growing in a considerably recessed and shaded cavity. The largest and most uninteresting plant is one grown in a planter against the north side of a building.

I have not propagated this fern by division, though I assume it is possible. Certainly, young plants grown from spores are easier to handle and should have a greater potential for survival.

Though my own experience with *Ceterach officinarum* covers only a few seasons, success thus far and the optimistic comments to be found in several good fern books, suggest that it will be a reasonably permanent resident in the rock garden. Its naturally wide range would indicate that this should be true most anywhere in the United States and, at least, in the southern part of Canada.

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