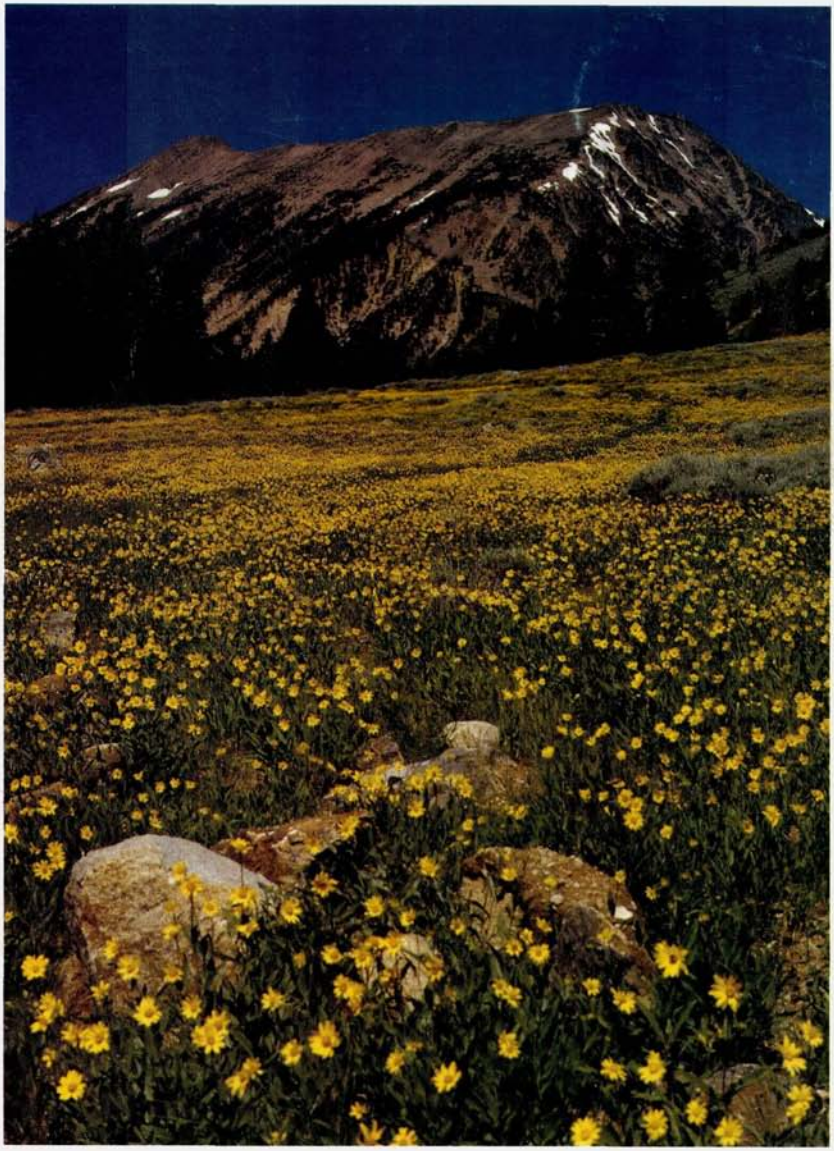
Bulletin of the
American Rock Garden Society



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CALENDAR OF COMING EVENTS

Eastern Winter Study Weekend (Hudson Valley Chapter)
Stouffers Westchester Hotel . . . . . January 23–25, 1987
Harrison, NY
Western Winter Study Weekend (Northwestern Chapter)
Red Lion Inn . . . . . February 27–March 1, 1987
Bellevue, WA
Annual Meeting (Connecticut Chapter)
Sheraton-Hartford Hotel . . . . . May 22–25, 1987
Hartford, CT
Western Winter Study Weekend (Western Chapter) 1988
Annual Meeting (Columbia-Willamette) 1988

Cover photo: Wyethia meadow in the Rocky Mountains is the sister picture to one in Rocky Mountain Alpines, the excellent and beautiful volume prepared by the Publications Committee for Alpines '86, the Second Interim International Rock Garden Plant Conference held this summer in Boulder, Colorado. The book is available from the ARGS Bookstore. Photographer: Sharon Sutton.

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Bulletin of the American Rock Garden Society

An Introduction to Some Ornamental Grasses, Rushes, and Sedges for the Rock Garden

Sieglinde Anderson
Hope, New Jersey

Grasses and their relatives, sedges and rushes, including bamboos, make up the three largest plant families in the world.

Whether in moist meadow, wet stream side, lake and pond edge, cool northern or warm and dry southern slopes, woodland or open prairie, grasses by their unique structure have adapted to nearly every possible ecological community throughout the world. Only a very small percentage have ornamental value and of these an even smaller percentage are being propagated and made available to gardeners.

Grasses are pioneer plants. In the mountains their mission is to make and hold humus, to provide protection to neighboring plants, and to hold loose stone rubble, rain, and dew. In addition to this gigantic task, they are often

endowed with a subtle beauty influenced and enhanced by weather and light conditions. On some, dew and raindrops are caught in foliage or seed creating fairy–like glistening in the sun. Some have showy foliage or seed heads. And some are grown specifically for winter interest; when covered with hoary frost or snow, they create pictures of great charm in an otherwise dull landscape.

Although grasses cover vast areas in the mountains, they are rarely seen in rock gardens, yet they are particularly suitable for the rock garden. Grasses could provide the unity that is so often missing in our gardens by playing the role of the middleman among our specimens. They are especially valuable in the summer and fall garden.

Obviously, strong growing grasses should not be planted too close to fragile alpines and attention must be paid to their light, soil, and moisture requirements. Understanding not only their environmental needs but also their design qualities in terms of scale, form, color, and texture allows us to use them for the best effect in the overall composition and scale of our gardens. And for those of us who are height snobs in our rock gardens, we can be assured that not only the smallest, but also more stately grasses grow among the highest peaks, sometimes as single specimens, more often in groups.

A quick hike through the European Alps shows us that specific grasses, e.g. the Arrhenatherum community, are associated with valley meadows and transitional grasslands between valley and mountain slopes, depending on the ecological character of the area. Others grow in wet and marshy hollows and at lake and pond edges. For instance, *Briza media* grows in company with sedges, rushes, and other grasses each according to its specific needs. Higher up, at the edges of larch and pine woods in the alpine pastures, are found shorter grasses, especially *Festuca ovina* and *Nardus strictus.* As we come closer to what appears to be all grass, we find trollius and gentians, *Alchemilla vulgaris* and *Silene acaulis, Bellis perennis* and various primulas. What appears from a distance to be sheer rock cliff turns out to have little pockets of grasses and alpines carved into the face of the rock. Whether in the northern, southern, or central Alps, specific plant communities including grasses are associated with northern and southern exposures and degree of moisture as well as rock composition, be it limestone or granite. The same principles apply throughout the great mountain ranges of the world, whether here at home on Mt. Washington or in the Andes—and always grasses are present.

The Grasses

The grasses discussed here are arranged by height beginning with tall grasses suitable for rock garden background. Before presenting the individual

grasses; however, I'd like to share with you some notes on growing them in the garden.

Most grasses will grow anywhere, although for best growth we should try to come close to the conditions of their natural habitats.

A very few have specific needs.

Most grasses are best planted in spring as potted plants.

Not enough is known about hardiness, both summer and winter.

As is usual, grass species can be raised from seed while varieties and cultivars are propagated by division only.

Most deciduous grasses benefit from being cut back to within a few inches of the ground in early spring. I do not cut evergreen grasses, but in late spring I comb out dead foliage with my fingers.

Many grasses require patience and take several years to develop their full beauty.

Most grasses mentioned here are clump growing; a few spread by underground runners, but not aggressively.

Chrysopogon nutans (gold beard grass)
Origin: native
Height: 4 to 6 feet in flower
Form: upright, open, clump forming
Texture: coarse
Color: foliage, blue green
Inflorescence: violet brown in spectacular drooping panicles
Needs: rich, well-drained soil; open and sunny site
Uses: This grass can be used as a focal point in the fall garden (August to October) rising above a blue-green carpet of junipers; in combination with the purplish-red fall foliage of shrubs and trees, especially some azaleas, bog rosemary, and late-flowering heather in rosy-purple shades; or with violet-colored late asters and chrysanthemums which bring out the color of the panicles. Personally, I do not like to see it used with strong yellows and bright oranges.

Panicum virgatum 'Strictum' (tall switch grass)
Note: This species has a tendency to lie down with age, so it is best to use cultivars in the garden.
Origin: The species is native to prairies and dry, open woodlands from the eastern United States to Central America.
Height: 3 to 4 feet in flower
Form: upright, open
Texture: This grass has a unique delicacy among grasses as both foliage and inflorescence are very fine in texture.

Color: foliage, grayish green; in 'Rehbraun' the tips of the leaf blades change to copper by midsummer.

Inflorescence: has the effect of a purple haze which changes to gold in winter.

Needs: prefers full sun to part shade; will do in any soil that is reasonably moist. It needs no care for 20 years or more except cutting back in early spring.

Uses: for background and meadow with wildflowers such as black–eyed Susan and butterfly weed. I particularly like it in combination with gray–tinged, purple perennials such as *Salvia nemorosa.* A spectacular scene can be created by using it in front of and somewhat to the side of *Cotinus coggygria* 'Royal Purple' (royal purple smoketree)

Chasmanthium latifolium (northern sea oats)

Synonym: Uniola latifolia

Origin: native from the East Coast west to Kansas and south to Florida.

Height: 2 to 3 feet

Form: upright, narrow to open; foliage tips weeping; bamboo–like in effect.

Texture: medium to medium coarse

Color: foliage is a fresh strong green from spring until frost when it changes to pale copper.

Inflorescence: At first small and pale green, the seed heads increase in size and change color until the seed is ripe in August, when they become suffused with pink, then turn coppery brown. The effect is stunning. The color is maintained when dried for indoor use.

Needs: any soil; half shade with some moisture

Uses: Ideal for woodland and wild gardens, shady shrub groupings, and in irregular drifts interplanted with perennials in shady rock garden backgrounds. It is excellent as a companion to such plants as monkshood, foxglove, lilies, meadow rue, ferns, and deep green or yellow–green hostas. Its strong acid green coloring sets off pastel flower colors. It can also be used to great advantage as a unifying color among bright yellows, oranges, and reds.

Warning: This grass seeds itself profusely. Do not use in a manicured setting.

Calamagrostis x acutiflora 'Stricta' (feather reed grass)

Origin: a natural hybrid of *C. epigejos* and *C. arundinacae,* both native to Central Europe.

Height: 5 to 6 feet in height in flower, although foliage is only about 18 inches high.

Form: stiffly upright most of the season.

Texture: fine in both foliage and inflorescence.

Color: foliage, medium gray green.

Inflorescence: In June stiff stems with open green panicles rise above the leaves. Over a period of a few weeks these change slowly into narrow, first green, then yellow, pencil–like seed heads that remain upright and stiff through all summer storms and autumn winds. In late fall, early winter they become insignificant.

Needs: none in particular; will grow in sun to light shade, in either acid or neutral soils, in dry to moist but *not wet* conditions, and will do in even fairly heavy soils.

Uses: spectacular when seen against a dark background in a planting of conifers with late–flowering perennials such as ligularia, helenium, and chrysanthemum or in large groups in prairie gardens or small groups among heaths and heathers.

Warning: The species *C. epigejos,* one of the parents of C. x *acutiflora* 'Stricta,' is a horrible, fast–spreading weed, hated by foresters as much as witch grass is hated by gardeners. Surprisingly, this wild spreading tendency has not been inherited by the hybrid.

Deschampsia caespitosa (tufted hairgrass)

Origin: native to boggy meadows from Europe to Asia, North America, and New Zealand. It is an indicator of badly drained areas in nature.

Height: only 6 to 12 inches tall in foliage; 2 to 3 feet high with seed heads.

Form: a tufted mound of foliage with upright, weeping, open panicles. The overall effect is very graceful as some of the names of varieties indicate: 'Bronzeschleier' meaning "bronze veil" and 'Goldgehaenge' loosely translated as "hung with gold." Named varieties vary mainly in the color of the inflorescence though the differences are sometimes barely visible to the uninitiated.

Color: bright green from early spring; foliage remains the same color and is semi–evergreen through the winter.

Inflorescence: changes from green to yellow, from June to September; should then be cut off.

Needs: no particular needs; will grow in any soil; full sun to deep shade; dry to wet.

Uses: in water gardens with forget–me–nots, buttercups, and marsh marigolds. To me it is especially attractive in light woodland with various ferns, woodland primulas, bluebells, foxglove, astilbe, or when rising from a carpet of sweet woodruff or foam flower where, in the dappled shade of the overhead canopy, the effect is fairy like.

Stipa (feather, spear, or needle grass) A large genus native to warm grasslands from the Mediterranean to southern Siberia, New Zealand, and Australia. It is represented in the European Alps by *S. pennata* and *S. capillata* which grow on exposed rocky southern slopes with thyme and sedum.

Stipa barbata (feather grass)

Note: similar to *S. capillata* but larger

Height: 25 to 30 inches after several years

Form: upright, arching

Texture: very fine

Color: gray green

Inflorescence: Just before the seeds ripen, the inflorescence is truly spectacular—pale gold and moving in the slightest breeze. It should be cut off after seeds are dispersed to give a neater appearance.

Needs: Exacting requirements for long life and full development are sun, warmth, and alkaline soil with *superb* drainage as most stipas are sensitive to winter wet, the most frequent cause of loss.

Uses: Because of its extremely graceful and delicate form, I like this grass best used as a specimen or in small groups rising above flat carpeting plants such as paronychia, junipers (especially 'Blue Rug'), thymes, ground hugging cotoneasters and sedums.

Helictotrichon sempervirens (blue oat grass)

Synonym: Avena glauca

Origin: from the southern steppes of the Soviet Union, the Middle East, and western Siberia

Height: It is the largest clump–forming blue grass, with a foliage height of 15 to 24 inches, to 48 inches with inflorescence.

Form: stiff, upright mound as much as 30 to 40 inches across after several years

Texture: very fine

Color: very blue throughout the season; semi–evergreen to evergreen

Inflorescence: oat–like panicle, pale gold in color

Needs: neutral soils; full sun to half shade; dry to moist

Uses: Definitely a focal point plant among low junipers or for a contrast among *Sedum* 'Red Carpet,' low cotoneasters, heaths, heathers, and dwarf conifers. The delicate gray–blue color looks best with pastel perennial flower colors. In half shade one might create a striking contrast with *Hosta sieboldiana* 'Elegans.'

Note: Do not cut back in spring, but cull out dead foliage with fingers.

Pennisetum alopecuroides (fountain grass)

Origin: native to Australia

Height: 2 to 3 feet in several years
Form: upright, arching
Texture: fine to medium fine
Color: light green; straw color in winter
Inflorescence: The fluffy flower and seedheads are truly spectacular, changing from violet and rose to brown and gold as the season progresses. A mature plant may have as many as a hundred seedheads—striking when seen against the rising or setting sun, especially in dew.
Needs: perennial border conditions; fertilizer, water, and full sun
Uses: This grass can dominate the late fall garden from September to October. Use as specimen and focal point; especially handsome with sedums, chrysanthemums, and asters, or to highlight a dwarf conifer grouping.
Note: Some of the named varieties are lower in stature and can be used in the rock garden, giving the same effect on a smaller scale. 'Hamelin' is only 2 to 3 feet tall. 'Weserbergland' is smaller, 15 to 18 inches high. But exercise caution since all of these fountain grasses arch over to a width of 2 to 3 feet and their dense foliage will totally shade any plants under their canopy. The species *P. flaccidum* is taller at 3 to 4 feet and has the same fluffy inflorescence, but the overall effect is less drooping. This one is for meadows and wild gardens as it both creeps and seeds profusely.

***Alopecurus pratensis* 'Aureus'** (yellow or variegated foxtail grass)
Synonym: A. pratensis 'Variegatus'
Origin: species (green) native to all of Europe and parts of Asia; valued as a fodder grass
Height: cv 12 to 24 inches tall in several years
Form: open, upright; spreading by underground runners
Texture: medium
Color: foliage, golden yellow with a green midvein
Inflorescence: This grass flowers very early (end of April to July). It is best to remove seeds before they disperse as seedlings are always green.
Needs: prefers rich, moist, well–drained soils; sun to light shade
Uses: Because of the spreading ability, it makes a good groundcover especially in moist meadows and near water where its coloring will highlight the flowers of buttercup, globeflower, and primroses, or create a golden contrasting carpet for forget–me–not and blue and pale lavender iris. The overall effect is very bright.

***Molina caerulea* 'Variegata'** (purple moor grass)
Origin: native to the acid heaths of Europe into Siberia
Height: from 12 to 24 inches in flower
Form: upright, open tuft

Texture: medium
Color: foliage, blue–green, striped cream
Inflorescence: dark purplish brown
Needs: Prefers acid to neutral soils in full sun to part shade, and grows most beautifully with plenty of moisture. This grass has the ability to lighten and aerate heavy, wet soils and prevents their compaction in drought. No need to cut this grass back in spring, as a light manual tug will pull off old foliage.

Uses: Considered the ideal edging grass for perennial borders, I like it best planted among heaths and heathers, as a groundcover for birches or as a contrast to blue–foliaged hostas, deep green astilbe, or reddish black–green ligularias for a very strong statement. This grass would also create interest and contrast in a dwarf conifer planting.

Note: There is a 3–inch miniature replica, 'Nana Variegata,' available in England but not as yet on the American market, so far as I know.

***Arrhenatherum elatius bulbosum* 'Variegatum'** (bulbous oat grass)
Origin: Both the species and the variety are extremely invasive grasses of Europe. 'Variegatum' is less vigorous and easily controlled.
Height: 8 to 12 inches; requires several years to reach its full beauty
Form: irregular, open
Texture: appears medium fine because of striping in the foliage
Color: deep green with white margins. One of the first grasses to green up in spring; browns out in hot, dry summers, and then comes back in fall and sometimes early winter. It is a cool season grass.
Inflorescence: produced June to September; insignificant
Needs: prefers moist, sunny or half shady positions; any soil
Uses: Because of its unusual coloring this grass can be used successfully as a groundcover to repeat a similar coloring in trees and shrubs, e.g. with *Chamaecyparis pisifera* 'Snow' and *Kerria japonica* 'Picta.' Or use it as a focal point surrounded by deep green groundcovers such as ginger or astilbes at water edges.

Sesleria autumnalis (autumn moor grass)
Origin: from the limestone heaths of northern Yugoslavia
Height: barely 12 inches
Form: upright, open, and spreading
Texture: fine
Color: foliage, yellow green; evergreen
Inflorescence: as its name indicates, September to October; brown and gold in color.

Needs: This grass has exacting requirements for best results: sandy, humus–rich soil in light shade, preferably open shade such as is provided by northern slopes. Acid soil is definitely not suitable.

Uses: As a bright accent along woodland edges or among dwarf conifers, low–growing shrubs, and perennials such as *Aster dumosus,* autumn crocus, and colchicum for the fall garden. Colchicum should not be planted too close or its gross spring foliage will crowd out this delicate grass.

Poa glauca (Greenland blue grass)

Synonym: Koeleria glauca

Origin: There seems to be confusion in the literature about this grass. Roger Grounds' *Ornamental Grasses* gives no description at all, while Karl Foerster's *Einzug der Graser und Farne in die Garten* gives the area of origin under *Koeleria glauca* as Central Europe to southern Siberia, avoiding Western and Southern Europe, from sandy, dry coniferous woods.

Height: foliage only a few inches high, nearly prostrate to 6 inches with inflorescence.

Form: a low tuft, spreading

Color: sea green to blue green in color

Inflorescence: produced in great quantity; delicate pale green

Needs: In the garden this grass prefers sandy, poor, but humusy soil; not too moist; full sun. It dies out in rich soil, but reseeds without becoming a nuisance.

Uses: Because of its low stature and early flowering in June, this grass is especially useful for overplanting the smallest bulbs, including species crocus, alliums, the smallest tulips, and delicate alpines.

Poa caesia (Pike blue grass)

Origin: native to the high peaks of the European Alps, across the Tatra and Transylvanian Alps to Afghanistan. In the northern mountain ranges, it is strongly represented in Scandinavia and Iceland.

Height: 4 to 6 inches

Form: stiff, tight polsters

Inflorescence: blue gray; very delicate, open spikelet

Color: intense blue green covered with white pubescence

Needs: full sun; dry and well–drained conditions

Uses: Smaller and bluer than *P. glauca, P. caesia* is considered to be the blue grass for rock gardens in company with delicate alpines. It may be used without fear that it will displace or overgrow even your choicest treasures. It will occasionally self–seed if conditions are favorable, but without becoming a nuisance. Divide every 3 to 4 years for longer life.

Nardus strictus (mat grass)
Origin: the predominant grass of alpine pastures in poor, permanently damp soil from Europe to Asia
Height: only a few inches high
Texture: fine
Color: dull blue green
Inflorescence: not spectacular, nor is the foliage
Uses: mostly of interest to the collector and rock garden purist; may be used in groups and mass planting among alpine shrubs and perennials.

Festuca as a genus is rapidly becoming muddled in nomenclature, partially because of cross breeding and partially due to lack of knowledge on the part of growers. One grower lists thirty-five festucas in his retail catalog, thirteen hybrids of *F. cinerea* alone, all varying in their degree of blueness, hardly distinguishable, unless one has an extremely intimate knowledge of them.
Origin: Festucas are native to the cool temperate regions of the world, mainly from Greenland across Europe to China and Japan.
Height: Species range in height from a few inches to a foot.
Form: almost always a tight cushion, stiff or soft
Color: varies slightly from silver blue to gray blue, and in *F. scoparia,* to acid green.
Texture: very fine to fine
Inflorescence: insignificant on most; showy in such species as *F. mairei* and *F. amethystina;* unappreciated by those who value the hedgehog appearance of these grasses.
Uses: The larger varieties are suitable for specimen use in the rock garden; the smallest ones are for screes and troughs; those in between do well as groundcovers. Festuca is most often used as an edging plant in straight rows. To me, all festucas look better placed loosely in elongated drifts or used singly, as specimens.

Festuca glacialis (glacier fescue)
Origin: from the high peaks of the Pyrenees
Height: 3 to 5 inches
Form: a flat pillow
Color: blue green
Uses: probably only for screes and troughs since it is a typical high alpine plant requiring superb drainage and cool temperatures

Festuca vallesciaca glaucescens (Wallis fescue)
Origin: prefers warmer climates of southeastern Europe, Turkey, and Iran

Height: 3 to 4 inches
Form: a low round cushion
Color: blue gray
Texture: medium fine among festucas
Uses: best in troughs, screes, and in dry walls in combination with low-growing sedums and sempervivums and as a groundcover for small bulbs. It is especially handsome with *Iris reticulata.*

Festuca scoparia (bear skin fescue)
Synonym: F. viridis
Origin: native to the Pyrenees
Height: 2 to 4 inches
Form: flat, spreading pillow hugging the ground or rock
Color: bright green, the color of Ireland seen from the air
Inflorescence: a golden, 12-inch-high, loose panicle which lasts months on end and forms a stunning contrast to the foliage.
Needs: It prefers any moist, well-drained soil and northern slopes and avoids dry, full sun exposures in its native habitat. In the garden avoid winter sun and overhead trees.
Uses: As a specimen plant where it can develop into a large carpet, perhaps interplanted with less aggressive alpine shrubs such as the dwarfest brooms, daphnes, and rhododendrons. Karl Foerster says this grass is always planted too closely which leads to bare areas and browning out. According to him, plants should be spaced far enough apart so they can grow into a carpet, eventually one square meter across. Because of its rich pure green color, it combines well with both cool and warm flower colors. Our hot and muggy summer weather might be another reason that we rarely see this grass as the lush velvet green carpet it ought to be and is in the Munich Botanic Garden.

Festuca tenuifolia (hair fescue)
Synonym: F. capillata
Origin: native to the British Isles, across Europe, south to the Pyrenees, and north into Sweden
Height: 6 inches, taller with inflorescence
Form: mound
Texture: very fine
Color: Karl Foerster describes the color as deep green. The grass I received from Kurt Bluemel, Inc. is blue green.
Inflorescence: Silver gray. It flowers June to July and is among the most beautiful of the fescues.
Needs: Since it is native to acid oak woods and heathlands in the wild,

it should be given the same conditions in the garden: acid, dry, humus–rich soil in sun to light shade.

Uses: As a companion to heathers and heaths, campanulas, and other small perennials and shrubs partial to the same requirements.

The following two Japanese grasses are of recent introduction to American gardens.

Imperata cylindrica rubra (Japanese blood grass)

Height: 6 to 10 inches

Form: Irregular, upright with arching leaf tips

Texture: medium fine

Color: bright green with blood–red tips

Hardiness: Sometimes listed as hardy to Zone 7, it has grown in my garden (Zone 5) for 5 years with and without snow cover.

Uses: To create a focal point among blue–foliaged conifers and with late–flowering gentians or with later–flowering yellow perennials, especially *Coreopsis verticillata* 'Zagreb.' Since it will grow in any soil, full sun to part shade, it remains for us to discover all the possible wonderful combinations and uses to which this showy grass may be put.

Hakonechloa macra albo variegata

Synonym: H. macra 'Aureola'

Origin: from the forests and mountains of Japan

Height: 8 inches, but the effect in the garden is about 5 inches since all leaf blades arch evenly downwards, often in the same direction, giving a neat "combed" effect.

Form: irregular, spreading, arching; spreads by runners but not aggressively.

Texture: medium fine

Color: deciduous; bright yellow with green stripes and occasional fine red stripes

Inflorescence: an open panicle in late summer; of little interest compared to the stunning foliage

Uses: a spectacular groundcover in contrast with deep green and reddish–green foliage plants in partial shade in any soil. It is especially beautiful as a foreplanting to a group of pink and white foxglove. An interesting groundcover might be created by planting this hakonechloa with *Carex morrowii* 'Variegata,' interplanted with an occasional perennial group.

The Rushes

Luzula sylvatica (greater wood rush)

Origin: grows in the mountains from Europe to the Caucasus in humus–rich, moist shade among dwarf pines and junipers as well as in deciduous woodlands.

Height: 8 to 12 inches

Form: densely tufted, arching

Texture: medium to medium coarse for its size

Color: bright green with hairy margins; evergreen; retains color through the winter

Inflorescence: chestnut brown in April and May

Needs: The easiest to grow of the wood rushes. Although it prefers full shade, it will grow and remain semi–evergreen in open shade and even some sun.

Uses: In the garden it is the ideal groundcover among low shrubs and dwarf conifers. It is especially handsome in woodland and wild gardens among ferns, hepaticas, tiarellas, and ginger where its bright green color makes a stunning contrast to deep and reddish green foliage colors.

Note: L. sylvatica 'Marginata,' with gold margins, is considered the most elegant of wood rushes and less sensitive to winter sun.

Luzula nivea (snowy wood rush)

Origin: native to woodlands from the Pyrenees to the Carpathians

Height: 8 to 12 inches; with inflorescence to 2 feet, except in 'Nana' which is only a few inches high.

Form: upright, arching

Texture: fine

Color: gray blue with pronounced hairy margins, especially so in *L. nivea* 'Schneehaeschen' ('Snow Rabbit')

Inflorescence: a very showy pompon in early summer

Needs: It prefers rich, moist, woodsy soil in full shade and looks rather insignificant when young, requiring several years to develop its full beauty.

Uses: In the wild this rush is a companion to dwarf rhododendrons, shade and moisture–loving saxifrages, soldanellas, and other grasses. In the garden its use is limited to shady wild gardens and along edges and backgrounds of rock gardens among shrubs and ferns.

Luzula pilosa (hairy wood rush)

Origin: circumpolar, from Europe across to Siberia and North America

Height: 6 to 8 inches, to 12 inches in flower
Form: densely tufted
Texture: fine
Color: dark gray green, turning darker and reddish in fall and remaining so over winter; hairy mostly on the bottom of blades
Inflorescence: small; dark chestnut brown in April and May
Uses: Since it greens up so early in spring, this rush makes a charming companion to early bulbs and early flowering small shrubs, especially in shady, acid, deciduous and coniferous woods edges. The reddish mahogany leaf color sets off especially the yellow of winter aconites, snow drops, and the pale mauve of *Crocus tomasinianus.* Because this rush slowly increases by runners, it is an ideal groundcover.

The Sedges

This is a mere introduction to *Carex.* Kurt Bluemel has listed at least twenty–five in his catalog and is growing many more not yet available in large quantities.

Carex plantaginea (plantain–leaved sedge)
Origin: native to our woods
Height: 6 to 10 inches, to 24 inches in flower
Form: tufted, arching, irregular; spreading slowly without becoming aggressive
Color: bright green from spring to frost; evergreen where it is not damaged by winter sun
Texture: coarse
Inflorescence: yellow and insignificant
Needs: prefers slightly acid soils in full shade with some moisture
Uses: In my experience, this sedge is very sensitive to winter sun damage, so is best used where it is not in direct view during the cold months. Otherwise, it makes a beautiful groundcover in woodland, among shrubs, ferns, and such wildflowers as hepaticas, trilliums, and violets.

Carex pendula (drooping sedge)
Origin: at home in moist, spongy woods in the mountains of Europe and Asia
Height: 15 to 18 inches
Form: upright, arching fountain; eventually covers 30 square inches
Texture: coarse
Color: deep green, year round

Inflorescence: unique among *Carex,* but not showy

Needs: prefers acid soil, winter shade, and moisture, but will grow with less moisture under garden conditions without spreading as quickly

Uses: an excellent companion to large ferns, thalictrum, cimicifuga, rodgersias and as a contrast to hosta foliage

***Carex morrowii* 'Variegata'** (silver variegated Japanese sedge)

Origin: The species is native to damp woodlands of Japan.

Height: 6 to 8 inches

Form: upright, arching; eventually covers 30 to 40 square inches

Texture: Medium fine

Color: deep green, edged white

Needs: moist woodland or rich soil, well drained; shade to half shade, but will grow in sun if moisture is maintained throughout the growing season

Uses: This is the most attractive evergreen sedge and certainly the most elegant and, therefore, eminently suitable for the manicured shrub and woodland garden. It spreads slowly to about 30 inches across, making an excellent groundcover among shrubs, ferns, and wildflowers. Especially handsome with dark green and green and white variegated hostas for contrast.

Note: This plant has been in cultivation since 1895 and although it has had other names in the past, the form being sold under this name by Kurt Bluemel, Inc., Bluemount, and other nurseries is correctly named.

***Carex conica* 'Variegata'**

I was unable to find any information about this sedge in available literature and my description is based on a sedge growing in my garden under that name, received from Stonecrop Nursery.

Height and form: Although the blades are 3 to 5 inches long, the total height is only 2 inches as the form is an open, irregular, tufted cushion.

Color: blue green, edged white

Needs: It appears to be happy under the same conditions as *C. morrowii* 'Variegata,' i.e. shade; moist, woodland soil.

Uses: More suitable to rock garden setting than the aforementioned since it is smaller in scale. Ideal as groundcover in semi-shade under the dwarfest deciduous shrub and rhododendron foreground, or as groundcover among dwarf conifers, other dwarf grasses and small ferns. Ideal companions might be *Aruncus aethusifolius,* the dwarf goatsbeard; shade and moisture-loving saxifrages such as *Saxifraga umbrosa* 'Nana'; soldanella; and dwarf primulas, especially those with pink flowers.

***Carex firma* 'Variegata'** (variegated miniature sedge)

Origin: The species is from the European Alps and is the high alpine

pioneer sedge covering rocks and ledges up to the snowline.

Height: only 2 inches

Form: an open, spreading, somewhat arching tuft, so in effect it is even less than 2 inches in height

Texture: medium

Color: olive green, edged cream

Inflorescence: June to August; not significant

Needs: This sedge requires limy soil in an open position with excellent drainage as in scree or trough. Suffers from winter wet; otherwise cold and wind hardy; will grow in moist and dry locations.

Uses: Ideal for trough gardens with the tiniest of willows and as a companion to small gentians, primulas, and soldanellas.

Carex comans (Greenwig grass)

Origin: from New Zealand

Height: overall effect 12 inches, though individual blades are sometimes 2 feet long, ending in little scrolls

Form: upright, arching fountain

Texture: very fine, hairlike

Color: a delicate whitish green, turning pale blond in winter

Inflorescence: insignificant, hidden in the center of the crown

Needs: nothing special; will grow in any fertile soil; sun to part shade

Uses: As specimen or in loose groups among dwarf conifers and large rock garden perennials. It makes a fabulous contrast to moss–covered rocks and sets off pastel flower colors, especially delicate pinks and the palest blues.

Hardiness: Doubtfully hardy in Zones 5 and 6

Carex petriei (Petrie's sedge grass)

Origin: native to mountain wetlands and stream sides in New Zealand

Height: 12 inches, though individual blades are sometimes much longer

Forms: upright, arching fountain

Color: a very unusual coppery pale brown to reddish brown, turning straw in winter

Needs: sun or shade; any soil, but prefers moist conditions

Uses: Because of its unusual year–round color, this sedge combines beautifully with dark green and reddish foliage plants such as bog Rosemary or ligularia, also with silver and blue foliage colors. For late autumn, a stunning picture can be created by combining this sedge with purple and deep lavender gentians.

Note: I consistently lose this plant over winter, but there are always seedlings among stepping stones.

I hope that this introduction to some of the grasses suitable for rock gardening will inspire you to experiment in your own gardens: to create grassy meadows between woodland and rock gardens, perhaps with only a mowed path separating the two; to create a more naturalistic effect in the rock garden by using grasses as the unifying element with other groundcovers rather than gravel, or as a contrast to areas of stone mulch; or to use grasses as focal points and to soften architectural features such as steps in the rock garden.

I hope, too, that you will keep notes on survivors and also on those that disappear and that you will share your experiences with us through the pages of the *Bulletin.* This is especially important with reference to hardiness. With so little information available and the generally conservative ratings given in catalogs, those of us growing grasses ought to make this information available to our fellow gardeners.

(All of the grasses described above have survived three to four winters, some longer, in my garden in northwestern New Jersey at the foot of Jenny Jump Mountain, elevation 560 feet, northern slope, USDA Zone 5. These notes are based on a talk given at the Eastern Study Weekend in Newark, New Jersey, in January 1984.)

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Award Winners

Carleton R. Worth Prize, 1986

Brian Mathew

Brian Mathew

The Carleton R. Worth Prize, awarded to an author of distinguished writing about rock gardening and rock garden plants, is given this year to Brian Mathew, Senior Scientific Officer, Royal Botanic Gardens, Kew.

While bulbous plants have interested many gardeners as well as many scientists, our recipient is a rare example of a combination of the two. He not only cultivates the plants, but he adds a further dimension to his expertise: He has experienced the bulbs—at home in their native habitats.

About all these things he has written competently and with great interest. Everyone keen about learning the latest in bulbs or who wishes information about something grown from one of our seed lists has copies of his sumptuous works on *Crocus* and *Iris* as well as the two general surveys of the rest of the cultivated bulbs. He even appears as co-author of the book

about the shrub we can never get enough of: daphne.

As if all this were not more than adequate, Brian is a modest, quiet, self-effacing chap. He has a ready smile and a quiet wit. He is friendly to Americans, too, proven on several visits when he has delighted and softly educated the masses.

Regrettably, Brian cannot be here to receive his prize but has asked his friend Jack Elliott to accept the check in his behalf. It is my very great honor and pleasure to give this prize to him.

— Howard Pfeifer

The Marcel LePiniec Award, 1986

Stephen G. Doonan and Phillip Pearson

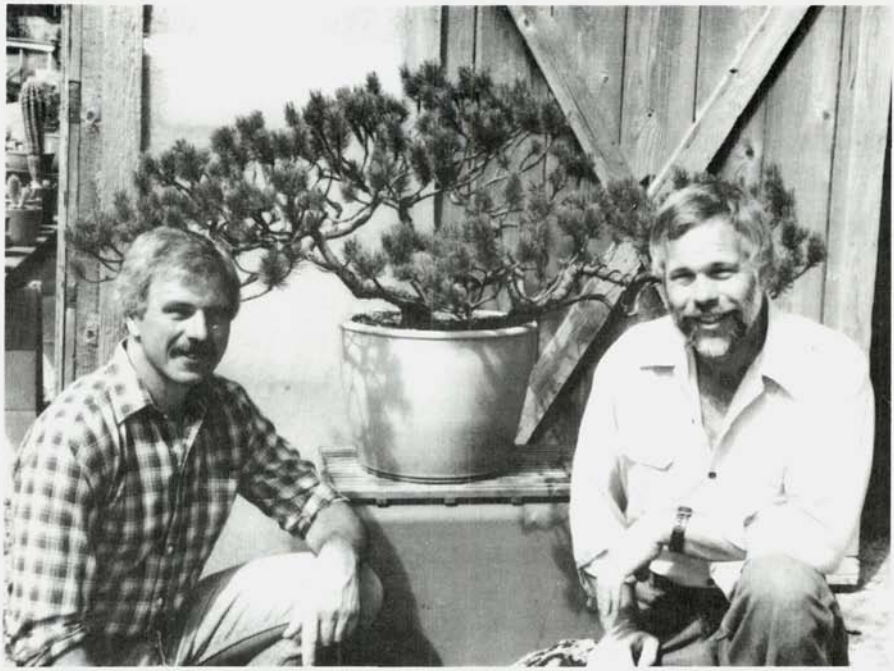
It is with great appreciation of their meritorious service that we present the Marcel LePiniec Award to two distinguished men, Stephen G. Doonan and Phillip Pearson, who operate Grand Ridge Nursery near Issaquah in the Greater Seattle area.

These two cousins have worked in harmony to practice scientific methods of propagating and growing plants, especially the difficult and rare alpines. Their horticultural pursuits are based on persistent study, keen observation, and practical application of theory. They have been honing their skills a long time while paying close attention to conservation and to the preservation of natural ecological communities.

Extensive field trips in the mountains have given Steve and Phil opportunities to botanize and photograph. Phil has frequently shared his expertise by giving programs on "Tips for Great Plant Photography" and related topics. Rapt audiences always glean a lot of practical information.

Unselfish sharing of knowledge is a trademark for both Steve and Phil. An example of this trait is the effort they have expended to teach people to procure cuttings from the coveted *Lewisia tweedyi* plants in the Wenatchee Mountains and to do so without damaging the parent plants. Furthermore, instruction in rooting and caring for the cuttings is their natural follow-up. Another specific instance of sharing a technique with others is their method of propagation of *Daphne petraea* which has resulted in 100% success.

An outstanding example of their work in hybridization is *Shortia* 'Leona,' a cross between *S. galacifolia* and *S. uniflora* with flowers well above the



Steve Doonan and Phil Pearson Photo: Kitty Pearson

foliage and larger than in *S. galacifolia.*

Painstaking selection of superlative plants occupies their attention wherever they go. The Wallowa Mountains were where they found an *Erigeron chrysopsidis* var. *brevifolius* of unusually healthy growth, floriferous habit, and attractive stature. They propagated it extensively and introduced it into the trade.

The Olympic Mountains, the Wenatchees, and the Wallowas have become open books for these intrepid outdoorsmen by reason of their numerous investigative hikes there, trips on which they were often accompanied by Phil's precious wife Kitty and their children Jim and Jean.

Steve and Phil have also become familiar with the geography and flora of other parts of the West, and Steve has even botanized in the Orient. Their research is also expanded by exchange with other growers in widely scattered places. Ever alert and watchful for unusual plants and ever observant of improved methods of propagating and growing them, Steve and Phil have contributed mightily to horticultural progress.

Genera which claim their most concentrated attention are *Shortia, Schizocodon, Primula,* and *Saxifraga,* but there are no boundaries to their interests.

They have been ARGS members for many years, always accepting responsibility for the smooth functioning of the Northwestern Chapter by leading field trips, by bringing outstanding plants to Show–and–Tell, by selecting and operating projection equipment, by giving programs, by writing for the Newsletter, by welcoming visitors to Grand Ridge Nursery, and by assistance in many other ways.

Steve and Phil are always in demand for participation in horticultural meetings from simple monthly gatherings to regional conferences and study weekends. They share knowledge unstintingly by means of instruction, slide shows, plant and container exhibits, and their enthusiastic conversations.

An adjunct to their work of growing plants is Phil's expertise in making stoneware which is eminently suited to the special subjects they grow and is resistant to frost damage. Pots are hand thrown and then glazed and fired, with handsome results.

These two men have added immeasurably to the depth and breadth of horticultural know–how and enjoyment, first in the Northwest and then rippling out in ever–widening circles. Steve and Phil certainly merit our recognition of their continued service in "extending and enriching the plant material available to American rock gardeners." It is an honor to present to them jointly the Marcel LePiniec Award of the American Rock Garden Society.

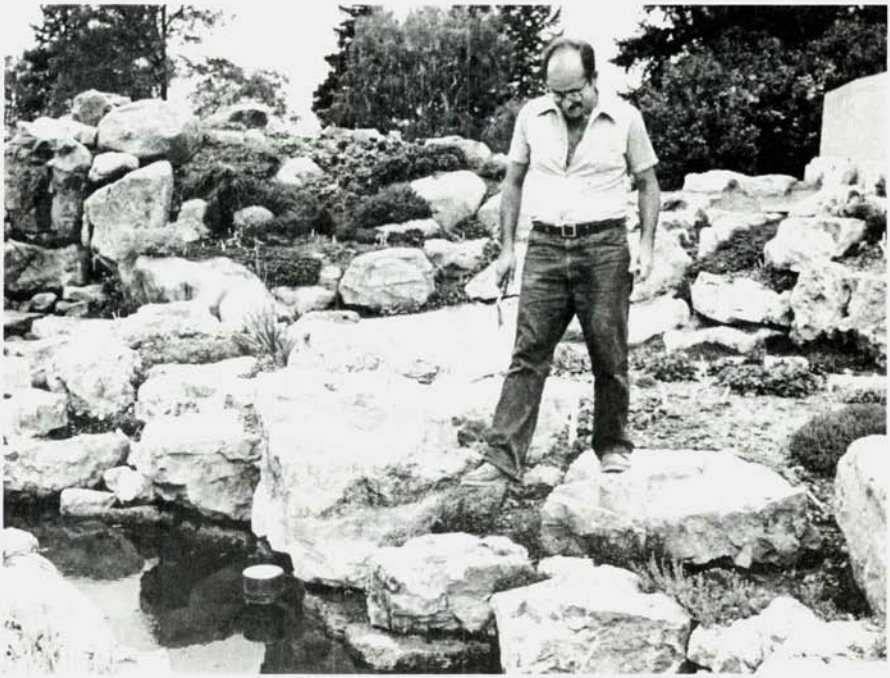
— Frances Roberson

Edward T. Wherry Award, 1986

Panayoti Kelaidis

Very often, it seems, we give awards to stalwarts who have marched and survived. We honor their gray heads and their former accolades. And that is proper. Is it not appropriate, however, to make an award at the very springboard of a career that has already demonstrated a broad scope of talent and a forward leap into new achievements? Like Dr. Wherry, for whom this award is commemorative, this year's recipient has a rich background of disciplines outside the fields of botany and horticulture. Yet in a short time he has demonstrated a remarkable grasp in a diversity of aspects of both botany and horticulture.

He has certainly had a real impact on American rock gardening in terms of American native plants and particularly of the plants of the Rocky Mountains.



Panayoti Kelaidis

Through his association with the Denver Botanic Gardens and its Rock Alpine Garden, Panayoti Kelaidis has made his mark not only among his devotees here in Colorado but in the whole of the American Rock Garden Society and, indeed, among our confreres world wide.

For what he has already accomplished in Denver and in the rock gardening world and especially for the promise of his future, the American Rock Garden Society is itself honored to present the Edgar T. Wherry Award to Panayoti Kelaidis.

— H. Lincoln Foster

November Garden Visits

Panayoti Kelaidis
Denver, Colorado

Every perennial border is built along similar lines, but all rock gardens are different. The truth of this observation is driven in to me as I tour northeastern gardens. At first I was disappointed at the prospect of traveling in the late fall, but I realize that it is indeed propitious.

Any place is pretty in May. Even railroad embankments and factory yards have some lovely plants in spring. But just as human character reveals itself under adversity, so too does a rock garden show its true character when early frosts have quelled bright foliage and lingering flowers, when short days hint ominously of winter.

At this time no one is tempted by the collapsed jungle of stems in the perennial garden, assuming he has not spent hours in trimming and cleaning it. The vegetable plots and annual beds are not inspiring: either a jumble of dead stems or upturned soil already sprouting winter annuals. Shrub borders and foundation plantings are as uninteresting now as they are at any other season.

Compare these to the rock garden nearby, which no less than nature is still pulsing with activity and interest. Unlike a foundation planting with its dwarf conifers and shrubs lined up for inspection, architectural plants in a rock garden are placed strategically. Here a chamaecyparis, deep gold, is gradually enveloping a rock, while a fresh deep–green weeping hemlock drips down a slope over there. Between them a mat of aubrieta is still blooming. A plump dwarf blue spruce is painfully glacous.

Conifers especially are freshest at this season when their foliage takes on rich tints before winter inflicts its toll. What pleases so much in the rock garden is not simply the conifer or shrub, the flower or rock, it is the combination of these elements, the endless permutations such a wealth of material offers the designer in manipulating landforms.

Novices panic at the diversity of plant materials and styles encompassed by rock gardening. After all, isn't it easier to use a limited palette to fill in the flat piece of ground? Perhaps it is, but this highlights the freedom and interest of our art; rather than imposing artificial patterns on a homogenized flat piece of ground, the rock gardener collaborates with nature. Nature has much to say about which plants will grow on a steep bank, on certain soils, exposures, and watering regimes.

A rock garden seeks to select and heighten these natural combinations, and late November is no less important to nature than any other time. The woods have shed their last bushel of leaves, gardeners have raked the last

pile. Two wonderful things happen. Finally the gardener can sit back with absolutely nothing pressing to see to. With the opaque curtain of verdure gone, the backdrop surrounding our gardens suddenly lifts, vistas open up, and for the first time since last winter that distant house is visible over there through a mesh of fine twigs and festive *Ilex verticillata* berries.

Unlike Colorado, where the foothills and plains are sere and brown and everything in the back country is already muffled in snow, Connecticut enjoys a crisp, maritime autumn. Lawns all along the eastern seaboard are as green as they are in summer. Japanese maples and Bradford pears still blaze with color. Conifers in the Rockies are already experiencing a little stress, but here they are deep green and bronze with frequent autumn rains. A whiff of sea air heightens one's sensibilities.

In sixteen days I foolishly attempt to visit Connecticut and five other states and see dozens of gardens. Hundreds of plants new to me, countless new sights pass hurriedly by. My observations are lamentably brief and superficial. The very spaciousness of this season lets one view things less specifically. Gardens are harder to break down into their components. And gardeners are ever so much more relaxed. It's a good time to visit anyone, but certain gardens linger tenaciously in my memory.

Eleanor Spingarn's garden is noted for walls, troughs, and the rarest plants. I spend a few feverish minutes looking at these while a mellow sunset performs across the valley from the garden. This garden captures for me the outstanding feature of rock gardening (eastern seaboard rock gardens in particular): the counterpoint of detail and vista. Only a quintessential rock gardener, such as Ellie, would undertake a several-acre garden by herself. The result is alpine in its scale. A backdrop of dramatic vistas and views soothe the eye and spirit in this garden while on a smaller scale, saxifrages and androsaces vie in a trough. The evergreen filigree of campanula foliage softens the massive Cyclopean walls. The balance between these extremes of vista and intimate detail is a tribute to the artistry of the gardener.

Space and proportion are the hallmarks of the Redfield garden as well. With very different plant materials (more woodlanders, shrubs, and dwarf conifers), Dick and Herbert Redfield have created an utterly spacious garden. Lao Tzu observed that, "the nothing in the middle is what makes a bowl useful." The Redfield garden is built around a wonderful half-acre sward of lawn. How often rock gardeners criticize lawn! Yet, here the open space offers a perfect counterpoint to the immense rock garden sloping down from the lawn in three directions. Starting near the drive I descend through specimen dwarf conifers and unusual shrubs and trees into the first planting bed of alpines. These grow so effortlessly and so well that one finds oneself immediately absorbed by them. Suddenly a stream appears up ahead, deep in the woodland. A path skirts the stream bank (thickly planted with primulas

in spring) and I notice rare plants such as shortia growing in profusion. These appear so much at home that one almost forgets that this is Connecticut. Perhaps those ferns and pyrolas were planted. In the end, nature and gardeners are one. Slowly the path rises along a steep hill open to the sun and filled with more conventional alpines and a few surprises such as Lewisia tweedyi. All of this is so effortless one begins to wonder just how many Redfields there are. Everything belongs just where it is.

This garden, on a very large scale, represents the finest qualities of rock gardening. At the height of late fall, it is clean, utterly uncluttered, and flows untrammeled from the surrounding hills. In addition to being a work of art, this garden is an unparalleled collection of rare plants.

Stylistically, Paul Palomino's garden runs the same melody through a very different key. Here science and art are also blended, but rather than on Connecticut's rolling hills, Paul lives in Seaford, Long Island, not far from Manhattan. The great majority of Americans live in undifferentiated suburban subdivisions. For those of us who do, Paul's garden is nothing short of a revelation. Trees and shrubs are carefully situated and planting beds are placed so that even near winter, with deciduous trees naked and sky open around, the urban world is completely closed out when one enters the garden. To the left, a variety of troughs and pots against the south wall of the house rivet my glance. These are exquisite in their detail, and distract me for some time. Turning southward and looking into the garden, I could be anywhere. Anywhere, that is, but in a city. I am drawn to the planted dry wall surrounding the base of the alpine house where a wealth of tiny plants encrust the crevices and pave the chip mulch.

The alpine house itself is full of compelling plants, but I can't resist walking straight over to the well-known tufa mound covered with alpines. What a triumph for our art—a miniature mountain filled with very interesting plants, indeed. Who ever dreamed *Draba bryoides* var. *imbricata* would grow outside? Here are the mountains of the outside world delightfully reduced in microcosm in this intricate garden.

In Pennsylvania, three rock gardens have elaborated, on a grand scale, a different type of rock gardening altogether which I think is best described as "naturalistic" rock gardening. In all these gardens, a tremendous variety of exotic herbaceous plant material has been naturalized in the garden. Most of us plant rock plants much as a mosaicist places tesserae, one here, one there, gradually filling in a pattern with individual pieces. Lee Raden, Anita Kistler, and Norman Deno work more dramatically, combining plants in such a way that the plants self-sow, spread by runners, blend, and ultimately form a viable ecosystem of their own. These naturalistic gardens are utterly different one from the other but share an ambitiousness, a succcess and scope that might be compared to a large impressionistic canvas alongside

a Renaissance miniaturist's portrait.

Lee Raden does not have a single rock at Alpineflora. A series of hills composed of sand, gravel, and stone chips in varying textures and depths surround his house like a number of bonsai–Alps. Along the margins of the garden, prostrate junipers are allowed to clamber over the hills, suggesting distant woodlands. The hills nearest the house contain the smaller, more delicate alpine plants. The manner in which rare brooms, such as *Cytisus emerifolius*, spread unencumbered across a broad shoulder of hill, combining recklessly with tiny mounts of dianthus, areneria, phlox in bewildering varieties, anemones, and countless other wildly self–sowing alpines in exuberant result is something very much like a high alpine meadow. In early December *Orostachys iwarenge* (the true sea–green–leaved species) has filled a bowl along the side of one hill with dozens of shriveling rosettes. (Lee can undoubtedly often point out this sort of anomaly.) Here late fall frost has withered most of the Japanese stonecrops into complete dormancy, while on the lea of one hill, a large clump utterly untouched by the frost or wind continues in full bloom, in full leafage. Only this naturalistic style of planting and the myriad climatic niches provided by a rock garden (here a sand and gravel garden) could provide such a stark illustration of the paramount importance of microclimate.

Again I am struck by a great paradox of rock gardening: here plants self sow, fight, ramp and scramble with one another, and yet from a distance the overall effect of Alpineflora, as with most rock gardens, is a sense of tidiness. This is a trim, clean garden. Lee Raden's alpine house deserves an article in itself.

Not far away, Anita Kistler lives in a farmhouse overlooking her own valley. The Kistler valley, filled with a series of ponds and a boggy stream, comprises a rock garden in macrocosm. Technically, however, Anita's rock garden cosists of a series of naturalistic outcrops and screes built into the native shaly slope spilling gracefully downhill from the house near the road toward the pond–filled valley below. This garden is artfully screened from traffic by a sizeable woodland garden and strategic shrub plantings. The screes are an alpinist's dream: dwarf shrubs and rare alpines spread and rub shoulders, multiply and prosper. This garden is a feast for the eyes. *Iris sauveolens* (formerly *I. mellita*) is supposed to be the most delicate bearded iris; in the Kistler garden it is a weed. Look at *Chamaecyparis pygmaeus*, how dense the foliage on stems! Many other unfamiliar alpines fill the scree and overflow onto the paths of this living Persian carpet. I can heartily recommend Anita's garden in late fall. It is as interesting in leaf and texture then, as blossoms are in spring.

Driving from the environs of Philadelphia to State College, my western eyes are impressed by the beauty of the eastern countryside. People have

lived long enough in this region to learn respect for landscape. I have not seen the sort of hideous commercial advertising which mars so much of the West. Cities are trimmer and the farmlands seem to have been landscaped. The West is very poor in species of forest trees. Watching the woods flash by, I am frustrated at not knowing which tree is which, except for sycamores and evergreens, of course. What a wealth of plant material is harbored in the eastern hardwood forest!

Norman Deno picked a steep north–facing slope upon which to perch his house. After several decades, a remarkable garden has evolved. No decent American rock gardener would believe you if you claimed that Kabschias were viable rock plants. In Norman's garden, they are virtually landscape plants, blending with their silver cousins to cover every crevice and slope for perhaps an eighth of an acre. This portion of the garden is alpine gardening par excellence.

The Deno garden consists of more parts than can be comfortably handled in a few paragraphs. I will mention only the dryland sand beds, the woodland garden, and the alpine scree.

Between the front door of Norman's house and the street are the renowned sand beds. These are the beds that Norman has described several times in various articles for the *Bulletin*. These articles imply that this is a sort of laboratory to study plant growth. Don't be fooled; like the rest of the garden, the sand beds are aesthetically attractive. I have not seen healthier echinocereus cacti, even in the wild, than are found self–sowing in this area. Acantholimons, in several forms I have never seen before, form immense domes to the west. I would like to count the plants of *Draba dedeana* and *D. aizoon* naturalizing in different parts of the sand beds. I seriously doubt that an afternoon would suffice to do so, since the progeny number in the thousands. *Phlox andicola* and *P. allysifolia* grow well here as they do in the wild. *Eriogonum subalpinum* forms a mat perhaps 6 feet across. I have seen this eriogonum many times in the Rockies, but never so happy as in central Pennsylvania. *Eriogonum flavum*, which was originally collected 50 miles north of Denver, grows far better here in Pennsylvania than on its native plains. These sand beds are doubtless showy in the spring, but at this time of year the autumn tints are as gratifying to a sophisticated eye.

On the other hand, woodland gardens are not very interesting in the fall. Aside from galax, shortia, and a few other evergreen woodlanders, little is evident in the woods to untrained eyes. I recognize sweeps of *Jeffersonia dubia* and J. diphylla here. Norman is genuinely annoyed at the spreading tendencies of the latter as I suppose I might be, if I could only succeed in growing these "weeds."

I recognize the tall wands of tricyrtis as we walk down the hill toward a long ridge. Suddenly I freeze—growing wild in the limestone outcrop are a

number of vigorous plants of *Camptosorus rhizophyllus* and *Asplenium ruta-muraria*. Starting with plants like these and *Lilium editorum*, growing natively on the property, I find it hard to sympathize with Norman when he complains about anything at all.

Walking eastward from this corner of the property toward the alpine screes, I cannot help but admire the careful selection of plant material. Anything Norman plants must be able to survive without supplemental waterings. He does not consider a plant as growing in his garden until the plant has carved out a niche and succeeded in self sowing. This sort of ecological rock gardening is altogether novel to me. I believe that this garden is a remarkable, living laboratory for our art. To maintain hundreds of natives and exotic ornamentals over such a large property, Norman has exercised the highest intelligence and economy of effort possible in rock gardening. The result is sobering in its success and possibilities for application elsewhere.

Pat Renzetti likewise has created a beautiful garden. Her scale is considerably smaller, but her cottage, situated under towering white oaks along a dramatic stream, consists of a whole series of interconnected but discrete rock gardens. These follow the contours of the path and stream so well that it is only after a few minutes that one notices an occasional arc or patterned walk that interjects a formal element in the overall naturalistic planting. This is a thoroughly designed garden; it achieves a natural effect through careful organization of plant materials, which must perform perfectly in order to remain in this garden.

Smaller than most of the estates that I have mentioned, this garden achieves spaciousness because of the massive woods that surround it and because of the careful, winding, round contours of the planting areas. The dark, granite wall forming an amphitheater alongside the roaring stream is especially striking.

As I review these gardens, I can see that they are utterly dissimilar. They range from flat topography to steep hills. Some employ massive rocks, others no rocks at all. Some are large, some are small. They employ different soils, plants, and philosophies. They possess different path materials, different kinds of garden structures such as alpine houses. They share several qualities as well: These are all gardens which are beautiful in November and December. They possess year–round interest in foliage and design. They are also plantperson's gardens, containing a wealth of rare plant material.

Such is our art, where no two gardens are even vaguely similar. What other art form allows such room for individual expression, affording scientific interest simultaneously? Looking at the best examples of our art, we realize that we need not be at odds with nature, nor should art preclude scientific interest.

Basic Gardening

Plants from Seed: Two Approaches that Work

Growing Plants from Seeds

Lee M. Raden
Phoenixville, Pennsylvania

One of the things that particularly fascinates me is the "cast-in-bronze" statements we make in writing about our hobby. In January 1973 I wrote an article on seeds in the *Green Scene* and in reading it over I feel that many of the things that I said are still valid, but I have changed my mind about some techniques in seed handling.

Why grow plants from seed in the first place when it is so easy to buy plants at your local nursery, get them from your best friends, steal them from your enemies, or just hack them apart and divide them? The answer to these questions is easy. Absolutely no form of gardening brings greater pleasure than growing your plants from seed. There is a magic in growing plants from seed, and part of the magic is water. A completely dry seed is in suspended animation, and water recharges it and starts a wonderful chemistry. Molecules of water begin to penetrate the outer coat of the seed, and when this water content reaches somewhere in the neighborhood of 8% of its total bulk the seed will begin to stir. When the water content reaches 12% germination and growth begin. Once this germination and growth begin then we are in a do-or-die situation. If we do not water the little seedlings properly they will slowly burn up their food reserves and die. Therefore, rule number one is: once you start watering the seeds they must never be allowed to dry.

When do we sow the seed? We sow the seed when we get it. If it's seed for vegetables, or annuals for the garden, we generally order them for the proper time for sowing. If we get the seed before it should be sown, it should be kept in some type of waterproof container such as a jar. However, if it's seed that must be stratified or chilled, it is best kept in the refrigerator, in a jar, until sowing.

I don't use sterilized soil. It doesn't occur in nature and, quite frankly, the average gardener or horticulturist does not need it. The real super secret is a light, porous, extremely well-drained medium; a medium that allows good oxygen retention, water drainage and has a rich nutrient base. Such a medium is needed for the seedling roots to spread and feed. A good seed soil mixture is composed of ⅓ to ½ stream sand and the balance a mixture of garden soil and compost. A major change in my thinking since 1973 is

that I never incorporate peat of any kind in my seed pans. Seeds of the *Ericaceae,* and their seedling plants, do not need peat. Peat retains too much water and is a major cause of damping–off. I am assuming that we all have a source of compost; if you do not, then go out into the woods, get permission from the owner, and use some of that marvelous hardwood forest duff for your compost, but use compost.

In blending the above–mentioned soil mixture it should not be tamped or crushed. It should be aerated by throwing it up in the air; never screen the mix. Gently pour into the seed pans using a broad trowel. In place of tamping, shake the pan gently to obtain a level surface. Now sow your seed as uniformly as possible on the top of this mixture. If the seed is large, very carefully cover it with some coarse stream sand. If the seed is fine, mulch the top lightly with 1/8 inch stone chips or aquarium gravel. Water thoroughly from the top using a fine nozzle. That is how nature pushes the seed into the soil.

Now a constant vigil must be kept. The seed pans must never be allowed to dry out and they should be stored someplace out of the sunlight, but in a light area. I never cover seed pans with newspaper, polyethylene or glass because proper air circulation is important and in a closed atmosphere with 100% humidity it's asking for trouble. When the seed germinates in a highly humid atmosphere "damping–off" is usually what happens.

When germination occurs the plants must be moved to much stronger light, preferably to sunlight, for part of the day. Good ventilation is now all–important, and we must make sure that we have these last two factors in balance or plants will stretch from lack of light and you will never have strong seedlings, or they will damp–off. In my own experience, if your watering schedule and light and air circulation are correct, then your reward is an astounding growth of the seedlings.

Many experts say that when the first true leaves appear the seedlings should be pricked out. I never prick out plants at this stage. I let them fight their way in the container to the bursting point.

After this initial transplanting, give the plants about a week to recover. They will let you know their vigor is renewed by their color and general appearance. If you just took the seedlings directly from the seed pan to flats, or directly into the ground, fine, but let's be smart. Modify that garden soil or soil in seedling flats with sand. In our Delaware Valley soil I have found that it generally must be lightened considerably. If you will work sand into the soil and transplant on a day that is cloudy, you will find that there will be very little transplant shock if the plants are amply watered–in. Watering continues to be all–important until the plants are fully grown; and if you have proper drainage through the addition of sand, you cannot overwater or sour the soil. A top dressing of stone chips is as good for roses as it is for conifers

or for very fine alpine plants. You will be keeping the neck of the plants dry, the soil will be cool, and there will be no soil spattering in the event of a thunderstorm.

From an expense viewpoint there is nothing cheaper than water. All plants need it for growth and the absorption of nutrients from the soil. You cannot over-water if you have proper drainage.

Fertilizers—use one with a low nitrogen content and cut the recommended manufacturer's dosage in half; if the seedlings are healthy the halved dosage will be ample.

Happy gardening!

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Starting Seeds Indoors: All It Takes Is Light, Food, Moisture

Sandra Ladendorf
Chapel Hill, North Carolina

You've ordered from several seed catalogs. The first small stack of seed packets is waiting on your desk. Now what?

As in so many other aspects of gardening, there are a number of different ways to produce seedlings. One way or another, you need to provide moisture, a medium, food, and light. The seeds will do the rest.

If you've ever tested the viability of old seed by putting some on a wet paper towel, you know that moisture can be enough to break the seeds' dormancy and start them into growth. A few, like *Thermopsis caroliniana* (Carolina lupine), need to be soaked in warm water or scratched with a file (scarification); seeds from many evergreens and from perennials like trillium need to be mixed with a moistened medium and put into the freezer or refrigerator for a period of time (stratification); but most annual, perennial, and vegetable seeds just need moisture.

As soon as a seed germinates, it begins to put forth first a root and then a tiny leaf or leaves. Media like pearlite, vermiculite, peat moss, sterilized soil, or milled sphagnum moss all can serve as anchors for the new roots

of germinating seedlings and as conduits for water and food to the new plants. You can mix your own blend of peat moss, pearlite, and vermiculite, or buy sterile, soilless seed-starting mixes at your garden center.

When talking about various media, the important word is "sterile." You don't want weed seeds, or fungal or insect problems bothering your newly germinated seedlings.

Food becomes important as soon as the seedlings appear. Each seed you plant is a fascinating little package of stored energy. It contains enough of its own food to support that initial spurt of growth. To keep the young seedling developing vigorously, begin feeding regularly with a balanced fertilizer. It's easy to use any water-soluble plant food.

To utilize that food through the complicated process of photosynthesis, light is required. As soon as the seedlings germinate, give them as much light as possible, whether you are growing on a windowsill, in a greenhouse, a cold frame, or under fluorescent lights. The light requirement for seedlings is very high.

Because I have neither a greenhouse nor sunny windowsills (our home has four-foot roof overhangs), I raise my seedlings under lights. My light garden happens to be in the laundry room of this house, but you can have an indoor light garden anywhere you have room for a table and a four-foot fluorescent light fixture. I know gardeners who have light setups in attics, basements, spare bedrooms, kitchens, bathrooms . . . even garages.

Each of those gardeners has a favorite way of starting seeds. Seed catalogs and local garden centers are filled with pots, flats, peat pots, compressed peat pellets, heating cables, labels, and other supplies for starting seeds. If you're having great success, don't change. But since I've been raising seedlings under lights for 24 years, I've gradually developed a routine that works for me, and I'm happy to share it with you. If you'd like to try a new method, here's the system I've evolved.

For almost all seeds, from easy marigolds to challenging alpines, I take a four-inch shallow pot of vermiculite, scatter the seeds on top of the vermiculite, sprinkle a little more vermiculite over the seeds (except for tiny seeds that I don't cover at all), label with plant name and date, and stand the pot in a pan of water to soak. When the pot is thoroughly wet, I put it in a plastic bag, tightly sealed. The bag is not opened until seedlings appear. Most annual, perennial and vegetable seeds germinate quickly, but some, like the alstroemeria seed I planted in March 1983 that didn't germinate until November, take a long time.

After trying all the media mentioned earlier—which all work—I prefer plain vermiculute. The only medium I don't like to use is milled sphagnum moss, which many experts recommend because of its reputed anti-fungal properties. It tends to cake, however, and a tough layer on the top of the

pot or flat makes it difficult for small seedlings to struggle through. If you want to use it, milled sphagnum works better in a mixture than alone.

The technique for sowing seed varies according to the size of the seeds. Large seeds like beans or marigolds can be placed evenly around the pot or flat. Most seeds can be sown by opening the seed packet at one end, squeezing the package slightly open in one hand and then tapping that hand with the other hand. A few seeds will roll out at each tap. The powdery fine seeds of begonias or gesneriads I pick up between thumb and forefinger and scatter them over the pot with a gentle, circular rubbing motion.

Just because you have a seed packet full of seeds, don't feel you have to plant them all at once. Seeds purchased from American seed companies are usually of fine quality, with excellent germination. If you want just 10 tomato plants, plant 10 seeds—plus three or four more as insurance. Seal the rest of the seeds in their packet, and store all packets of surplus seeds in a closed container in your freezer. Most stored seed will be viable even after a year or two of freezer storage.

Most seeds germinate best with bottom heat, so I line my bagged pots up on a heating cable. (Cables are inexpensive, but if you are just beginning to raise your plants from seed and don't want to invest in a cable, you can warm a few pots or flats by putting them on top of your freezer.)

For the few plants, like cyclamen, that demand darkness for germination, I put them under the bench, covered with cardboard.

From then on, I enjoy the game of seeing what has germinated each day. Some seedlings like rudbeckia will pop up in two days. Last year my impatiens and tomato seeds germinated in seven days. Other seeds, from difficult alpines, bulbs, and trees, may take a year or more.

As soon as seedlings appear in a pot, I move the pot to another shelf and place it as close to the lights as possible. My two–tube, four–foot fixtures are considered a low–light–intensity setup. If I had four tubes in the same space, I could put the seedlings further away from the lights. Unlike sunlight, however, the light from an indoor light garden has one big advantage: You cannot burn a plant under lights unless a leaf physically touches the tubes, so you can put seedlings very close to the light source.

When the seedlings appear to be evenly germinated, I begin to open the bag. The first day I untie the bag; the next, I partially open it; and not until the third day do I remove the pot from the bag. After losing seedlings by rushing them from the 100 percent humidity of the closed bag to the 50 percent or less humidity of my light garden, I have learned to be patient. Newly germinated seedlings are fragile and need to be treated gently. Introduce the new plants to an environment of lower humidity gradually . . . unless you have a mist system that can give them an occasional shower as they are adjusting.

As soon as the bag is removed, I water the pot gently with a dilute fertilizer solution and continue to feed the seedlings until they are in the ground.

While books generally recommend transplanting seedlings when they have four true leaves, I don't always follow that rule. I now move them into individual pots or flats as soon as they are big enough for me to grasp.

There are exceptions. Saxifrages resent being pushed. After I lost a batch or two, I learned from H. Lincoln Foster, author of "Rock Gardening," that they should be left in their original pot until they begin to form clumps, which may take a year or more. But most of our ordinary flower and vegetable seedlings thrive when pushed. Some few seedlings, like dill, lupines, and poppies, resent transplanting. For those plants, it's best to start them in peat pots that you can put directly into the garden.

Somewhere near our average last frost date, I put the seedlings out of doors, in a sheltered place or cold frame, to harden a bit before I put them into the garden. Here in Chapel Hill, N.C., that date is April 11, but when we lived in Michigan, it was roughly Memorial Day. Wherever you live, it's always important to remember that the date is just an average. Last year the peach crop and gardens were devastated here in North Carolina by a late April freeze. Listen to the weather reports during those tricky days of spring and prepare to cover your new plants with plastic or newspapers if the nights approach freezing or if you have a storm brewing.

Before you think about harvesting your first tomatoes or cutting the first zinnias, there's one more step. As you place each seedling in its hole, water it in well with a dilute–fertilizer solution, to minimize the transplanting shock.

If possible, do your transplanting on a gray, overcast day. We all garden when we have the time and not necessarily when the conditions are perfect, so if you must move your small plants into the garden on a sunny day, protect them from the sun with inverted berry baskets, a board held above the plants on bricks, or some similar sunshield. One inventive gardener I've heard about collected old umbrellas and used them to shade his newly transplanted garden.

Whether you are an experienced grower or an absolute beginner, I would like to recommend Park's "Success with Seeds." This book, written by Ann Reilly for the Geo. W. Park Seed Company, is wonderfully thorough. It begins with a detailed "how to" section and follows with 240 pages of plant descriptions and information. The back of the book contains a number of useful lists of plants that need stratification, cool temperatures to germinate, or dark to germinate. It can be ordered from Park's, Box 31, Greenwood, S.C. 29646 for $12.95.

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Hypertufa Ingredient Experiments

Wayne Kittredge
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Many rock gardeners faced with limited space are forced into using hypertufa troughs, others are taken with their aesthetics, and still others use them for the really diminutive plants which would be swamped if grown out on the scree with rock plants of ordinary size. Troughs are also useful for growing non–hardy plants in for ease of transporting into the alpine house in winter. And there are probably other reasons that I've not thought about. So, troughs are practical, except for one drawback: filled with grit and plants and well watered, they are not exactly light. It is easy to imagine many readers with aching backs willing to attest to the unwieldiness of most troughs.

The author has constructed upwards of fifty troughs (and has an aching back). Some troughs were quite small and easy enough to transport, some won't get carried even with a crane, and the majority were in the 30 to 60 cm diameter range. In the begining of this adventure, I used the relatively standard hypertufa mix of equal parts cement, sand, and peat moss. With the disadvantage of having an injured back, the relatively heavy standard mix problem became magnified, spurring me on to experimenting. A visit to a local friend's garden gave me a bit of inspiration when I picked up one of the empty troughs she had made. To my eye, her trough had overly thick walls, and I expected it to weigh the proverbial ton; to my surprise it was quite light. Closer inspection revealed that she had used a very high density of perlite in her mix, and the wall thickness was for added structural strength, as perlite provides very little in the way of sturdiness.

Having taken pottery classes (post graduate, for those already snickering), I became very conscious of interior space versus overall size in utilitarian containers, so despite the obvious advantage of the lightness of perlite, I was unhappy with the wall thickness. Through experimenting, it was noticed that vermiculite has even less strength, and substantial amounts of it in the mix caused the cement to harden improperly and to crumble in short order. It seemed only natural to start experimenting with varying amounts of perlite, vermiculite, and peat moss. Eventually I became satisfied with the proportion of equal parts of the three comprising what would be the whole part of peat moss used in the standard mix. This mix made it possible for me to make the walls of the troughs roughly 1 to 2 cm thick, providing excellent interior space while also making the cement mix itself considerably lighter than the standard mix.

Not satisfied with the progress already made, one whole winter was spent

wondering if it could be possible to incorporate air bubbles into the cement mix. I never got around to attempting mixing liquid soap into the mix and beating vigorously, largely because my chemistry background wasn't strong enough to tell me if the soap might interfere with the cement powder's return to its original state as gypsum rock. Need also took precedence in the spring as I required many troughs which I could be sure of structurally. Nonetheless, having pottery materials hanging around the cellar, I couldn't resist the temptation to mix some finely broken up (80 mesh), fired, unglazed crockery (grog) into the receipe. At first it was merely an additive in the very unscientific ratio of a handful per medium-sized trough. Meanwhile, I tried to talk myself into substituting grog for some of the sand in the mix. The grog is as hard as sand, so the desired structural strength didn't seem endangered, and on the positive side, the grog would absorb water, unlike sand, making the cement mix when set more absorbent and moisture retentive, which was the reason for incorporating small amounts of vermiculite. Because of the added strength the grog lends, it could be used in place of the vermiculite; however, I like the slight softening effect the vermiculite has on the color and texture of the hypertufa.

Coarser mesh grog was also tried with excellent results, so the cement quantity of the recipe remains the same, the peat moss is cut with perlite and vermiculite, and the sand portion is cut with or replaced by the grog, depending mostly on my mood at the moment. That may seem elaborate if not exotic hypertufa, but it has performed well for me. What more could I ask for? Well, it occurred to me that this fake tufa is impervious to roots, unlike the real thing. How could the formula be rearranged to effect a hypertufa which would have properties as near as possible to real tufa?

During one of my experiments, there was some extra cement mix which was predominantly vermiculite. It was dumped on the plastic-covered floor in disgust and forgotten. When it got under foot again, I noticed it was crumbly as usual, and it seemed roots should have no problems invading it. Having another batch of mix left over which would set hard, it somehow came to me to dump that over the crumbly material. The results were excellent. The soft mix could no longer be crumbled from the outside and places were left where the hard-setting cement didn't cover the soft mix. It was easy to drill holes for setting plants in. The acid test, of course, is whether the plants find the soft hypertufa suitable as a growing medium. Initial attempts will be made with such calciphiles as genus *Saxifraga*. Next is to somehow find a way to render the hypertufa neutral in pH reaction in order to accommodate those little treasures that are at least lime tolerant.

Some Experience Breeding Lewisias

Bedrich Parizek
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(Translation, Vaclav Plestil; initial editing, G.B. Charlesworth)

I would like to share with our readers some of my experience with hybridizing lewisias. Although I have not done broad–based, systematic work in crossing lewisias but have limited my work to more or less isolated experiments, in my opinion the results could be of interest to other alpine and rock gardeners.

Perhaps I should say a few words first on my use of terminology and nomenclature. I use *Lewisia cotyledon* in its widest sense to include all of its varieties and forms, not only *L. heckneri* and *L. howellii*, but even the well–known 'Sunset Strain' of Jack Drake. For this reason I have used in nearly all cases only plants of garden origin for hybridizing. On the other hand, *L. columbiana, L. wallowensis,* and *L. rupicola* will be understood as separate species (though the latter two are often classified as varieties of L. columbiana). These three lewisias are easily distinguished by their characteristic habit, flowers, etc., but also their genetic characters are quite distinct from one another. *Lewisia longipetala* will indicate the plant that has been cultivated here for years under the name *L. pygmaea,* from the time when the true *L. pygmaea* was not cultivated in this country. Here now *L. longipetala* is often labeled "*L. pygmaea* of gardens." I have never used the true *L. pygmaea* for my work.

Some *Lewisia* hybrids are well known and have been widespread for years among rock gardeners; such is the classic hybrid between *L. cotyledon* and *L. columbiana, L.* x 'Trevosia,' 'George Henley;' and the hybrid of *L. longipetala* and *L. cotyledon* named 'Pinkie.' Sometimes we can even find spontaneous hybrids between these species differing little in appearance: there are possibly even hybrids between the evergreen and deciduous species. The majority of *Lewisia* species can be crossed. An exception, *L. tweedyi*, is unique in that it does not hybridize with any other species of the genus on account of the number of its chromosomes.

Lewisia hybrids are usually sterile though occasionally hybrids of *L. cotyledon* x *columbiana* will give a little seed, seedlings of which are quite similar to the female parent. Propagation of hybrids is thus by vegetative means, side shoots, offsets, and cuttings. It is a slow way of getting a good stock of plants, but it is the only possible way if we want to have identical plants. The trials using hybrids for further hybridizing always led to failure

and no seed was set in any trial because of the non–viable pollen in the hybrid plants.

The technique used for hybridizing lewisias is the same as is widely used for other plants, and I suspect it is unnecessary to describe it in detail. However, we must not forget to isolate the stigma before and after the artificial pollination to avoid uncontrolled pollination by insects. The seeds obtained are usually ample in quantity and of good viability. They should be sown immediately after harvesting. Germination comes early the next spring.

Results with some species:

1. **L. cotyledon x L. longipetala** and **L. longipetala x L. cotyledon**

All the plants obtained from this hybridization were closely related to the known 'Pinkie.' The only difference observed was in the size of the flowers. Here it is interesting to note that the plants with noticeably larger flowers were more shy with side rosettes. I did not continue with these experiments.

2. **L. rupicola x L. cotyledon** and **L. cotyledon x L. rupicola**

L. rupicola is an excellent plant for the breeder as it gives its saturated purple violet or mauve color to all its hybrids. In this cross I have obtained several plants quite similar to the known 'George Henley,' but different from this plant in having violet flowers. When the female parent was *L. cotyledon*, the hybrids obtained were a little more robust than when *L. rupicola* was used as the female plant. The color of the flowers was the same in all cases. These hybrids form enough side rosettes to be easily propagated.

3. **L. brachycalyx x L. cotyledon**

The female parent *L. brachycalyx* was pollinated by pollen of *L. cotyledon*. Since the plants do not usually bloom at the same time, the pollen parent *L. cotyledon* was kept in a greenhouse for earlier blooming while *L. brachycalyx* was left outdoors in the rock garden. As I wished to avoid any self–pollination by *L. brachycalyx*, after first pollinating, I removed all the remaining buds from the female parent plant.

The seeds from this cross were of unusual size and all gave nice hybrid plants very similar to one another. The leaf rosettes were akin to *L. brachycalyx*; however, the plants retained their leaves in summer instead of losing them as is the case with the deciduous female parent. The number of leaves were reduced only a little in summer, so we can say that the hybrids are evergreen.

Flowers of these plants are twice as large as those of *L. cotyledon*, but somewhat smaller then those of *L. brachycalyx*. They bloom one to several on very short (1–3 cm) stalks, looking nearly sessile. In color they recall *L. cotyledon* and have its characteristic lines on the corolla. The basic color

varies from rose to yellow. These hybrids bloom unusually heavily and very often repeat bloom, sometimes several times during the season. In some cases the flowering is too exhausting for the plant and thus fatal.

Because of the beauty and long flowering period, these hybrids are superior to the parent plants. They occasionally produce side rosettes; however, the rooted side rosettes do not seem to have the same vitality of the seedlings. In our climate, their hardiness is less than that of *L. brachycalyx*, but some are hardier than *L. cotyledon*.

4. **Lewisia rediviva x L. cotyledon**

Three specimens of *L. rediviva* were pollinated by pollen collected from several plants of *L. cotyledon*. The seed obtained was sown together and the seedlings were observed and judged.

A. For the first experiment, the plants used as female parents and even as pollen parents were quite average plants of both species, holding as near as possible to the type. In the case of *L. cotyledon*, plants were chosen with the basic rose flowers, always with stripes on the petals. Viability of seed was nearly 100%.

Seedlings from this experiment are evergreen, with only a slight reduction in the number of leaves in the fall. The leaf rosettes are of the same size as *L. cotyledon* with leaves somewhat narrower and with acute tips. The width of the leaves varies from plant to plant. Flowers are relatively large, reaching two thirds the size of flowers of *L. rediviva*. There are four to seven flowers on stalks 5 to 15 cm long. They are of pale rose color always with marked stripes on the petals. Among these hybrids appeared some specimens with flowers of especial beauty—a quite saturated pink in color. Flowering is profuse, some plants blooming twice or even three times a year. It seems that the plants with more flowers are more tender. All these plants tend toward caudex rot. Propagation is slow as the plants produce no seed and are shy in forming rosettes.

B. In this case the female parents of *L. rediviva* were selected with large flowers of especially saturated color. The pollen parents of *L. cotyledon* were chosen with large and distinctly colored flowers, 'Rose Splendour' as a rose–flowered type, for example; also plants with red and yellow flowers. I anticipated obtaining hybrids of special beauty in this way. The hybrids were quite similar to those resulting from the crossing of average plants, except that the flowers were somewhat smaller and varied in color from pure pale rose to a saturated yellow, all with striped petals, and some blooming higher on the stalk than the other crosses. No exquisite plants were obtained. These plants generally bloomed only once a year, just occasionally repeat blooming. Perhaps hardiness was somewhat better, but this could have been caused by the fact that the plants were not so exhausted by flowering as in the

previous case.

C. In this trial, the white-flowered albino form was used in both species with the reasonable hope of obtaining a white-flowered hybrid. But even this experiment was a failure. All thirty seedlings obtained were of the same appearance as in case 4B; however, the color of the flowers varied from pale yellow to pale rose with remarkable stripes. Although some plants had very pale flowers, they were relatively small, about half the size of *L. rediviva*.

In general, the nicest hybrids were obtained when the typical plants of both species were used as parents. This case would hold out most hope for good spontaneous hybrids.

5. **L. cotyledon x L. rediviva**

Here the cross was much more difficult than in the previous cases, but even here some hybrids were obtained. These have smaller, firm rosettes with narrower acute leaves. They are quite evergreen and increase very slowly. These plants are very shy-flowering; the flowers number four to seven on a stalk that is only up to 10 cm high. The flowers are only a little bigger than *L. cotyledon*. Propagation is possible only by side rosettes, but even these are few in number. Although these plants are decorative, they are never as beautiful as those obtained by using *L. rediviva* as the female parent.

6. **L. rediviva x L. rupicola**

These species cross with great difficulty. I have only one plant, but this plant is quite different from either parent. It is an evergreen plant with plenty of plump leaves about 2 mm wide in a rosette so that when not in bloom it resembles an armeria. After several years the plant forms a cushion composed of several heads. Flowering is not as easy as in the previous cases, but the flowers retain the violet color of *L. rupicola*. They are on very short (2–5 cm) stalks. The flowers are two to four to a stalk and about half the size of those of *L. rediviva*. Propagation is possible only by cuttings, but the cuttings root very badly compared to *L. rediviva* x *L. cotyledon*. I have established only three of the six rosettes. I think it would be interesting to continue this on a larger scale and perhaps obtain a seedling more readily propagated.

7. **L. sierrae x L. brachycalyx**

I obtained two seedlings which are similar to the more robust *L. sierrae*, though the flowers are double the size. It is interesting that the flowers are very early, blooming in March here even though both parents show their flowers a month later. The leaves disappear very slowly. No seed has set nor were side rosettes observed, so the plants cannot be propagated by the usual methods.

I have not tried other species of *Lewisia*, although I think there is some possibility of obtaining interesting hybrids. With some plants such as *L. wallowensis, L. rediviva* var. minor, L. stebbinsii, and *L. oppositifolia* I would not anticipate interesting results. Finally, *L. kellogii, L. maguirei, L. disepala,* and *L. triphylla* I have never had in cultivation.

The Show Bench

Alpines '86
Second Interim International Rock Garden Plant Conference
Boulder, Colorado—June 28, 1986

Bloom Classes, 1-19

Class 1: Asteraceae. 1st *Townsendia grandiflora*—Marty Jones; 2nd *Townsendia eximia*—Andrew Pierce; 3rd *Psilostrophe bakeri*—Gordon Koon.
Class 2: Bulbous plant. 1st *Allium oreophilum*—Susan Lang; 2nd *Allium oreophilum*—Marty Jones; 3rd *Allium sphaerocephalum*—Sandy Snyder.
Class 3: 1 pan Primulaceae, not *Primula*. 1st *Androsace lanuginosa*—Stan Metsker; 2nd *Androsace lanuginosa*—Homer Hill; 3rd *Dodecatheon meadia*—Neils-Lunceford.
Class 4: 1 pan Campanulaceae. 1st *Campanula cochlearifolia*—Marty Jones; 2nd *Campanula cochlearifolia*—Bea Pratt; 3rd *Campanula cochlearifolia*—Ray Radebaugh.
Class 5: 1 pan hardy cactus. 1st *Echinocereus triglochidiatus* var. *melanocanthus*—Marty Jones; 2nd *Escobaria sneedii* var. *leei*—Bill and Karen Adams; 3rd *Echinocactus texensis*—Denver Botanic Gardens.
Class 6: 1 pan Lamiaceae. 1st *Salvia hypargeia*—Andrew Pierce; 2nd *Nepeta phyllochlamys*—Ted Kuettel; 3rd *Scutellaria prostrata*—Sandy Snyder.
Class 7: 1 pan *Lewisia*. 1st *Lewisia cotyledon*—Marty Jones; 2nd *Lewisia columbiana* var. *rupicola*—Ray Radebaugh; 3rd *Lewisia cotyledon* x *leana*—Denver Botanic Gardens.
Class 8: 1 pan *Penstemon*. 1st *Penstemon hirsutus* 'Pygmaeus'—Marty Jones; 2nd *Penstemon strictus*—Bea Pratt; 3rd *Penstemon virens*—Neils-Lunceford.

Class 9: 1 pan *Phlox*. 1st *Phlox* x *procumbens* 'Millstream'—Ted Kuettel; 2nd *Phlox nana*—Stan Metsker; 3rd *Phlox purpurea* 'Arroyo'—Homer Hill.
Class 10: 1 pan *Primula*. 1st *Primula florindae*—Marty Jones; 2nd *Primula ellisiae*—Herb Dickson.
Class 11: 1 pan Saxifragaceae. 1st *Saxifraga paniculata*—Andrew Pierce; 2nd *Saxifraga* x *andrewsii*—Marty Jones; 3rd *Saxifraga paniculata*—Homer Hill.
Class 12: 1 pan rock garden plant, not *Penstemon* or *Lewisia*. 1st *Dianthus gratianopolitanus*—Marty Jones; 2nd *Acantholimon glumaceum*—Homer Hill; 3rd *Dicentra peregrina*—Ray Radebaugh.
Class 13: 3 pans rock garden plants. 1st *Aethionema armenum, Dianthus nitidus, Silene alpestris* 'Flore Pleno'—Andrew Pierce; 2nd *Gentiana cruciata, Leontopodium alpinum, Scabiosa lucida*—Ted Kuettel; 3rd *Phlox* 'Denver Sunset,' *Phlox* 'Seedy,' *Phlox* 'Tangelo'—Pete Hill.
Class 14: 3 pans rock garden plants, native to North America. 1st *Phlox lutea* 'Vanilla,' *Phlox* 'Mary Maslin,' *Phlox* 'Tangelo'—Homer Hill; 2nd *Aquilegia caerulea, Castilleja sulfurea, Rhodiola rhodantha*—Neils-Lunceford; 3rd *Astragalus* sp., *Oenothera serrulata, Penstemon discolor*—Denver Botanic Gardens.
Class 15: 1 pan western American rock garden plant. 1st *Penstemon crandallii*—Marty Jones; 2nd *Oxytropis lambertii*—Neils-Lunceford.
Class 16: 1 pan Great Basin rock garden plant. 1st Penstemon strictus—Marty Jones; 2nd *Eriogonum ovalifolium*—Denver Botanic Gardens; 3rd *Penstemon tusharensis*—Homer Hill.
Class 17: 1 pan southwestern rock garden plant. 1st *Oxytropis lambertii*—Marty Jones; 2nd *Silene laciniata*—Gordon Koon; 3rd *Penstemon eatonii*—Neils-Lunceford.
Class 18: 1 pan Great Plains rock garden plant. 1st *Callirhoe involucrata*—Stan Metsker; 2nd *Buchloe dactyloides*—Sandy Snyder; 3rd *Liatris punctata*—Iza Goroff.
Class 19: 1 pan Rocky Mountain rock garden plant. 1st *Aquilegia caerulea*—Marty Jones; 2nd *Penstemon ambiguus*—Homer Hill; 3rd *Townsendia grandiflora*—Helen Taylor.

Foliage classes: 20–28

Class 20: 3 pans hardy Crassulaceae. 1st *Jovibarba heuffelii* 'Bermuda,' *Sempervivum arachnoideum* 'Icicle,' *Sempervivum arachnoideum* 'Rubrum'—Bill and Karen Adams; 2nd *Sempervivum arachnoideum, Sempervivum ciliosum* var. *borisii, Sempervivum arachnoideum*—Pete Hill; 3rd *Rosularia globularia, Sempervivum arachnoideum, Sempervivum pilosum*—Marty Jones.

Class 21: 1 pan dwarf shrub of western US. lst *Potentilla fruitcosa* 'Nana'—Marty Jones; 2nd *Artemisia tripartita* var. *rupicola*—Denver Botanic Gardens; 3rd *Cercocarpus intricatus*—Sandy Snyder.
Class 22: 1 pan dwarf conifer. 1st *Chamaecyparis obtusa* 'Green Cushion'—Denver Botanic Gardens; 2nd *Abies balsamea* 'Nana'—Stan Metsker; 3rd *Tsuga canadensis* 'Coles' Prostrate'—Ray Radebaugh.
Class 23: 1 pan western American fern. 1st *Cheilanthes eatonii*—Larry Schlichenmayer; 2nd *Woodsia oregana*—Ray Radebaugh; 3rd *Cryptogramma crispa* var. *acrostichoides*—Judith Jones.
Class 24: 1 pan fern. 1st *Adiantum pedatum* ssp. *subpumilum*—Judith Jones; 2nd *Polystichum tsus-simense*—Denver Botanic Gardens; 3rd *Dryopteris affinis* 'Crispa'—Andrew Pierce.
Class 25: 1 pan western American rock garden plant, gray foliage. 1st *Sphaeromeria capitata*—Ray Radebaugh; 2nd *Sphaeromeria capitata*—Denver Botanic Gardens; 3rd *Artemisia frigida*—Marty Jones.
Class 26: 1 pan rock garden plant, gray foliage. 1st *Helichrysum virgineum*—Marty Jones; 2nd *Antennaria* sp.—Neils-Lunceford; 3rd *Sideritis taurica*—Denver Botanic Gardens.
Class 27: 1 pan prickly plant, not cactus. 1st *Vella spinosa*—Denver Botanic Gardens; 2nd *Dianthus erinaceus*—Bill and Karen Adams; 3rd *Acantholimon glumaceum*—Stan Metsker.
Class 28: 1 pan cushion plant. 1st *Saxifraga moschata* var. *kingii*—Homer Hill; 2nd *Draba hispanica*—Ted Kuettel; 3rd *Asperula gussonii*—Pete Hill.

Container classes: 29–31

Class 29: Trough. 1st Gwen Kelaidis; 2nd Pete Hill; 3rd Keith Funk.
Class 30: Trough of limited geographical region, not western US. 1st Stan Metsker; 2nd Gwen Kelaidis.
Class 31: Trough of limited geographical region, western US. 1st Gwen Kelaidis; 2nd Stan Metsker; 3rd Marty Jones.

Awards

Best of Show: Class 14, Homer Hill
Runner-up: Class 1, Marty Jones
Best Trough (Delaware Valley Chapter): Gwen Kelaidis
Best Fern (Fancy Fronds): Class 23, Larry Schlichenmayer
Doretta Klaber Award (Delaware Valley Chapter): Class 10, Marty Jones
Robert Senior Award (Ohio Valley Chapter): Class 4, Marty Jones
Piedmont Chapter Award: Class 1, Marty Jones
Rocky Mountain Chapter Award: Class 19, Marty Jones

H. Lincoln Foster Award (Connecticut Valley Chapter): Class 14, Homer Hill
Minnesota Chapter Award: Class 18, Stan Metsker

Book Review

Saxifraga and Related Genera by Fritz Köhlein, Batsford, available in the United States from ISBS, Portland, Oregon ($34.95) or from the ARGS Bookstore ($24.50).

I first became interested in saxifrages when, as a student at Kew, I was assigned to the Alpine department. Up to that time they had just been names in books and plants occasionally seen in gardens. Of course, as a Londoner, I knew that plant called London pride, without realizing it was a saxifrage.

My interest in rock garden plants stems from the period spent rebuilding the north end of Kew's rock garden. My first job after leaving Kew was with a nursery selling garden pools, aquatic plants, and alpines. (The easiest way to hide the mound of soil from the pool excavation was to turn it into a rock garden.) We used to get shipments of alpines from Bloom's, and I can still remember a *Saxifraga grisebachii* 'Wisley' that followed me home and that I grew for a year or so in a pot.

The big trouble with growing saxifrages in southern England was too little snow and too much rain which rotted many species overwinter. When I came to Canada I found the reverse was true. With good snow cover there is no problem bringing the plants through the winter, but the hot, humid days of July would prove fatal.

Over half the 200 pages in this new book on saxifrages are devoted to two chapters: "Ways of using saxifrages" and "Species, varieties and hybrids described." As the author says, "There are so many different ways of using saxifrages in the garden that no book could possibly describe them all." He does describe drystone and freestanding walls; rock gardens of several types; terraces; trough and table gardens; growing in tufa, pots, and alpine houses, as well as various types to try in different aspects. Having studied Fritz Kohlein's book, I can see many of the mistakes I made, particularly in siting my acquisitions.

While realizing that the book was originally written for the German gardener, I find it hard to reconcile his recommendation that mossy saxifrages must have a high degree of atmospheric humidity and need automatic misting systems for optimum growth, considering the way mossies react to our periods of high summer humidity. If, as he states, "Protection from scorching midday sun is even more important for plantings of 'Kabschia' saxifrages in troughs. The higher the atmospheric humidity, be it natural or artificial (Automatic misting), the greater their tolerance of sunshine," then why do we have such trouble growing these plants in summertime, even in a shaded location?

The book is beautifully illustrated throughout with line drawings and most of these include a detailed drawing of a specific plant. Thus in the illustration of the proportions of drainage, compost, and top-dressing on a pot-grown plant, a flowering plant of *Saxifraga kellereri* 'Schleicheri' is shown growing in the pot.

The general text on species and varieties is full of helpful hints on cultivation and identification and is arranged by botanical division into sections with the interspecific cultivars of each section given last. Unfortunately, the eighty color plates in the center of the book are neither numbered nor referred to in the text. When reading about a species it is necessary to go through all the plates to see if it is illustrated.

Twenty pages are devoted to descriptions of other Saxifragaceae suitable for rock gardens, from *Astilbe* to *Tolmiea.* Comparing the entries on *Bergenia* with the article in *The Garden* (Vol. 108, pp 480–484) by Ken Beckett, shows very minor differences in the species but many more cultivars described by Kohlein.

The final chapter is made up of lists of saxifrages for special purposes: collections for beginners, vigorous Kabschias, small encrusted types, those which are monocarpic or annual, those flowering in a certain month, etc. Something here for the amateur or experienced grower.

From a horticultural standpoint this is a most useful book, but it is spoiled by several silly editorial errors. There is no rhyme or reason behind the order of varieties and cultivars for some species. Thus, under *S. marginata* we have var. *coriophylla,* var. *marginata,* 'Purpur,' var. *karadzicensis,* var. *rocheliana,* 'Major,' 'Minor,' 'Intermedia' in that order. Most synonyms are given in the index as "see so-and-so" but some are included in the general index and some are not given at all.

Mr. Kohlein is vice-president of the German Hardy Plant Society and has also written books on iris, primulas, and hardy succulents. Hopefully we will also see equally good translations of these in the near future.

– Trevor Cole

Omnium-Gatherum

Alpines '86 attendees arise—A portion of the winter *Bulletin* will be devoted to revisiting the Conference and the tours, to remembering and recounting what you found intriguing, amazing, amusing, or new. Not everyone who wished to attend the Conference was privileged to do so. If you can't share plants or seeds or your wonderful Conference book with them, you can share words.

What are your impressions? What inspired you? What are you going to do to your garden as a result of the Conference? What did you see that will stay with you for a long, long time? What plants or areas meant the most to you? Why? What questions have been answered or raised for you by the Conference? You've had time now to recover and regroup and the holidays aren't here yet. It's a good time to reflect and to write a little. Brief expressions are quite as acceptable as more elaborate ones.

Your comments must reach the Editor before November 15 to be in time for the winter issue of the *Bulletin.* Please send them to Sharon Sutton, PO Box 1371, Port Townsend, WA 98368.

Beginnings—How many of you know all there is to know about every aspect of rock gardening and rock garden plants? I thought as much. Not many hands went up. From time to time articles will appear in the *Bulletin* to help beginners and others come to better grips with the fundamentals of this amazing obsession. Your questions, suggestions, and contributions are most welcome.

Illustrations—We have a surprising number and variety of needs in this department. Getting good pictures on the pages of the *Bulletin* is not at all easy. In fact, even merely adequate results seem difficult to achieve.

In view of this situation, here are some of my suggestions: We need a whole host of you to take up black and white photography and become overnight experts. We need someone, also overnight, to come up with either an inexpensive method for printing beautiful pictures in glowing colors or funding to do it the expensive way. We need a process for transforming color slides into crisp, clear black and whites. We need an endless supply of talented and eager illustrators pouring out exquisite line drawings. We need a pool, a library, of diverse sorts of illustrations into which the delighted editor can dip as need arises. And, finally we need some marvel of far-sighted efficiency to organize all of these wonders.

We may not be able to come up with all of this by next Friday, but in the meantime perhaps you wouldn't mind casting about to see if there is some way you could think of to help make the *Bulletin* a little more visually pleasing.

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A Synoptic Guide to the Genus Primula

by G.K. Fenderson

This book is intended to serve as a basic reference to the genus *Primula*. Approximately 1375 species, synonyms, and hybrids are included, each with complete reference to author, initial publication, and current status; for nonhybrid taxa, details of typification are also given. Distribution, habitat, altitude, section, a cultural code, stature, and color are indicated for all currently accepted species. The several dozen species described since 1949 are included within this conspectus.

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This book is completed by an extensive bibliography that includes both botanical and horticultural works. It provides a unified reference to the most important horticultural and systematic contributions to the genus Primula since the appearance of Smith and Fletcher's monograph.

Pages i to iv, 1-186 (plus indexes to subjects and to scientific names and authorities) 8" x 10", hardbound on archival quality paper: 56 line drawings, 1 black and white photograph; $40.00. Available from March 1986 from major distributors of horticultural and botanical books (outside the U.S.A. ... from Wheldon & Wesley, Ltd. Codicote, Hitchin.

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