BULLETIN

of the AMERICAN ROCK GARDEN SOCIETY including SAXIFLORA

YEAR BOOK NUMBER 1942-1943

Jan.-Feb. 1943

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PRESIDENT'S REPORT FOR 1942-43

The year '42-'43 has been marked by significant changes in the official family of our society. The resignation of Mrs. Dorothy Hansell who had been the secretary since the society's inception has been a great loss, for her ability and enthusiasm were spent unstintingly in our behalf. She will be greatly missed. Fortunately her place has been filled by one of our members, Mr. Arthur H. Osmun, who has given his attention to every phase of secretarial activity to our great benefit.

Due to the confusion made by this change there will be no reports from the secretary and treasurer, and no member roll in this Year Book. For these omissions your indulgence is besought.

The annual meeting was held in May at Skyland Farms, the mountain home of Mr. Clarence McK. Lewis. Despite the gasoline rationing a goodly number attended and were overwhelmed with the gracious hospitality of the host and stirred by the magnificence and beauty of the many types of gardens—a mountain side converted to floral design. There were not one, but two rock gardens that contained many treasures of rock gardening, grown to perfection. Here was the union of knowledge and skill. Here was inspiration.

The Gold Medal of the Society was awarded to Zenon Schreiber for his superb exhibit at the New York Flower Show last March.

A bold new venture I here announce. For it I ask your welcome and your aid. The future of our society is in your charge, where it should be. Your help and your knowledge are needed.

On April 1st, 1943 our connection with the Gardener's Chronicle will end. Thereafter our society will publish its own Bulletin, bi-monthly, each issue to contain about 20 pages of text. Thus we shall publish in a new and more extended form what has been published formerly in the Gardener's Chronicle, our Year Book and Saxiflora. There will be instructive articles on alpines and rock garden plants by authorities and also by our members —this means you—; news and reports from our regional groups; questions and answers pertaining to rock gardens and plants; much other valuable information to rock gardeners. There will also be a "Where to Get it" directory. One issue will be the Year Book and this Year Book is No. 1 of Vol. I, of the Bulletin.

For this exciting enterprise our society is happy to announce the following staff:

Editor	Dr. Edgar T. Wherry
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Exchange Editor	Harold Epstein
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A ROCK GARDEN OF NATIVES

MARY G. HENRY

THE time has arrived for a becoming appreciation of our native plants. They were of course at home in America long ago before the first white man set foot on the continent and yet they are still treated as rarities and strangers. All my life I have been immensely interested in our native flora. Alas, I lived in the heart of a big city until about fifteen years ago. The few tramps in the country I had as a child stand out in memory. At long last opportunities came and I have wandered far afield.

Eleven trips to the Rocky Mountains from southern New Mexico to the British Columbia-Yukon border gave me many thrills and a great love for the mountains and their marvelous flora, and I must confess I would rather go there than anywhere else in the world. Thirty-five trips to the Southeastern States have given me thrills aplenty, too. Horticulturally the plants from there are of greater value in our eastern climate than those from the northern Rockies. Rare and beautiful plants are usually only to be found in places difficult of access, so I have tramped through many lonely pathless forests, waded through countless rattlesnake-infested swamps and climbed numerous mountains to fulfill my mission. The rewards of my labors have exceeded by far my fondest anticipations and I am reaping the harvest now. When given room in which to grow and spread, most of the plants and shrubs I have collected in the Southeast are even more beautiful, if possible, under cultivation than they were when growing in their native haunts.

In order to have a naturalistic rock garden, it is desirable to imitate Nature as far as practicable. Usually the prostrate, mat-forming and dwarf tufted plants grow on exposed mountain summits. Below this, tiny shrubs often find shelter nestling among rocks. Gradually larger perennials find a home and shrubs, too, are bigger ones. Lower down they are intermixed with small trees and then come the forests.

Often a rocky outcrop part way down the mountain will carry the flora of the summit and sometimes too shrubs and trees will climb higher up above their natural range, especially in sheltered valleys. In a rock garden of small proportions this idea can only be carried out on a limited scale. Then perhaps it is best to attempt the summit type with dwarf plants only. Prostrate plants intermixed with a few diminutive tufted ones and several miniature bushes may be used. Compact shrubs and trees can form the background.

Undoubtedly rock gardens planted with native material are the easiest of all gardens to take care of. If we choose our plants wisely they will need no water in our hottest mid-summers, nor will they require any protection during our coldest subzero winters.

As for my rock garden, the largest of the existing pile of rocks were too big to move and all I did was to rearrange the smaller ones and to make paths and steps that are scarcely distinguishable. Soils were changed into suitable mixtures.

No two plant lovers ever agree, so I will just describe some of my favorites among those growing at Gladwyne.

PROSTRATE GROWERS

Phloxes rank high as extremely decorative plants and for eastern gardens, according to my mind, the finer varieties of *Phlox nivalis* top the list. P. N. "Gladwyne" is my first choice and Dr. Wherry agrees that it is probably the finest dwarf Phlox in existence. The large circular creamwhite flowers are of perfect form with broad, widely overlapping corollalobes. The pale green foliage makes a tidy compact mat and during full bloom scarcely a leaf is visible. Growing on the level or cascading over rocks it forms a wholly delightful object. It is really an everbloomer as it produces flowers liberally all summer and even into November. The delicate-appearing blooms stand severe frosts unharmed. P. nivalis "Azure" is a fitting companion, with all the good qualities of the former; its flowers, of almost as perfect form, are light blue, a firm pure tone. I have several pale pink varieties from the same locality as the foregoing and hope before long to have a worthy trio.



BY JOSEPHINE HENRY PHLOX HENRYAE (Phlox bifida in the background)

Antennaria neo-dioica is far too good a plant to be merely called a "filler-in". It makes a very prostrate deep green wide spreading mat that is useful in many places. One may as well shear off the buds, as the flowers detract from the pretty green carpet effect. A. parvifolia comes from far northern British Columbia and really does not belong in this article, but its much smaller pale silvery grav leaves make an attractive contract to A. neodioica. The shorter stemmed fuzzy flower heads are large enough to add considerably to the decorative quality of this pleasing little plant. A. rosea also comes from British Columbia and I am verv fond of its little bright pink everlastings.

Phlox Henryae, a cross of P. nivalis and P. bifida, originated at Gladwyne, a chance seedling in my trial garden. It bears handsome flowers that are considerably larger than those of either parent. They are a pale phlox pink and the lobes are deeply notched. The foliage resembles that of P. bifida but the leaves are smaller. Phlox Henryae is a beautiful, vigorous and unusual looking phlox for the rock garden with pleasing and delicate coloring. Most of my varieties of P. subulata have been discarded. One of those I expect to keep, however, bears tiny well rounded white flowers. Although a vigorous grower, it has a very dainty appearance.

Another choice completely prostrate plant is *Paronychia argyrocoma*, which makes mats of gray green in dry stony soil. In summer this little

plant becomes an object of unusual beauty when the comparatively large transparent silvery bracts unfold from every branchlet to shelter the tiny flowers. Although I brought it from the White Mountains along with other northerners, it fits in well with my southern plants.

THREE TO SIX INCH PERENNIALS FOR THE ROCK GARDEN

Iris verna var. "Vernal Snow". Adorable white flowers with fiery orange crests and the delicious fragrance of the type, are set amid glossy evergreen foliage. Need more be said? This is the best of my three white varieties of the species.

Iris verna var. "Vernal Dawn" is another gem of the first water. The palest pinky-lavender flowers are of perfect form and the brilliant orange crests make them glow like opals. There is quite a heavy bloom on the foliage which gives it a very pretty pale sea-green shade. The var. "Vernal Sky" bears its pale sky-blue flowers profusely and well earns its name. Then there is var. "Vernal Fairy", a marvelous little bicolored variety as good as the best. Several springs were spent by the writer collecting the above precious gems of the *Iris* family. Dark colored forms in striking contrast to the above are awaiting selection in the trial garden. Most of the above varieties of *Iris verna* are planted at the edge of a woodland rock garden but some are in the dry rock garden too. These little Iris are compact growers and delightful ornaments when comfortably situated; they require acid soil.

Iris cristata is here in distinct and attractive variations also. Although very lovely, they cannot quite compete in striking beauty with *I. verna*. I do however have one very distinct and notable variety of *I. cristata* that I found this past season. The tube and external surfaces of the flower are yellow. The upper surfaces are pale lavender and white. Happily it is sweetly fragrant, an unusual trait in this species.

Silene Wherryi var. "Alabama" bears very handsome comparatively large and well shaped flowers of the most exquisite shade of pale pink that it is possible to imagine. They are held about six inches above the compact rosette of foliage, which is pale silvery green. Few plants can excel this one in beauty. The Kentucky variety of S. Wherryi has deep green foliage and vivid pink flowers, but to my mind does not compare in attractiveness.

Tradescantia rosea graminea is an adorable miniature but four inches tall. Even if the color is not a favored one,—pink with a magenta cast,— this charming little *Tradescantia* should find a home wherever choice rock plants are grown. It comes from the hot dry sandy barrens of the Coastal Plain and it can stand both summer heat and winter cold.

Viola Walteri, especially the variety with highly colored foliage, is well qualified to travel in choice company. This tiny violet is a veritable gem. It belongs to the leafy stemmed group but is a small edition. It spreads mildly into little tufted mats but does not flop or spread untidily as so many of these violets do. The foliage is quite conspicuous, as the small deep gray leaves have purple veins and the under surface is purple, which shows through and appears to give them a purple scalloping. It grows in full sun or part shade and stands any amount of drought. Viola fimbriatula is another choice violet for the rock garden. It is a dwarf compact grower and it "stays put". The flowers, generously produced, stand up well above the woolly oblong leaves. It too is happiest in a sunny dry position and always gives a good account of itself. I would not willingly do without it.

AMERICAN ROCK GARDEN SOCIETY



Viola pedata is, of course, the "glory" of our eastern violets and a most noble little plant. There are many varieties here that I have collected over a period of years. Among them are broad petalled, large flowered ones and these are I think my favorites. although the type (bicolor) and V. p. alba both push it a close second. V. p. rosea is not quite as pink as one would wish, but it is nevertheless a real gem.

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IRIS VERNA "VERNAL SNOW"

PLANTS A TRIFLE TALLER, ABOUT SIX TO TWELVE INCHES

Allium oxyphilum is one of the prettiest native white flowered Alliums. The individual flowers are fairly large, nicely formed, and are carried like a tiny fountain. A group of a few bulbs planted closely together, or even one by itself, forms an attractive feature.

Amsonia ciliata and its affinities are among the very nicest blue flowered plants I know of for the rockery. It is surprising that they were not put into cultivation long years ago for good blue-flowered plants are all too scarce in gardens. Like most plants, Amsonias vary in form and color. It is important to make selections and propagate vegetatively. Pretty heads of true blue flowers top 8 to 12 inch stems that are well clothed with narrowly linear leaves. A. c. alba is nice but not as good as an extra fine blue variety.

Amsonia ciliata tenuistyla is probably the gem of the race. At least that can be said of an especially fine variety that I found in the Georgia barrens some years ago. The flowers are extra large with broad well rounded lobes and they are colored a marvelous greenish blue that is just about the color of an aquamarine. I know of no other flower of this lovely shade of blue. It is a much smaller plant than A. ciliata but with rooting shoots that spread underground, it soon forms a wide mass of feathery green leaves that are as fine as pine needles. In autumn the whole turns to an attractive shade of old gold. A. c. tenuistyla alba is a lesser beauty. Probably when all is said A. c. tenuistyla will be given specific rank.

Until I found some plants of *Campanula divaricata* (*flexuosa*) with deep blue flowers, I thought it scarcely worth growing. These are extremely worth while and produce a light airy spray of tiny bells on thread-like stems, very ornamental when well placed. Mine are doing nicely in crevices where neither rabbits nor cutworms reach them.

Delphinium tricorne is a beautifully showy small plant with deepest blue-purple flowers, much like a garden delphinium, only its maximum height is about twelve inches. It likes a dry stony soil in sun or light shade.

Gentiana porphyrio is a "must have" for anyone who wants his rock garden to entertain the best in native plants. The slender stems that sway with every breeze carry large widely expanded flowers. Their brilliant sapphire color puts almost any other blue to shame. The New Jersey forms bloom the latter part of September and early October, while those from far south bloom here in November. G. p. alba is just as beautiful as its blue sister, perhaps even lovelier if that were possible. G. p. rosea is represented by one plant I found near Wilmington, North Carolina. It is an exquisite and interesting member of the family. I have also a fine sky blue variety and one whose lovely flowers are white tinged pale blue. There are other variations here too. It is difficult to say which is the most beautiful. Gentiana porphyrio and its varieties all do well in a "coastal plain" soil mixture. I have successfully divided some of the color variations. It is not a difficult operation if done in early spring and the plants are carefully handled.

Gentiana villosa is a dignified little Quaker in comparison to its gorgeous cousin. It is a closed Gentian with ivory white flowers that darken as they age. Good varieties of this one too must be selected. I have one whose ivory flowers are shaded with old rose and another that has blue shading.

Marshallia Mohrii well earns its place. It is a very valuable compactgrowing plant with pretty deep green leaves that add definite beauty both winter and summer. The pure white flower heads resemble scabiosas. It is not at all rampant and is fit to keep good company.

Penstemon dissectus is a little larger than the foregoing, but it is a tidy grower and too scarce and precious to go with plants its own size—about 15 to 18 inches. It is the rarest of all eastern Penstemons and probably the most beautiful. It bears large purple and white flowers on slender stems and the foliage is dissected like a fern, an exception in Penstemons.

If it never produced a flower I would still want *Phlox Buckleyi* for its outstandingly handsome and unusual looking evergreen foliage. But it does have flowers and they, too, are beautiful. This is particularly so as they are a pleasant deep pink that lacks most of the harsh magenta tone so common to phloxes. My specimens were selected with regard to form and color.

Phlox carolina var. "Gloriosa". The gorgeous coral-pink flowers of this wonderful Phlox are large and of splendid form and the huge heads each form a perfect bouquet. Glossy healthy foliage make handsome evergreen rosettes. It does best in a dry soil and blooms all summer long. It is perhaps the finest of all native Phlox. *Phlox floridana* var. "Bella" is another stunning phlox. It bears extra large flowers that are a very pale pink and the heads too are large for the size of the plant. From June until October it freely displays its lovely flowers. Glossy and interesting deep green foliage adds to its charm.

A FEW LARGE COMPACT PERENNIALS

Of all Liatris, surely none can be handsomer than L. aspera sphaeroidea. It produces a tall stout stem that reaches $4\frac{1}{2}$ feet. The foliage is long and broad. In a sense it has a double blooming season, because the unopened buds are just as beautiful as the full opened flowers. The buds are covered with large transparent bracts and look something like small cellophane roses. Another variety has buds of dark plum purple with dark bracts edged with silver. There are many intermediates between these two. The buds open up and produce large shaggy flowers and the stem is stiff and stout in lean soil and full sun. The heavy flower stalks flop in rich or moist soil.

Lilium Michauxii (Carolinianum of many lists) is perhaps the best and most reliable lily for the rock garden. The flowers are bright and fragrant. In full sun and a lean soil it does not usually grow higher than 18 inches.

When a tall slender plant is needed, *Manfreda virginica* fits in nicely. The spikes are 4 to 5 feet tall. I especially like it for its quiet and unusual greenish flowers. It is not a strong grower and vigorous plants must not overrun it.

I have an affection for *Tradescantia hirsutiflora* because I collected it on a sand dune when I was preparing to swim in the Gulf of Mexico. I never dreamed it would survive our cold subzero winters. But it has been here for about eight years and seems well satisfied. The flowers are a good pure blue and it blooms all summer long, right into October.

ROBUST PERENNIALS FOR THE ROUGHER PARTS OF THE ROCK GARDEN

Asclepias tuberosa can well find a place, especially the very beautiful and striking color forms. I have collected many colors including Lemon Yellow, Deep Yellow, Tangerine Red and an excellent Scarlet, also one with changeable colors like a Lantana.

Baptisia vespertina is a plant that is like a very hardy Lupine. The flowers are a wonderful deep indigo blue. It is a strong grower but not invasive.

Dicentra eximia is truly everybody's plant, for its thrives in sun or shade, in sandy soil or heavy clay. It does like good drainage. The handsome feathery foliage alone is enough to make anyone want it. It seeds freely, so although many rock gardeners will need it for its dependability, those who grow rare and choice treasures in their garden should keep *D. eximia* for the outlying portions and places set apart for rougher growing plants. *D. e. alba* is the reason, however, for mentioning *Dicentra* at all. The white variety is one of the loveliest iron-clad foolproof plants that I know, and it has a very delicate and fragile appearance. For years I had been looking for just such a plant, so I was thrilled when I found it on a Virginia mountainside about four years ago.

Eryngium aquaticum is an especial favorite of mine. The clump of foliage reminds one of a *Yucca*. The 3 to 4 feet tall well-branched spikes bear fascinating globular flower heads of tiny frosty pale green flowers that are packed together tightly in a geometric pattern, the whole surrounded by decorative spiny bracts. It is a grand bold perennial, about as attractive a plant structurally as any with which I am familiar.

Every native American Hymenocallis that I have seen is handsome and should a floral "beauty parade" come to pass they will surely be with the winners. They are amaryllids. The simply immense flowers are snow white and remind one of a gigantic superbly fragrant Narcissus. They have great sheaves of fine bold foliage that look like those of a *Hippeastreum*. I have collected specimens from various parts of Georgia, Florida and Alabama and botanists and collectors have sent me some from Tennessee, Louisiana and Texas. What species they are does not really matter as far as their use and beauty is concerned, so it is well to grow anyone and everyone that is obtainable.

Monarda punctata is a splendid long-flowering plant for adorning a sizable space the latter portion of the summer and all autumn too. Its decorative qualities have been woefully neglected. The flowers are shaped much like those of the well known *M. didyma* but the colors are totally different. The corolla is soft creamy yellow and all over it are scattered tiny deep red dots. It may sound a bit garish but the effect is one of great beauty and refinement. The large drooping bracts surrounding each flower cluster make the biggest "floral" display of this Monarda, and they are very conspicuous. Sometimes they are white and sometimes pale pink but they all darken with age to a fine rose color. The foliage is deep green and remains so during the hottest summer. In fact, they require heat, drought and poor soil in order to bloom well. The highly colored bracts remain ornamental until October's heaviest frosts finally destroy them. By that time next season's shoots are above ground and these remain fresh and green all winter, a very great asset.

Penstemon Murrayanus is tall and quite a lush grower. It is undoubtedly one of the most showy of all scarlet flowered perennials that we can grow in this latitude. The longest spike I ever had was 7 feet 2 inches. I hesitate to tell it because I know full well it is hard to believe. The wide mouthed flowers are more beautiful than those of the more often seen P. Torreyi.

YUCCAS

Perhaps Yuccas should come here between the herbs and shrubs. For some are herbaceous and some are shrubby. In this part of the country they may all remain herbaceous perennials. Whatever they are called, they are indeed among the noblest of all American plants. It was only about five years ago that I began to collect Yuccas from the Southeast. Each time I visited a new part of the south I brought one home. Now there are growing here Yuccas from about eighteen different localities. I must confess I began collecting them in a sort of half-hearted way, more from a sense of duty than anything else and also because I seemed to run into one in almost every out-of-the-way place I visited. Now, seeing their variations I am simply enthralled. I had not the slightest idea there were so many different kinds of Yuccas in the east. Few have yet bloomed but the leaf variations are strikingly different and some are extraordinarily handsome, so the flowers are awaited with keen anticipation.

Yucca concava is here and Y. filamentosa, and a number of others that botanists say they are unfamiliar with and may be new ones. All I can say now is that they are hardy here, even those I collected in Florida. The smaller Yuccas are used as accents in the upper part of the garden and the more robust ones are along the lower ledges and in the grass, intermixed with large perennials and smallish shrubs. They are most interesting and very handsome during the winter season and in a year or perhaps two years from now they should give a marvelous floral display.

Among many hundreds of shrubs growing at Gladwyne it is difficult to select just a few, so any list I make today would probably be changed tomorrow. But the following are among my favorites, that are growing in, and on the outlying portions of my rockery.

LOW SHRUBS THAT ASSOCIATE WELL WITH SMALL PERENNIALS

Corema Conradii is one of the treasures of the New Jersey Pine Barrens, unfortunately far too rare in gardens and alas, as a result of overfrequent man-set fires, too rare in its native home too. Its beauty lies in its fine needle-like almost blackish green foliage which is persistent. The flowers are so minute they are of scant importance as far as ornament is concerned but they are interesting if viewed closely. I grew this cherished little shrub for several seasons in my trial garden before I dared let it fend for itself in the Rockery. Being a native of the driest barrens, it stands heat and drought perfectly.

Hudsonia ericoides is another Pine Barren treasure. It is of low tufted growth and the little branches are upright. I am not too fond of bright yellow flowers but I do like this little shrub. It reminds me of a yellow flowered heather, only the buds expand until the blooms are quite flat. H. tomentosa is possibly even prettier than H. ericoides because it is more hoary. Both of these low shrubs can stand any amount of drought when they are fully established.

Perhaps Leiophyllum buxifolium prostratum is the most useful one. It is an exceedingly compact evergreen and its miniature glossy deep green leaves are crowded closely together in a quaint and attractive fashion. Tiny coral pink buds open into small white flowers, which often cover almost the entire surface of the plant. Fortunately Leiophyllums are easy to grow, but newly transplanted plants must be watched and watered carefully the first season.

Vaccinium crassifolium is another small evergreen gem. It is really a trailer that extends its little runners slowly, gradually embracing the rocks in its immediate vicinity. The flowers are small pale pink urns. It likes a coastal plain mixture and it has but one drawback. It is slow to recover after it is moved.

SHRUBS EIGHT TO FIFTEEN INCHES

Ampelothamnus (Pieris) phillyreifolius must head this list both on account of its beauty and because it is such an extraordinary "plant" too. One hesitates as to whether it should be called a shrub or a vine, for when growing in dry sandy soil, as it commonly does, it is but a shrub, whereas, when in shaded swamp places it will climb 30 feet up a tall flaky barked *Taxodium*. I collected my plants in Florida sixteen years ago and during that long period we have had many cold winters. On one memorable occasion the temperature fell to 20 degrees below zero, an all time record, but Ampelothamnus phillyreifolius never once died back. It is growing in the well drained sandy soil of the rock garden and also in straight heavy Gladwyne clay and is thriving in both places, but in neither one does it exceed a height of 15 inches. It is an exquisitely lovely little shrub with comparatively large white flowers like elongated pearls, and with distinctive evergreen foliage. Magnolia virginiana, dwarf variety (presumably var. parva) is another elect dwarf bush suitable for a rockery where choice shrubs may find a congenial home. I found this beautiful and unusual Magnolia in 1936 on an arid hillside in Georgia, where the strange little shrub was fruiting at heights varying from 8 to 12 inches. Rather hesistatingly I brought home several small pieces with roots attached, being fearful that when grown in richer moister soil they would extend their growth. Such has not been the case. This past season one specimen 12 inches high and 16 inches broad produced eleven deliciously fragrant blooms. Two others, 8 inches and 9 inches in height produced respectively four and five blooms each. Both flowers and foliage are proportionately small. The leaves remain on this little Magnolia all winter, making it a perfect evergreen. Increase in size comes slowly as it only makes a short stemmed growth each season.

Myrica pumila is a "must have" little broad-leaved evergreen for every rock garden where it will succeed. It is a perfect replica in miniature of its larger sister, *M. caroliniensis*. It has the same pleasantly scented foliage and the little fruits are just as decorative. My specimen about eight years old is 11 inches tall. So far it has not fruited but in the hope of remedying this, I have provided a mate.

For some strange reason scant attention has been paid to the many miniature oaks of our Southland. There are several of them here and they are of great decorative value.



Quercus pumila has made itself at home for over fifteen years. It produces pretty red catkins and tiny acorns at a height of about a foot, and spreads slowly until it is broader than tall.

Salix tristis is another distinctive small "tree". In thin poor soil it remains about the same size as the little Quercus. There is no more welcome sight in spring than this dainty willow when its branches are all strung with tiny silvery "kittens".

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MAGNOLIA VIRGINIANA-DWARF VARIETY

Rhododendron atlanticum and its varieties are among the most delightful of all small azaleas for the Rock Garden. Because of their dwarfness, perhaps they are the cream of them all for this purpose. They are stoloniferous and spread slowly and vary from about 6 to 18 inches in height. They keep their low stature and bloom most freely when grown in sandy soil and in full sun. All are deliciously fragrant.

Notable are: *Rhododendron atlanticum* blue-leaf variety. Rose pink buds open to snow white flowers, while the leaves are pale bluish gray. It grows about 10 to 12 inches but can be kept much less if grown in thin soil. It is perhaps my favorite of all azaleas.

Rhododendron atlanticum yellow-flower variety. The color is a pale tint which sometimes has a pinkish cast, but on the whole it is an exquisite soft yellow.

The two foregoing azaleas are both low compact growers and often send up shoots that flower 4 and 5 inches above the ground. There are a number of other varieties of R. *atlanticum* here, several with pink flowers, a vigorous one with extra large flowers and a tiny one.

Rhododendron carolinianum, bronze-leaf variety. This had a nearly creeping habit on its native mountain top. The branches on my young plants are already prostrating themselves so I am hoping they will keep this highly desirable trait. Both leaves and stems are deeply stained a striking deep dark crimson. I have not seen the flowers but natives said they were "dark purple". One of my plants is well set with buds so the color will soon be rightly known. The beauty of the dark foliage is unquestioned.

Vaccinium angustifolium is one of the best of the low growing blueberries and it is a beauty of a highly refined order. By all means one should be selected which bears extra large and highly colored fruit. Mine bears beautiful large pale blue berries. They are a joy to see and to eat, too! V. a. leucocarpum is even more beautiful with pure white berries that have a pink "blush" on the side exposed to the sun. V. a. nigrum with glossy black fruit makes a fine contrast.

COMPACT GROWING SHRUBS, FIFTEEN TO THIRTY-SIX INCHES.

Very many beautiful shrubs are in this group. I will only name a few.

An exquisite gem, Cyrilla parvifolia red-stem variety must head this list, because it is so utterly lovely. This species is much like C. racemiflora except that it is smaller in all its parts. The type has the usual greenstemmed drooping racemes. In this rare variety the stems, stalks and calyces are a bright crimson red, which makes the white flowers appear quite pink, as indeed I thought they were when I first saw the bush, the only one of its kind I ever found. I took two suckers and young as they were, both survived unprotected the first as well as several succeeding winters. Gaylussacia hirtella is another ericaceous shrub of compact habit and great beauty. It has bell-shaped flowers and nearly evergreen leaves. Usually it bears white flowers, but I selected one that has them pink shaded.

Calycanthus sp. nov. I regard this beautiful little shrub as one of my most precious treasures. It is a dwarf bush with short jointed growths. Young foliage, at first silvery, expands into smallish gray green leaves. The flowers of fair size are a delightful old rose and deliciously fragrant. It blooms when less than a foot tall. I found it in southern Georgia and it merits a choice position in full sun and in sandy soil. Castanea alnifolia and C. floridana are extremely interesting and very pretty. Both produce their white pendant catkins and remarkable little burrs when 15 inches or less tall.

Lyonia lucida is an excellent little broad-leaved evergreen with crimson buds that expand to pink flowers.

There are many azaleas from the south that in this latitude remain small compact shrubs. They are extremely beautiful. I have forty-nine species and natural variations of native azaleas and I would not willingly do without one of them. They have been collected over a period of many years and I cherish each individual. The following are especially noteworthy:

Rhododendron alabamense, white with yellow spot with a marvelous fragrance. R. austrinum, orange shades to pale yellow and fragrant. R. canescens candidum, fragrant, early white. R. speciosum, in handsome color forms.

Rhododendron Chapmanii is certainly one of the most beautiful of eastern American evergreens and a very outstanding little shrub for the rock garden. I have it in several exquisite shades of rose pink and none has the slightest hint of magenta.

Vaccinium tallapusae and V. hirsutum both make exceedingly pretty little shrubs for growing among rocks.

SHRUBS THREE TO SIX FEET

The following are indispensable beauties where large shrubs **a**re wanted in a rock garden:

Aesculus neglecta georgiana sometimes 4 feet tall and 5 feet broad. It is then a wonderful sight when covered with its immense broad racemes of showy flowers. The colors vary and I have it in pale yellow, pale pink, intermediate shades to red, and with bicolored flowers too.

Elliottia racemosa a rare erica with plumy white flowers.

Halesia parviflora, the smallest of the Silver Bells. It is a lovely shrub which begins to bloom when less than two feet tall. Mine has now reached $4\frac{1}{2}$ feet.

Hamamelis sp. A low stoloniferous shrub, growing here, produces small silvery leaves in spring and fragrant palest yellow flowers about November 25th to December 1st. It is a much smaller shrub than *H. vernalis* or *H. virginiana*. It may be a new variety of *H. macrophylla* or perhaps it is a new species.

Osmanthus americana. A fine broad-leaved evergreen with fragrant cream white flowers. Best from northern end of its range.

Rhododendron prunifolium, July flowering and one of our grandest azaleas with large scarlet blooms. Grows 12 feet tall in its native home.

Styrax americana and its variety pulverulenta are too beautiful to be omitted. Their myriads of white flowers are splendidly fragrant.

Vaccinium fuscatum must surely be one of the finest of its genus. Crimson buds open to pink flowers. The fruits are good to eat and exceptionally showy, too. V. Elliottii is another highly desirable blueberry.

There are a number of very beautiful small trees in my rock garden. They should be included wherever they can be given positions in well drained soil in full sun. Here are a few:

Bumelia lycioides. Often holds its deep green leaves through February. It bears large glossy black fruit that makes a fine display. There are other decorative Bumelias of uncertain identity that are growing here.

As for *Crataegus*, one could make a garden of these alone. I have them from shrubs of 2 or 3 feet to small trees. They are of amazingly diverse habit and most attractive in flower and in fruit. C. apiifolia is a grand little tree.

Acer floridanum may not outgrow the dimensions of a shrub. Its small and dainty leaves are deeply cut and a few sprays are pretty enough to place in a vase. Illicium floridanum merits enthusiastic praise for the striking crimson flowers and also for the large rich green leaves that remain beautifully fresh and fragrant all winter long. Another valuable small tree with evergreen foliage is Myrica inodora.

Styrax grandifolia is one of our superlatively lovely small trees with drooping clusters of flowers that resemble orange blossoms in appearance and in their delicious perfume too.

And now as I lay down my pen, numerous other beautiful natives suitable for a Rock Garden are crowding into mind and my conscience smites me for omitting so many deserving names.

Yes, Nature has indeed been bountiful. So let us be more appreciative of her treasures and cherish them according to their deserts.

JEWELS OF THE GREAT PLAINS

By CLAUDE A. BARR

SANGUINARIA canadensis, the Bloodroot, is one of a few eastern woodland plants which in time long past somehow traversed the now impassible four hundred miles of prairie and plain from the valley of the Big Sioux River, at the eastern boundary of South Dakota, and established a home in the Black Hills, at the west end. This scant handful of rovers, not found farther west, evidently has dwelt here since the most recent of the glacial ages. Their present habitats are very narrowly restricted in certain rich valleys and canyons where they escape the more drastic xerophytic influences of the surrounding Great Plains.

Briefly, the Great Plains are the higher and dryer prairies bordering the Rocky Mountains on the east, an area 1600 miles long, 200 to nearly 500 miles wide, and the Black Hills a major mountainous island, 125 by 75 miles, so dominated by the plains climate that certain Cacti and semidesert plants thrive in exposed places almost to their summits.

But the Bloodroot has not by its sojourn of a mere thirty thousand years—as estimated by geologists—gained any adaptability that better fits it to survive in my garden on the dry prairie than other stocks of the species I have had from the woods of eastern or western Iowa. Time after time a friend in the Black Hills has supplied new plants from her garden and I have given them the best I could afford, trying various somewhat sheltered positions, hours of midday shade, a black humus soil brought out from the Hills and all possible favor in moisture. Yet the succulent and brittle stems and tender leaves have always received injury from the winds, so that the plants were short of factory space for accomplishing full maturity, and often drought brought a forced dormancy. After a period of such unhappy existence the Bloodroot loses out.

How different the plants that have been bred by prairie forces! And what sense of well-being and security their presence gives. Though one experiences a touch of sadness for the delicate beauties he knew where nature was, it would seem, somewhat kinder, there is in the Great Plains plants no lack of brilliance and color and novelty of form, and with it all the bold assurance that all matters of climatic vicissitude may be met and conquered or endured. Bringing many of them to the garden opened a new world to me.

Years ago while getting my bearings with technical names I was inclined to be resentful that my plants should be considered different. A newspaper notice mentioning the "largest collection of plant specimens ever received at the State University for identification," included the comment of the authorities that "all of them evidence adaptation to a dry climate environment in thickened leaves or stems, waxed, glossy, felted or hairy surfaces, cushion and rosette habit, moisture storing roots, etc." And, it might be noted, other devices which are less readily seen. With more intimate acquaintance, however, one admits that the dry country denizens are different and their distinctive adaptive characters, apart from the blossoms, involve much of the appeal and charm of the Great Plains types. Let us observe a few of them:

Townsendia exscapa, Evergreen-cushion, leaves narrow, thickened, slightly grayish with protecting short stiff hairs, and doubtless with adjustable pores for while always retaining moisture in its tissues it is almost drought proof. The leaves are laid flat in cool or humid weather or may be held well upright to ward off the sun and escape reflected heat from bare earth or rocks. The stemless blossoms are gold-centered Daisies of shimmering delicate pink, of such a size that half a dozen of them hide the plant.

Viola nuttalli also has adjustable leaves, broadly lanceolate, glossy. Apparenty stemless in early season and when not crowded, it puts up a short stem in shaded positions or in competition for light. Heat and drought are dodged by dying down in midsummer and by storing moisture in the roots. The dainty blossoms are as gay as golden yellow can make them.

Erigonum flavum has some moisture capacity in the root and more in the thick, heavily felted leaves, rich green above and white below, that lie in a mat formed of many rosettes. They tend to be evergreen but weather out before spring. Rounded close umbels of soft yellow are raised on low scapes, in May.

Phlox alyssifolia's obvious adaptation is in its leaves which are quite thick, relatively small, ovate to broadly linear, somewhat glossy, white edged in maturity and also somewhat rough-hairy. Though not shrubby the stems are alive throughout the year, and if its leaf green has been reduced by drought or cold new leaves are put out whenever moisture and temperature are suitable. The blossoms are pale to deep pink, often an inch wide, produced singly but lavishly in spring. All of the several plains Phloxes send their slender roots deep. I have seen the roots of Phlox andicola, a true prairie species, at a depth of thirty inches in a caving bank.

Penstemon angustifolius, leaves, stem and roots moderately fleshy, the last in a great fascicle, providing in total a considerable storage. All green parts are glossy and heavily coated with bluish bloom. The plant is evergreen when moisture is steady, or it can lose its leaves by drought and put out new ones when moisture comes. The blossoms in very showy spires in June are usually of a deep radiant azure.

Oenothera caespitosa is noted for its thrilling blossoms of pure white, often four inches across. It mostly chooses for its habitat in the wild a steep bank of tough clay where little else can grow,—a bad-land soil, as it is known,—which contains much gritty substance, as volcanic ash or limestone particles, in effect a scree. Here it may endure for five years or longer while in ordinary soils or in competition its days are short. In the garden it thrives in a nearly humus-free mixture having one-third sharp sand. The true Oe. caespitosa has thick glossy leaves almost wholly devoid of hairiness. It is a rosette type and its very thick and deep reaching roots need occasional drought for well-being.

These and many other delightful natives of the Great Plains, as many, indeed, as I have been able to gather from near and far in the entire region, are so much at home in my garden that they frequently move by seeds or roots from my screes and other prepared places into the basic soil, and appearing here and there unexpectedly and at random give added pleasure—and at time a strain on the judgment in questions of restriction or laissez-faire. This is not to say that all the plants I would entertain are easily accommodated. Some are unable to survive out of their congenial scree, others are pleased by the cooling and changeful shade of the slat house, while a few that I very much desire for my company have proved as intractable as the Bloodroot, and the reasons remain undiscovered.

Gardening without a water supply and with such a soil presents peculiar problems. This soil is a gumbo clay, sticky and untouchable when wet, very hard when dry unless tillage has maintained a mellowness. Though it runs at a shallow depth into the mud-shale from which it originates, it is bottomless both as to its absorbing facility and non-availability of moisture from below. In most of the dry country—semi-desert, if you like —there is no known water table. Only for brief periods following precipitation has capillarity but the one function, to dissipate moisture from the sphere of the roots, spreading it out, downwards, until the natural holding capacity of the soil is reached. It so brings about a state of dryness, when rains fail to come, beyond the limits of any satisfactory gardening program. Hence the extensive use of scree.

In the official organ, Gardeners' Chronicle, February, 1941, page 30, Mr. Joseph J. Elliott presented an article on the scree, both thoughtful and thought provoking, and very much in line with my own practise. I would recommend it for careful study and reference. Mr. Elliott was writing of Imitating Mountain Moisture, and in correspondence he was astonished at what I read between his lines and marveled at my application of his principles.

Scree is an ideal growing medium for a vast number of subjects. It provides a most acceptable root run; varied as to amount of humus and other elements plants of many different tastes are furnished sustenance; properly proportioned and constructed it insures "absolutely perfect" drainage. As Mr. Elliott points out, it retains within its own mass a moisture supply superior to that of ordinary soil. To his remarks on interference of the rock particles with capillary action I should add that this function is, in dry gardening, most valuable.

Let us say that a rain wets to the depth of the scree. To the extent that capillarity is broken up moisture will not be returned to the surface to be lost in evaporation nor carried to the dry subsoil from whence, there being no surplus, it cannot return. So much to the good, then, the reserve water in the scree.

To make capillary interference doubly sure and to facilitate drainage in periods of unusual rainfall a six or eight inch layer of coarse to fine gravel is placed below the scree mixture. Of course, during construction it must be borne in mind that neither scree nor gravel provides perfect drainage without an outlet. With the adjunct of the gravel layer the scree need be of no great depth, perhaps twelve inches for most plants, as many roots that commonly go deep will accommodate themselves to a shallower growth when moisture is always on tap. Gardeners in climates of heavier rainfall who would grow dry climate plants may find the gravel layer valuable also for shutting off the accession of capillary-borne water from below.

NATIVE FERNS IN THE ROCK GARDEN

EDGAR T. WHERRY*

 $^* {\rm Lecture}$ at the December, 1942, luncheon meeting of the Middle Atlantic Section of the AmericanRock Garden Society.

H ROM time to time, as the result of geological phenomena or of the activities of man, masses of rock become exposed at the earth's surface; the outcrops do not long remain bare, however, for Nature promptly sets about covering them with vegetation. The earliest invaders, the pioneerplants, will most likely be the lowly lichens, liverworts, or mosses, and if the climate is unfavorable, they may hold sway indefinitely. In many regions, however, as soon as these early settlers have produced a little organic matter which becomes mingled with the rock-fragments, plants higher in the evolutionary scale and larger in size will come in; and among these are the ferns.

Ferns differ from the more familiar flowering plants in certain details of their life-cycle. They migrate over the earth by means of *spores*, which, unlike the seeds of the flowering plants, are microscopic bits of protoplasm, protected by a surface crust, but essentially formless within. When conditions become favorable, they germinate into a prothallium,** a small flake or lump of tissue on which grow tiny gametangia or sex-organs. When these mature and become covered by a film of moisture, sperms are liberated, swim through the water, and fertilize eggs. The resulting zygotes then grow into the familiar fern plants. In the group sometimes called fern-allies, for which I prefer the terms Lycosphens, the cycle is the same, but the adult plants differ in details of structure and sporeproduction.

Many ferns and lycosphens grow in ordinary soils, in meadows, woods, etc., but there are a certain number which thrive best on rocks or gravelheaps, and so are of special interest to the rock-gardener. Ordinarily he can not wait for Nature to bring the plants in, but attempts to do so himself. Now, almost any plant can be moved from one place to another, and be grown for a season or two without any consideration being given to environment factors. Indeed, folks who have, as the saying goes, "a green thumb," seem able to grow anything anywhere. Most of us, however, find our introduced plants dwindling and ultimately dying, unless we carefully adjust the environment of their new home to suit their needs.*

The three factors most influential in determining whether a given plant will thrive in a certain place seem to be moisture, acidity, and temperature. Every gardener knows that sufficient moisture must be provided to keep plants from wilting, and has made arrangements to obtain this. Ferns as a class require somewhat moister conditions than do most of the floweringplants suitable for rock-gardening, although there are some notable exceptions. As to acidity, rock-plants including ferns are divisible into three main groups, those that require high acidity (which I designate in lists by "A"); those that are more or less indifferent in this respect (which may correspondingly bear the letter "B"); and those which thrive best where lime is abundant and the reaction accordingly circumneutral (so labelled "C").

From the standpoint of temperature, there are again three groups: the northern, or high altitude, plants, which are "hardy" or resistant to winter's cold, but "thobic" or injured by too much heat in the summer; the intermediate class, which seem able to withstand both cold and heat; and the southern or lowland species, which are "tender" and injured by cold, but "thermic" or favored by warmth in the summer season. These may be designated by N, I and S, respectively.

Relatively few ferns thrive in full sun, although the members of the genera *Cheilanthes* and *Pellaea* are able to do so. It is in the partially or wholly shaded rock-garden where ferns in general find their greatest usefulness. A few alphabetical lists of the species of interest in this way to the middle-atlantic states rock-gardener may now be given, with their preferences as to the factors just discussed indicated by the appropriate letters.

**Sometimes termed a prothallus, or, incorrectly, a thallus. This is known technically as the gametophyte stage of the cycle.

*Not so long ago, in a sumptuous but untrustworthy volume, a planting-plan was published showing **Pellaea atropurpurea** (which requires dry limy rocks) alongside of **Osmunda cinnamomea**, (which prefers wet intensely acid swamps) at the base of a dogwood tree (which can stand neither of these conditions). More than one green thumb would be needed for the successful maintenance of such a jumble.

LISTS OF EASTERN NATIVE FERNS FOR ROCK-GARDENS (Geographically intermediate except where specially lettered N or S) 1. SMALL-SIZED SPECIES.

A. (acid-soil plants) Asplenium bradleyi montanum pinnatifidum trudelli Cheilanthes lanosa tomentosa Woodsia ilvensis scopulina Lycopodium selago (N) Selaginella rupestris B. Indifferent Asplenium platyneuron trichomanes Asplenosorus ebenoides Cystopteris fragilis Polypodium virginianum Woodsia obtusa Dryopteris fragrans (N) C. Circumneutral Asplenium rutamuraria Camptosorus rhizophyllus Cryptogramma stelleri (N) Ophioglossum engelmanni(S) Pellaea atropurpurea Pellaea glabella Phyllitis scolopendrium(N) Woodsia glabella (N)

Α.

2. MEDIUM-SIZED SPECIES. B.

Dryopteris intermedia marginalis Polystichum acrostichoides C. Cystopteris bulbifera (N) Polystichum braunii (N)

3. FOR ROCK-CARDEN MARGINS Adiantum pedatum Botrychium species Currania dryopteris (N) Phegopteris connectilis (N)

4. KEEP-OUTS (RAPID ROOTSTOCK-SPREADERS).

Athyrum (Lady-and Glade-ferns); Dennstaedtia (Hay-scented Fern); Equisetum (Horsetails); Onoclea (Bead— or "Sensitive" Fern); Phegopteris hexagonoptera (S. Beechfern); Pteretis (Ostrich Fern); Pteridium (Bracken); and Thelypteris (Marsh-ferns.)

SUPPLEMENTARY NOTES.

Sources of material.—Rock-ferns may be collected from the wild; but it must be borne in mind that those which grow in small crevices of cliffs and similar situations are really sending their roots several feet down into hidden cracks; if simply pulled with a few short roots attached, they must be treated like cuttings for a time, until new long roots get started, before being set out in the garden. Then, they do best if so placed that their roots can enter deep, moist, narrow crevices.

In the interest of conservation, never collect more than half the plants in any colony; and clip off a few fronds from the plants removed, rubbing their spore-patches (sori) over the surface of the rock wherever bared by the removal. This will give Nature a chance to bring the colony back to its former abundance.

Some species can be purchased from dealers; but unfortunately commercial collectors too often destroy native colonies by failing to observe the rules just stated. Kings Mountain, North Carolina, the only place in the world where *Asplenium bradleyi* was abundant, has been practically denuded of this species by over-collecting.

Best of all, grow your own, from spores. The simplest method for the average rock-gardener is as follows:

Growing ferns from spores.-Nearly fill a flower-pot with chopped sphagnum, Michigan soil sponge, or other form of peat; bake it in the oven for a few minutes to kill weeds, fungi, bacteria, etc. Cool and set into a pot-saucer and thereafter do all watering into this saucer (instead of on the surface of the pot-contents). Collect some fertile fronds of the desired species, and with a blunt knife scrape from the backs of these fronds a mass of sporangia and spores. Place the powder in a fine sieve and sift the finer material out so as to become scattered thinly over the peat surface. Cover the pot with a sheet of glass and place it in a window where it will receive daylight but no direct sun. See to it that there is always a little standing water in the saucer. Once a week lift the glass and inspect the surface. In a month or two the peat surface should show a green film of fern prothallia, and the glass should then be supported so that it does not rest on the pot rim, but allows air to circulate freely without the surface drying out. Ultimately, young sporophytes will begin to extend upward, and when their first-fronds are well-developed, the glass may be removed. When the tiny plants have produced 2 or 3 fronds, they may be transplanted into individual pots, and ultimately to the garden.



WOODSIA ILVENSIS

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ASPLENIUM TRICHOMANES

BY WHERRY

Adjusting the soil-acidity.—For species which require high acidity, especially the Appalachian spleenworts first listed, the rock-garden should be constructed of sandstone, granite, or other rock free from soluble lime. The crevices between the rocks should be filled by well sifted acid material, comprising lime-free sand, upland peat dug from under kalmia or blueberry bushes, peat-moss, well-rotted wood, etc. Watering should be done with lime-free water, preferably rain-water which has been collected in a wooden barrel, and has been freed from possibly toxic metals by dumping in a large mass of sphagnum-moss.

For species which require circumneutral, lime-rich environment, limestone and chunks of concrete should be included among the rocks used in construction, and the finely-sifted filling material should contain some agricultural limestone (60-mesh fine). Watering can now be done from ordinary community water supplies.

Adjusting the temperature.—Nature's method of keeping soil surfaces cool is to have water actively evaporating there. The success of what rock-gardeners term a moraine in keeping alpine plants happy at lower altitudes is due to this. Moisture present or artificially supplied at depths of a foot or two is brought to the surface by capillary action in the crevices between the rock-fragments, and as it turns into vapor lowers the temperature well below that of the surrounding air. The water must never be present in such excess that it stagnates in the rock mass, for that is likely to result in killing the plants.

Reduction of temperature for individual clumps can also be aided by setting them on the north sides of large rocks, so that the sun never shines directly on the soil around their roots.

On the other hand a south-exposure is preferred by the southern, lowland, or relatively tender species; and in winter their crowns may have to be protected by a mulch of litter. Ferns as slope-holders.—The rather large evergreen species, especially Dryopteris marginalis and Polystichum acrostichoides, are invaluable for holding the soil on slopes where because of there being too much shade, or for other reasons, ordinary ground covering plants fail to thrive. Their clumps should be set a foot apart, so that the tips of the fronds from any one, when they rest on the ground, intermingle with those of adjacent clumps. Tree leaves, blown around by the wind, will gradually accumulate among the fern fronds, and in a relatively short time a humus layer will accumulate even on a fairly steep slope.

ALPINE FLOWERS OF KASHMIR

RALPH R. STEWART

Gordon College, Rawalpindi, India

The least tropical part of India is the rugged region ruled by the Maharajah of Kashmir. His state covers 84,000 square miles and lies between 32 and 36 degrees north and 74 to 78 degrees east. The part of this territory seen by the ordinary tourist is the famous Vale at 5,200 feet. This valley is reached by a trip of about two hundred miles by bus or car from the rail head at Rawalpindi, the city where I have made my home for the last thirty years. The Vale of Kashmir is about sixty miles long and from ten to twenty miles wide and completely surrounded by high mountains from 13,000 to 17,000 feet high. Except for a short period in the summer, these mountains are covered with snow fields. The climate in the valley, however, is temperate, and familiar fruits and vegetables grow in profusion. There are a number of beautiful lakes, and a number of the old Mogul gardens are still kept up in first class condition.

There are many fine flowers in the valley and the irises are worth going a long way to see. *Iris ensata* is the most abundant, and canal and river banks are lined with it everywhere. The lotus is the showiest flower in the lakes, but a yellow-flowered *Limnanthemum* is the most abundant aquatic and covers many hundred acres with sheets of yellow. Another interesting aquatic is *Ranunculus Lingua* which roots in the mud and grows to be five or six feet high. The white water lilies are abundant and there is a curious relative, *Euryale ferox*, with floating leaves as large as those of the lotus, and a prickly red under surface to the leaves. The flowers are blue.

The alpine zone is much higher and begins at about 9,000 feet in sheltered valleys, where the snow lies late, and begins at about 12,000 feet where the last birches give up the struggle at the tree line. There are few roads for wheeled traffic and the alpine pastures must be approached leisurely on foot or on horseback. Living is not expensive in Kashmir and there are a number of firms in Srinagar, the capital, specializing in camp equipment, which they rent out by the month. In July and August hundreds of people rent an outfit and camp out in an alpine valley or go on trek. A riding pony with a groom costs only \$10 or \$12 a month and a pack pony \$7. A cook can be employed for \$10 or \$12 and ordinary coolie laborers work for about sixteen cents a day so that one could (at least before the war) employ quite a caravan for as little as \$100 a month.

When we had small children in India, we used to set up a camp each summer in a sheltered spot within easy walking distance of the alpine pastures and I would go out collecting on almost every fine day. I listed the species found, working out the puzzles at the Royal Botanical Garden at Kew or at the New York Botanical Garden. My list now numbers some 2,200 species of flowering plants, including grasses and sedges, for the whole of Kashmir. In addition there are a hundred ferns. I have not made a list of those which are strictly limited to the alpine zone but believe that it would be about one-third of the total number.

One of our favorite camping grounds is at the entrance of the well known "Glacier Valley" at Sonamarg in the Sind Valley at an altitude of 9,200 feet. Within a radius of eight miles I was able to find about seven hundred species, the majority being true alpines.

In spite of the fact that a good many collectors have visited Kashmir, it is still possible to find new species and rarities, especially in the inner ranges. The Cruciferae and the Scrophulariaceae have yielded me more new species than any of the other groups.

In general there is much similarity in the alpine floras of the northern hemisphere. One who knows the flora of the Alps or the high Rockies would recognize the families and most of the genera in Kashmir. The lists which follow give the number of species of the chief families and genera in the Kashmir Flora. Most, if not all of these names will be familiar to many a rock gardener here in the United States.

Ranunculaceae	74	Scrophulariaceae	
Cruciferae		Labiatae	
Caryophyllaceae		Polygonaceae	55
Leguminosae		Euphorbiaceae	
Rosaceae	100	Orchidaceae	
Umbelliferae		Liliaceae	
Compositae		Cyperaceae	
Boraginaceae		Gramineae	
	Chief	Genera	
Anemone	10	Artemisia	
Thalictrum	10	Senecio	17
Ranunculus	16	Saussurea	
Berberis		Lactuca	
Corydalis		Primula	
Arabis	17	Androsace	
Draba		Swertia	
Sisymbrium	14	Veronica	
Viola		Pedicularis	
Dianthus		Orobanche	
Lychnis		Nepeta	
Stellaria		Polygonum	
Arenaria		Euphorbia	
Geranium		Ficus	
Impatiens		Salix	
Astragalus		Inula	
Oxytropis		Tanacetum	
Rubus		Iris	
Potentilla		Allium	
Cotoneaster		Juncus	
Saxifraga		Cyperus	
Sedum		Scirpus	
Epilobium		Kobresia	
Bupleurum		Carex	
Lonicera		Stipa	
Galium	10	Poa	

CHIEF FAMILIES

Festuca

Plant life in Kashmir is to be found up to about 19,000 feet. The Mt. Everest expeditions brought back a good many specimens of the alpines found in the eastern Himalayas and they too found that 19,000 feet is about as high as plants can grow. In Kashmir the main Himalayan range divides the country into two climatic and floristic divisions. This range stops the moisture-laden winds, so that very little reaches the hinterland. On the side toward the plains the snow line lies between 14 and 16,000 feet, while behind, on the Tibetan side of the range, it is between 18 and 19,000 feet. The dwarf-tufted or cushion plants from the highest elevations are therefore from north of the main range.

The New York Botanical Garden has a large collection of high alpine plants, both from India and from China, in their Oriental Herbarium. I myself have found plants up to about 17,800 feet but Mr. Walter Koelz, collecting first for the Roerich Museum, second for the University of Michigan and more recently for the Bureau of Plant Industry, has made a number of collections from 19,000 feet (if his estimates of altitude are correct).

The plants which grow above 15,000 feet have much to contend with. It may freeze or snow any night of the year, and the growing season is eight or ten weeks at most. In 1940 we were in Baltistan, Little Tibet, and were looking forward to getting some fine alpines on the Thalle La, a sixteen thousand foot pass. When we were ready to leave Shigar, in the middle of August, there was a heavy snow fall on the range and our coolies reported that it was not possible to get across. We had to wait a few days and when we did cross there was so much snow at the top that the alpines were covered. This we much regretted as there are always interesting things on the screes just below passes and in the crevices of the passes themselves. At about 15,000 feet in Rupshu, a little further east, the water froze at night in our wash basin in August. Only the hardiest of plants can stand such conditions but I have collected well over a hundred that are doing it.

The largest leaves formed at 15 or 16,000 feet are the leathery leaves of a dwarf rhubarb. The tallest plant is probably *Delphinium Brunonianum*, which may send up an inflorescence of a foot or so. Few plants grow higher than six inches and many are prostrate. Few annuals are to be found.

It is an open question as to which groups furnish the most exquisite flowers. Taking them collectively I think that in Kashmir the primulas take the palm. Several are abundant and there is plenty of color variation, including white, cream, pink, yellow and various blues and purples. *Primula reptans* and *P. minutissima* are about as tiny and exquisite as flowers can be. *Primula rosea* pushes through the snow in bogs and marshy places and keeps on blooming for several months. *Primula denticulata*, *P. elliptica*, *P. macrophylla* and *P. Moorcroftiana* are abundant and delightful.

The gentians are another superb group. Some appear early in the spring and others are about the last flowers to bloom. Some are rock crevice plants and others prefer meadows. A few are tiny and bear a single flower as large as the rest of the plant, while others have a raceme with numerous blooms. G. argentea and G. carinata are very early and G. Loderi and G. Moorcroftiana are found in late summer. G. Kurroo is probably the finest of the group growing in Kashmir.

It would take several articles to tell about the composites. I think that the Asters and Allardias (Waldheimias) are the most attractive. *Waldheimia tridactyloides* has fine pink, aster-like flowers and is a dwarf creeper. The prostrate stem can be pulled from the soil with a series of handsome sessile flowers. Some of the Saussureas are like balls of cotton through which the small flowers hardly show. Saussurea gossypiphora grows on rocks at 16,000 feet and is the most woolly. Saussurea sorocephala grows in the sliding gravel near the top of passes. S. Atkinsoni forms mats in the high meadows suggesting a dwarf purple flowered dandelion. Several species of Saussurea have large, inflated bracts which hide the flowers until they are nearly mature.

An ecologist should make a study of the plants which grow in the gravel slides near the upper limit of plant growth. Like the water plants which can increase the length of their stems to keep pace with the rise of water in a lake they send up new shoots as they are covered with gravel. They are a highly specialized group of plants but belong to several families. Corydalis crassifolia with a fine spike of lavender flowers has thick fleshy leaves suggesting a sedum in texture and unlike any others I have seen in the genus. Crepis glomerata, (Soroseris Deasyi), Lagotis globosa and Nepeta longibracteata are also found in the same sort of habitat.

Some of my favorites are cliff dwellers. Paraquilegia anemonoides grows in good sized tufts and is covered with wonderful flowers which are pure white within and washed with violet without, as in some anemones. A number of fine potentillas, particularly *P. eriocarpa* and *P. curviseta* grow in similar crevices as do also certain campanulas, mertensias, androsaces, saxifrages and drabas.

The plant which is most sought after by visitors is not the edelweiss as in the Alps. Every mountain top has acres of edelweiss and so it is not thought much of. The blue poppy, *Meconopsis aculeata*, should be protected as it is now very rare in places accessible to summer visitors. It is the sort of plant which should be admired where it grows as the cut flowers do not last. The flowers are on a long raceme and are from two to three inches in diameter. They vary in color from steel blue to a dark or purple blue.

The beds of glacial streams near their source in another habitat which seems to favor lovely flowers. Masses of a dwarf sunflower-like plant, *Cremanthodium Decaisnei*, *Corydalis thyrsiflora*, species of *Primula* and *Pedicularis* thrive in the cold water.

In Kashmir the common marsh marigold, *Caltha palustris* is white. It grows in masses and I once found it as high as 13,000 feet. Just east of Kashmir the ordinary yellow form begins again but I have never found it in Kashmir.

The Ranunculaceae provide a large number of fine alpines. Not only is the order rich in species but many of the species are abundant, furnishing enough individuals to color large areas of the alpine meadows. Anemone obtusiloba is very abundant. The perianth is white within and bluish without. At higher altitudes these are replaced by "sulphur" anemones which grow in the same zone with the most abundant alpine buttercup, R. hirtellus, Anemone tetrasepala, A. rupicola, and A. polyanthes are all excellent and abundant species. Callianthemum has a delicate, white anemone-like flower and grows in stream beds. Adonis chrysocyathus grows in large tufts on the lower meadows and has large flowers about two inches across. Trollius acaulis has similar flowers but does not form large tufts. Oxygraphis polypetala grows at the limit of plant growth. The alpine columbines are marvellous, growing to be two or three feet tall and with flowers two inches or more in diameter. The colors represented are blue, white, yellow, mauve and dark,—almost blackish purple. There are no red columbines.

There are numerous fine Delphiniums. Some grow in rocky places in the submontane zone and others like *D. Brunonianum* and *D. cashmirianum* are high alpines. There are fine aconites as well. *Aconitum violaceum* var. *robustum* is perhaps the best. *A. rotundifolium* has flowers which are almost white and prefers to live at from 13 to 15,000 feet.

I will close my account of the Kashmir Ranunculaceae by mentioning *Paeonia emodi*, a fine gregarious white-flowered species that is fairly common on hillsides and has a fine white single flower from three to four inches in diameter and blooms in May and June.

Kashmir is not rich in Rhododendrons. There are only four species and one of these, R. arboreum, is at the western limit of its range and is a temperate and not an alpine species. The three alpines are R. hypenanthum (R. anthopogon D. Don in part), R. campanulatum and R. lepidotum. The first is cream colored or pale yellow, the second is pale lavender and the third red in color.

A good many of the Kashmir alpines have been introduced into rock gardens, (especially in Europe) but there are many more fine species which are worth a trial.

A TRANSPLANTED PEAT BOG

ELSE M. FRYE

T seems to me there never was a time when peat bogs were not a part of my consciousness. In my earliest days in Denmark when we drove out from our "Gaard" for visiting we passed desolated bogs, the peat piled in great blocks, beside them the menacing pools of brown brackish water left in the wake of the excavations. I do not know if the uncomfortable eeriness I felt was actual or a reflection of frightening fairy tales. A more friendly aspect lay in the tidy bricks of peat which were devoured by our tall white porcelain stoves. In my later days I have pushed through many a bog—sunny places, pungently fragrant and with a special flora that repeats itself with slight variation as one travels far northward or southward. They are fascinating places.

I have always wanted a bog. As there was no logical place where it could be made an adjunct to our garden proper, we built one in the nursery section. It was a cemented box, roughly three by six feet and two feet deep. Several drainage holes at various levels were put in the side to avoid possible disaster. These holes have always been plugged, even in winter, and in summer we have to admit water. We filled the box with commercial peat, then firmed and shaped a portion into a natural hummock such as cover the wild bogs. Unplanted it looked very much as if a "grizzly" had sat himself down at one end to rest.

In choosing the plants for the bog I tried to think back to the real bogs and repeat what I had seen, sometimes a near ally being chosen instead of the given plant itself. In planting, the starting point was a smallish slow-growing pine, so obviously not the true dwarf for which it was purchased that I shall refrain from surmizing any specific name. It is a compact small tree, branches spreading and slightly pendulous, the leaves in close fascicles of five. It is not uninteresting, placed on the highest point.

Here is a preponderance of small shrubs as in real bogs, many of them ericaceous: Arcterica nana likes it here. It is a small shrub of four inches or so with small dark green oval leaves and racemes of creamy flowers. It increases by stolons that come up close to the parent tuft. Vaccinium Vitis-Idaea minor is most beautiful with glossy thick oval leaves, waxy urns of soft pink and bright red fruits. I had a few uncertain skinny-looking Kalmiopsis Leacheana. They have improved in the bog, even sending out long panicles of shallow-cup-shaped rosy flowers. Any of the andromedas would flourish in the bog. I have used only the two most dwarf varieties-Andromeda polifolia montana and A.p. nana compacta, the former with the rosier flowers and the latter with the graver foliage; both very beautiful. One of the loveliest things from late summer to winter is the close carpet of Pernettya tasmanica. Large fruits, at first yellow-green, then cherry rose and finally scarlet are nested among tiny bright green leaves. A new plant in my garden, Corema Conradii, from the New Jersey Pine Barrens, has picked up wonderfully. It is of the same family as Empetrum nigrum which grows in several bogs which I have visited. This makes me wonder if the little pyxie flower, also from the Pine Barrens, could not be made at home in the bog. The cassiopes like it-Cassiope Mertensiana from our mountain meadows and the creeping C. lycopodioides from the north; pink-belled Phyllodoce empetriformis likewise. The loveliest thing of spring is Rhododendron kamtschaticum. Its sharp-green leaves are of the very essence of spring and large frosted-rose flowers with dark protruding stamens further adorn it. It increases by stolons and travels at a fair pace. A small Labrador tea and Dryas octopetala integrifolia, both from a Canadian Rocky Mt. bog, have taken hold. Silene acaulis is growing into a large beautiful green cushion, possibly too fast. Lycopodium Selago, a tufted club-moss is a point of interest as is the dwarf scouring-rush, Equisetum scirpoides. I was interested to see this listed in an English rock garden catalog at one time and therefore brought it home from the Canadian Rockies-(I have never chanced to find it elsewhere). It makes a prostrate and spreading tuft, two to six inches tall, the angled branches thread-like and bright green. Gaultheria procumbens, our common and beautiful wintergreen, grows well. The more difficult G. nummularioides persisted last winter while in other parts of the garden it was cut to the root. Coptis asplenifolia, the loveliest of its clan, has been used to good advantage. Close in the shade of the pinetree is Tanakea radicans producing feather-like panicles of creamy bloom as well as sending forth progeny attached by long thread-like stems. Last year I brought home a small mat of Saxifraga Tolmiei together with the soil and stone chips in which it grew. For this I made a little scree in a box, but the plant did not like it and shrank away from this earth. A small end that would not tuck into the scree-box I planted in the bog. It took hold and spread and bloomed this spring. The blue-flowered Omphalodes cappadocica and the fairy carpet of Houstonia Millard's variety, Gentiana kirishima and G. sikokiana, Campanula pilosa and Primula rosea grandiflora are among the more herbaceous plants that have prospered. We often find iris species in mature bogs so I put in a natural hybrid of Iris innominata. It has grown into a splendid tuft, a little overpowering in my small space. Fauria crista-galli is a plant that belongs in this association but has become altogether too bumptious for my small space. If my bog were much larger, a portion of it sloping away to a little hollow of water where it would settle itself down on the margin it would be very good. As it is, I am afraid it is doomed.

These are only a few of the things that could grow in a bog. Many other combinations might be made. My plants are on the way but have not yet in a year's time grown completely together into a lovely carpet, not all on one level and with an interesting variation in the height of the plants themselves. That is my goal.

HEMLOCKS FOR ROCK GARDENS

CHARELS F. JENKINS

T was way back in 1651 that the author of a famous French cook book, with a sense of humor, said, "To make a ragout, first catch your hare." In suggesting the use of dwarf hemlocks in rock gardens it is perhaps necessary to begin with "first find your plants." It goes without saying that our native Eastern Hemlock,—*Tsuga canadensis*, in its natural form, would be entirely misplaced in a rock garden, unless used as a sheltering background or trimmed high as a shade-maker for the wildings planted under it. However, there are now nurserymen who are specializing in the dwarf and unusual varieties which are eminently suited for rock gardening. When the new leaves put out in the spring with their delicate lighter shade of green, these treelets are as beautiful, many visitors have exclaimed, as a flowering plant. In the fall and winter the delicate cones would add interest to the rock garden.

There are many variations of all our native conifers. Among the hemlocks no one is ready to say how many, but to date about forty have been named and described. Three years ago John C. Swartley, a graduate of the University of Pennsylvania, who later had practical training at the Morris Arboretum, presented to the faculty at Cornell a thesis for his Master of Science degree, "Canada Hemlock and Its Variations." This was a monumental work of 275 pages and almost as many illustrations. Mr. Swartley had spent two years classifying and describing the then named sixty varieties of *Tsuga canadensis* which are listed in the index of his book. In collecting this material he used the Hemlock Arboretum, established at "Far Country," Germantown, Pennsylvania, in 1931, as a laboratory and in addition travelled some 3000 miles, visiting arboreta, private collections, nurseries and isolated specimens, throughout the New England and Middle States.

There are ten recognized species of *Tsuga*. Two in the eastern United States, two on the Pacific Coast, two each in Japan and China, one in the Himalayas and one native of the island of Formosa. So far but few variations of the exotic species have been differentiated and described.

Mr. Swartley's work was confined entirely to the consideration of our native Eastern Hemlock, *Tsuga canadensis*. This species is native from Labrador south along the Atlantic seaboard to the creek valleys of Piedmont, Virginia, then down the Allegheny Mountains to Central Alabama and westward as far as Minnesota, where there are a few isolated stands.

The praises of our Eastern Hemlock have been sung for years by our poets, writers, horticulturists, botanists and naturalists. Dr. Charles S. Sargent says, "No other conifers surpass the hemlocks in grace and beauty" and Dr. Alfred Rehder, one of the greatest living authorities, adds "There are probably no more beautiful hardy conifers than the hemlocks." Oliver Wendell Holmes, Longfellow, Whittier, Lowell, and many other lesser poets, have sung its praises. John Muir, one of our most perceptive naturalists says: "The hemlock is the most beautiful conifer I have ever seen."



"FAR COUNTRY" THE ROCK GARDEN

The hemlock is tolerant of varied soils, it grows in both damp and dry places and what is important, it is one of the few species of conifers that can be planted in full shade or in the woods and do well. However, the most symmetrical, flourishing and glorious specimens I have ever seen are in full sun. I have in mind a specimen in such a location planted by the late President William H. Taft, in 1915, on the grounds of the Arthur Hoyt Scott Arboretum at Swarthmore, Pa. A few days ago I had the pleasure of showing the tree to his distinguished son, Charles P. Taft. We both doffed our hats in appreciation of its great beauty and for the man who planted it.

There are growing in the Hemlock Arboretum at "Far Country" specimens of all the known species and of some 170 varieties, many of the latter, of course, duplicates and unnamed. There are possibly fifty really distinct varieties, but only about a dozen are suitable for rock garden work. The list would comprise those unusual either in color, shape or foliage, combined with slow-growing characteristics.

For those who may be intrigued, there is considerable literature about dwarf conifers. In 1923 there was published in England, "Dwarf and Slow Growing Conifers" by Murray Hornibrook,* an eminent authority. Mr. Hornibrook had been an indefatigable collector of dwarf conifers and on leaving Ireland had presented his collection to the Glasnevin Botanical Gardens at Dublin. Here were gathered some three hundred specimens in many genera,—firs, cryptomerias, junipers, pines, spruces, larches, etc. Apparently none of the numerous dwarf forms of hemlock was included.

Dwarf conifers have excited the interest of English horticulturists and they have been used extensively in rock gardens in the British Isles. The

[&]quot; A revised second edition by the same author was published in 1939.

expanding interest in rock gardens has conversely encouraged the propagation and dissemination of the dwarf conifers to be used in this way. Mr. Hornibrook continued his work of collecting in England and also in his later home in France. Those who may have access to his book and his later paper read at the Conifer Conference in London in 1932, know how much greater is the use of this plant form among English horticulturists and garden lovers than with us. The dwarf hemlocks suited for rock garden work growing in the Hemlock Arboretum may now be enumerated. They thrive best on a hillside, among stones and rocks and soil usual in rock gardens.

Among the first acquisitions of the Hemlock Arboretum was a gift of a little hemlock called the "Rocking Chair." It had arms and back and with some imagination the resemblance could be noted. Unfortunately the first winter the rabbits ate away some of the most distinctive parts and it has taken ten years of furniture repair to restore it. It is a smallleaved, rather dark green, slow-growing dwarf. No propagations have been made from it.

Perhaps as interesting as any is the tiny *Tsuga canadensis* var. *minuta*, now ten year old and six inches in height with a spread of six inches, resembling a pin-cushion. It is a bright and cheerful green in color and has exceptionally small leaves.

Another much admired specimen is *Tsuga canadensis* var. *aurea*, particularly golden in winter and suitable in every way for the back of a rock garden. It is a graft from the original plant growing in New Hampshire. It is slow growing, having accomplished five feet, six inches in height in sixteen years. Normal hemlocks make a growth of a foot to a foot and a half per year until they get middle aged.

One of the striking little plants in the Arboretum is *Tsuga canadensis* var. *alba-spicata*. These,—for there are three of them,—are grafted plants, the scions coming from an old tree at the Morris Arboretum, Chestnut Hill, Philadelphia. Its origin is shrouded in the past, although it is thought to have come originally from the Arnold Arboretum at Jamaica Plain,



A DWARF HEMLOCK AT "FAR COUNTRY"



TSUGA CANADENSIS SARGENTII

Mass. The young plants are ornamental with the distinguishing white tips on every little twig. It grows at the rate of three inches a year.

Also discovered by that amateur hemlock enthusiast, Frank L. Abbott, is *Tsuga canadensis* var. *taxifolia*. It is slow growing and as its name implies, its leaves resemble those of the yew. It is dense, and quite different from the type. Another of Mr. Abbott's finds made near his home at Athens, Vt., is *Tsuga canadensis* var. *cinnamomea*, a dwarf discovered in 1929 growing in a clearing surrounded by hay scented fern. Mr. Abbott has propagated this variant by grafts and cuttings. It is quite distinctive with brown tips where *alba-spicata* has white tips, and is dwarf, growing but an inch or so a year.

A number of years ago, touring through New England, we found in one of the leading nurseries a real prostrate hemlock. It had been collected at the foot of Mt. Madison, Coos Co., N.H. The branches lie flat along the ground almost as close as *Mitchella repens*, while the leaves are about half the size of the normal hemlock. The plant at "Far Country" is doing well. It has been carefully protected from the rabbits, for it is a fact that the more rare and valuable the plant the more it is inviting as rabbit-food. They will pass by available young shoots of our native trees to destroy some young seedling from afar that is being carefully nursed.

Tsuga canadensis var. globosa is a slow-growing handsome variety, a real dwarf, neither stiff nor deformed, with nodding branch tips. The typical specimen growing at Geneva, N. Y. is 16 feet in height and the same in breadth and is thought to be seventy years old.

A very dwarf, green, slow growing variety is *Tsuga canadensis* var. *Hussii*. It has stiff, stubby branches with crowded branchlets which have a tendency not to form definite terminals. An authority writing of this variation says, "Some of the plants in the Hussii group resemble the dwarf Hinoki cypress in form and will appeal to the lovers of this type of evergreen."

Tsuga canadensis var. nana. Of this there are many variations but the type is described as "a spreading shrub, broader than high, with more or less horizontal branches and a moderate rate of growth" say two inches in each year.

Eminently suitable for rock gardens is *Tsuga canadensis* var. *pumila*, "a dense, dwarf, conical plant with typically one leader about as broad as high and growing two inches in each year with mostly supraplanate and more or less crowded leaves." A typical plant has been growing at the Arnold Arboretum since 1918.

There are other named variants, which, at least in their juvenile stage, could also be used. Some of these have been so recently segregated or named, that it will be well to wait and see whether they are distinctive enough to make the effort to secure them.

It is interesting to note that all but one of the rare varieties of dwarf hemlocks listed above have been discovered in New England. Is there more radio-activity in the soil which may affect the embryo in the seed, or is it because there are so many more chances of cross fertilization? This writer wishes the authorities would answer this question.

The members of the Rock Garden Society are cordially invited to visit the Hemlock Arboretum at "Far Country." It is open to the public at all times and is in no sense a commercial enterprise. Come and see what may prove happy, unusual and interesting additions to your rock garden.

A COLLECTING TRIP IN THE WENATCHEE MOUNTAINS

FRANCES KINNE ROBERSON

At a small gathering one evening someone facetiously asked a western author and outdoor man to locate for him a camping place within easy driving distance of Seattle where there would be good fishing close at hand, easy hiking trips for his children, an excellent campsite with interesting scenery, and a dearth of mosquitoes. Some little time passed before any suggestion was offered but when it was the questioner investigated and found that Salmon La Sac lived up to his expectations and desires.

Hearing this story a number of years ago, my husband and I decided to visit this dreamland for ourselves one September. Salmon La Sac is located in the Wenatchee Mountains and is in the National Forest of the same name. Our first entry was late at night so that we missed much of the enticing scenery which we later learned to love. Utterly weary, we made our beds upon the boughs left by previous campers and slept within twenty feet of the road as it petered out at the north end of the ranger station site.

Next morning early fishermen tramped past us as did one or two pack trains, bent on longer treks, without really rousing us; but the actual alarm was the plop-plop of a hoary old porcupine approaching from the direction in which our heads pointed. Fortunately for us his path turned when still a yard away from us and he left us peacefully as we lay motionless scarcely daring to breathe. Our dog had spent the night in the car, so was averted a battle in which she would probably have been bested as was a little fox terrier somewhere near the camp.

As we lay pondering this adventure, our eyes rested on a beautifully sunlit peak gleaming with the color which gave it the name of Red Mountain. We decided to make the steep five and a half mile climb to its summit that day. Although Red Mountain is only 5400 feet high, it proved to be worth the trouble.

The initial part of the hike led us over needle-carpeted paths in open forest where the seed pods of the lovely orange Lilium columbianum were already spilling their brown flaked seeds, and the dry leaves, stems and open seed pods of Erythronium giganteum attested the earlier blooming of the pure white Deer Tongue or Avalanche Lily. From the crevices of the rocks bordering the river nearest the Ranger Station hung sprays of rosy Mimulus Lewisii and nearby in drier rock formations the evergreen rosettes of Lewisia columbiana held a few belated flowers of airy pink. Thus we encountered two reminders of the wealth of new botanical material found by Lewis and Clark on their historical journey to the northwest. A few plants of the brilliant flowered Penstemon rupicola blended with the gray rock the gray-green of their leaves, hinting the wealth of the same plant to be found at higher altitudes.

As we began to climb we debated the right of way with hundreds of tiny squirrels and a few whistling marmots shrilling like the traffic policemen of a large city. In the old rock slides where the latter lived were Gold-back Fern (Ceropteris triangularis) and Lace Fern (Cheilanthes gracillima), Arnica parryi and a lovely Erigeron.

The drumming of a Dusky Grouse came from the thinning firs as we topped a steep rise to enter a boggy meadow through which seeped the waning stream which had probably tumbled roughly over the whole terrain in early summer. Over the stones in the stream bed clung mats of Saxifraga Tolmiei, which so seldom transplants well. Caltha leptosepela, the western counterpart of the eastern Marsh Marigold, unfolded its manysepaled white flowers in the wettest spots. Phyllodoce empetriformis, the rosy flowers just fading, matted itself together over an area an acre or more in extent. Dotted throughout were the yellow flowers of Potentilla flabellifolia, the Cinquefoil, and apart stood a scattered colony of Dodecatheon Jeffreyi. Beyond the large meadow in a rill to one side from the main stream bed nestled several clumps of Gentiana calycosa in full bloom, with each stem surmounted by a partially open chalice of rich blue. No more memorable sight has ever imprinted itself on my mind.

Still steeper climbing brought us to a rounded summit where the dry seed pods of Erythronium parviflorum evidenced the beauty that had been. We dug large sods about four inches thick with our short handled trench picks and extracted from the bottom of each several dozen of the dogtooth shaped bulbs. This species of Erythronium is clear rich yellow shading to white at the center with white anthers and un-mottled leaves, not so large as E. grandiflorum and some others but very lovely.

As we traversed the long hog-back summit for some distance we passed through a ghost forest, the trees whitened by wind, rain, snow and sun after fire had robbed them of their verdant beauty. We descended part of the way on the far side of the ridge through blueberry thickets to a jewellike lake. As we retraced our steps to the rocky summit there were Pussypaws or Spraguea multiceps and a light yellow flowered Eriogonum hugging the steep slopes.

The lowering sun warned us that we had best leave strange territory while we could see our way clearly, so we reluctantly bid good-bye to the rocky peak and began the hike back to camp. We practically slid down a talus slope we had not dared to scale when coming up, hurried through the region of the stately Abies lasiocarpa, the Alpine Fir, with its shimmering cones held upright like glossy fat Christmas candles, and on down to Salmon La Sac nestled by the river.

Dusk drew close about us as we arrived at our camp site and tucked us into our temporary home filled with wonder that one short day could hold so many delights.

DIRECTORY OF ROCK GARDEN MATERIAL SOURCES

This guide to the country's leading nurseries and dealers in rock garden materials is presented with their co-operation.

Most of the desirable rock garden specialties propogated in this country—which includes alpines, bulbs, shrubs and perennials as well as choice American natives—are obtainable from amongst these sources.

These listed companies are desirous of co-operating with and serving members of the American Rock Garden Society. They are recommended to you. In purchasing materials or making inquiries from any of them, PLEASE mention the AMERICAN ROCK GARDEN SOCIETY YEAR BOOK,—for you will be given the recognition that membership in this Society warrants.

The Society can assist members in locating reliable sources of any unusual rock garden specialty. Any such inquiries should be addressed to MR. HAROLD EPSTEIN, 5 FOREST COURT, LARCHMONT, N. Y. for reply.

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