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Many gardeners think of primulas as garden material to be used for edging the border or path, or for filling in the gaps in the rockery. Occasionally a primula lover devotes a bed to mixed polyanthus or, having collected a dozen or more varieties, spends much time moving them around to find favorable locations. Sometimes this enthusiast forgets to mark the location of his newly acquired primulas and, if they happen to be herbaceous, they are either dug up or buried while dormant. He then decides that the plants have died, or are not hardy, and, after a few such experiences, gives up raising anything but polyanthus. This is regrettable, for this huge plant family, with its hundreds of species, comes from the four corners of the earth, and there are many primulas which are easily grown and are adapted to almost any locality. Primulas are a challenge to the gardener's cultural skill and offer a wealth of varied material for satisfying his artistic ability. Grouped with a proper background of shrubs, and with other herbaceous material, and following a sequence of color, the gardener can create a picture of lasting beauty. If the garden is large, the picture can be breathtaking, if it is small, it can be a gem.

Since primulas, especially the species, are at their best when in a natural setting, the wealth of native material which nature has so lavishly supplied, should be used whenever possible, for there is no better design than that developed by nature. A study of the garden picture of a mountain meadow, will teach us the principles of this design,—the value of sequence in size and color of not only the flowers, but of the foliage, the manner in which the different materials are grouped, the arrangement which gives a feeling of drift movement,—all showing the unusual and almost startling effects created by contrasting colors. The whole scene gives one the feeling of harmonious unity.

Primulas are perfect for the shady garden, because the ABC of primula culture is shade, moisture and drainage. These three are variable, depending on whether the primula in question is a woodland type or an alpine. Most of those mentioned in this article can be grown successfully with some shade during the noon hour in summer, with plenty of moisture when in bloom, and with adequate drainage in winter. A deciduous tree or group of trees, around which have been grouped evergreen and deciduous shrubs, is the key point of the garden and the foundation of a perfect setting for the primula planting. If these shrubs are selected from a list of those having the same cultural requirements, the maintenance is greatly simplified. The owner of a dogwood, oak, maple, ash, or other native tree, is indeed fortunate. If, however, the trees have to be planted, and rapid growth is desired, any of the Prunus family, the
many flowering plums, cherries, crabs, apricots or peaches, would be a happy choice. Should a single tree be desired, it is preferable to select one of spreading habit, if a group of three, they should be of the same variety and of upright habit. It is also advisable to select an early flowering variety for use with early flowering primulas or a later blooming tree for the later primulas. Since the blossoms of these trees range from white through apple-blossom pink to cerise, the color sequence of the primulas should be in harmony. For instance an early flowering tree is fine with acaulis and polyanthus primulas, and a deep rose peach with the japonicas and pulverulentas. In selecting flowering shrubs, follow this idea of blending colors and producing contrasts. But there is no intention, in this brief discussion, of attempting to deal with the problems of the landscape architect and gardener. However, in planning a primula planting, other plant material and its arrangement must necessarily be considered.

The broad-leaved evergreens should be grouped under the trees, using the broad-leaved material immediately underneath, and gradually stepping down with the smaller leaved material, always using an irregular number of shrubs, and grouping the varieties. Among the broad-leaved evergreens which are shade loving and thrive under the same general conditions, the following are suggested: Rhododendron, Camellia, Acuba, Lauristinus, Portugal Laural, Photinia. Since Rhododendrons and Camellias grow more slowly, they are more desirable where space is limited. The smaller leaved evergreens include: Andromeda, Escallonia, Daphne, Eunonymus (of upright habit), Kalmia, Skimmia, Mahonia. The third group may be selected from: Berberis, Box, Cotoneaster, Abelia, evergreen Huckleberry, evergreen Azalea, Heather. For grouping in the sunlight at the outer tips of the trees and for use with the earliest flowering primulas such as Denticulata, Acaulis, and Polyanthus, the following deciduous shrubs are suggested: Forsythia, single or double Kerria, Spirea and Philadelphus. The later flowering group, such as Deutzia, Viburnum, Weigela, and Buddleia, is desirable with the Candelabras, including Japonica, Pulverulenta and Bulleyana. The list of herbaceous material can include ferns, Astilbe, Hemerocallis, Columbine, Funkia, (both cordifolia and the dwarf lavender variety), and white, yellow or lavender Epimedium. While the material mentioned is especially adapted to the Northwest, similar shrubs and plants suitable for other localities, should not be too difficult to find.

In planning the grouping of evergreen and flowering shrubs, as well as the herbaceous material, strive for unity of the whole, that is, follow a sequence of color in the foliage of the shrubs and herbaceous material as well as in the flowers. Use contrast in form of foliage as well as in the color of the blossoms. For example, consider a yellow color scheme, using Forsythia bushes as a background for Acaulis or Polyanthus. Plant ferns under the shrubs as ground cover. Group the primulas at the base of the shrubs, starting with white at either end in the shadows of the shrubbery; proceed with cream through primrose yellow, deeper yellow, orange shades, flame and scarlet to purple. Use less of the white and red shades, the largest percentage being light yellow. The strong colors should be out in the light and the pale shades in the shadows. For accent, use a small group—three or more, depending on the size of the planting,—of Juliae Hybrids, such as Helenae, Wanda, Primrose Lodge, or any of the purplish-blue, burgundy or fuchsia shades of this group of Asiatics. An alternative accent is a planting of deep blue Denticulata. On either side of the primulas, as a background, plant some Hemerocallis and next a group of Columbine. The slender spied foliage of the Hemerocallis contrasts with the feathery gray of the Columbine, and the deeper green of the Polyanthus foliage. A small drift of Epimedium would be an excellent finishing touch. The transition from the flowering to the evergreen planting can be Berberis Darwinii with its glossy green foliage and bright yellow flowers. The evergreen planting can be Rhododendron, Mahonia, evergreen Huckleberry and evergreen Azalea. The yellow blossoms of the Mahonia and the bronze foliage of the Huckleberry blend well with the yellow primulas. Groups of Primula Bulleyana planted between the Huckleberry add an extremely interesting note as the terracotta buds and orange flowers push up through the bronze Huckleberry. The Bulleyana will be at its best when the polyanthus is past its prime.

Another primula setting might be of white flowering shrubs as a background for a mass of Polyanthus, Japonicas or Pulverulentas, in shades ranging from white through shell-pink, deeper pink to rose. This particular arrangement is unusually beautiful by moonlight. With this, Camellias, Kalmia, Andromeda, Daphne and Heather would be especially appropriate for the evergreen shrubs. Pulverulenta flower heads blend beautifully with the soft pink blooms of Kalmia. Primula Sieboldii is particularly charming with this group, or as a companion to Pulverulenta.

Visualize Primula marginata spilling out of a rock crevice, at her feet a drift of white, mauve and heliotrope Denticulata-Cashmeriana hybrids, the silvery foliage blending with the mossy, gray-green rocks. That could possibly be a better accent for this scene than the brilliant pink of Rosea, or of some of the brighter Julias? Then too, Auriculas, with their tidy rosettes of light green foliage and soft colors, lend themselves to exquisite arrangements in the rockery. Their pastel or half tones, some with a suggestion of green when the flowers are newly opened, most unusual opportunities for a delicate color range. Should you be the proud owner of a handsome scarlet or blue Auricula, you need not search further for a more stunning contrast.

Among the hardy primulas which extend the flowering season into summer, are Sikkimensis, Florindae, Chionantha, Helodoxa, Microdanta, Waloni, Nutans, Littoniana and Mooreana. Both Sikkimensis and its later blooming relative Florindae, are pale yellow and fragrant. These two, with Helodoxa, a deeper yellow, planted in separate groups near each other, are especially suited for the shady banks of a stream. Both Florindae and Helodoxa will take more moisture than Sikkimensis and can be planted nearer the water. Florindae, given the right location, will grow into a magnificent "Amazon". Chionantha, with its delicate ivory blooms and golden meal, Microdanta, in any of its three forms, and Waloni, the color of port wine, deserve consideration among those selected for early summer blooms. For midsummer, Nutans and Littoniana are outstanding primulas, although, in some localities, they have to be treated as
biennials. Nutans is lovely for its nodding, lavender-blue flowers, and Littoniana for its sensational flower spike, unique in primulas, Mooreana, the "heliotrope" of primulas, because of its fragrant purple flowers, is the last to bloom in the Fall, and since Chionanthus sometimes blossoms then, these two may be planted together. Do not overlook the desirability of using native material with these "wildings" of Asia. All the Asiaties afford an excellent opportunity for combining sequence of color and sequence of blooming period, which are interrelated and can well be considered together in selecting primula material.

There are many other primulas, both species and hybrid, suited to the wild garden, the border or the rock garden, that can be used to develop almost endless sequences of color and time of blooming. One's imagination is fired by the prospect of new species being brought by airplane out of China, Tibet, India and Burma. Plant lovers in the armed forces, from Italy to the Aleutians, have their eyes open for new varieties, and even now, seeds are finding their way to us. One can truthfully say that we have just started on our adventure of growing primulas.

THE PRIMROSE PATH

Laura B. Karnopp

I loiter pensively along the primrose path,
The morning bright on every prim in flower,
They beckon me that I would give them pause,
And seem to speak of mountain top or bower.

The little yellow primus,—first to bloom,
Takes me to English wood-lands lush with spring,
I see a royal queen forget her gloom,
And blithely fill her jeweled hands and sing.

I climb the snow clad slopes of Apennine,
To pick the dainty, frosty flowers that blow,
I cross the Alps and see the drifts of spring,
Beneath the very avalanche of snow.

If I but let these sirens lead me on,
I sink in marshy fens of Hindustan,
Their candelabra heads now beckon me,
And try to lead me then to far Japan.

I'm back again, there on the primrose path,
But battle-grounds seen: dim and far away,
And over them are primrose drifts and fields,
And God is in our troubled world to stay.
large-flowered plant, of a shade of pink known in England fifty years ago as crushed strawberry but which today could be described as dusty old rose. If happily grown in deep, rich leaf mold, given mottled sunshine and plenty of water, this plant is a stunning sight when in full bloom. I like to grow another old English variety called Nellie Gray near it. They are so complimentary to each other, the crushed strawberry acaulis and the very, very pale blue polyanthus. Both are early bloomers and very hardy.

Late Winter Arrangement of Polyanthus
Carl Starker

Primroses by Mrs. R. M. McClary

Budded sprays of the double pink primroses have been used as a background which, together with the primroses, give a very definite feeling of approaching spring. Polyanthus in shades of lavender-pink, yellow and cream were clustered with foliage for the focal point. The crinkled and wavy-edged leaves were chosen as being more interesting for arrangement material.

Various stem lengths have been used to give depth and shadows and to vary the outline, and the deeper colors were kept low. The whole arrangement is a radiating one from the common center which effect is added to by the lines of the bowl, a leaf-shaped container with a soft green outside glaze and a lining of mulberry-lavender.

COLOR IN THE AURICULA
Donald O'Connell

The modern hybrid Auricula displays one of the most diverse color ranges in the floral kingdom. It includes not only the red-yellow and blue-violet hues, but also green, brown, and gray. This wide divergence of color is one of the principle reasons for its widespread popularity. Therefore it is of importance that we understand the agents which make possible this marvelous variety.

Of the several coloring pigments found in the Auricula, the most important is hirsutin, which the modern Auricula inherits from P. hirsuta. This pigment is found in solution in transparent, pear-shaped cells which replace the normal epidermal layer. When it is the sole coloring agent of the flower, this layer can be peeled off, revealing a white underlayer; but the underlayer is often colored by other agents giving the effect of the two colors combined.

Hirsutin is sensitive to acidity. When the acid content of the hirsutin cells is high, the flower color is crimson; when neutral, it is violet; and when the cell content is alkaline, it is near blue.

However the pH of the soil has little or no effect upon the flower color, because the hirsutin cells possess “protective permeability”. This is the ability of the cell wall to admit or exclude alkaline ions carried to them by the petal sap. When the petal sap, which is usually neutral, becomes strongly alkaline, some of the cells are no longer able to exclude the alkali; and the result is a bluish-cast red. All red Auriculas which are colored by hirsutin contain these unresisting cells to some extent, particularly on the underside of the petals.

The pigment is also directly inheritable, and it can therefore be bred into strains colored by other agents.

Pelargoniin and delphinin are pigments which cause vivid scarlets and rich, true blues respectively. They are found in epidermal layers composed of cells similar to those containing hirsutin. They are more fixed in color however and, being products of photosynthesis, are found only in the presence of chlorophyll.

Also of great importance are the two yellow flavons found in Auriculas. They are responsible for all the yellow shades. They are inherited from the true P. auricula; and, when alone in the petals, they produce shades of lemon yellow and buff yellow. But since they are evenly distributed throughout the flower, they are frequently overlayed with hirsutin.

When this is true, the combination results in hues of orange, maroon, and brown with the lemon yellow flavon, and orange yellow, beige, tan, and several gray-tinted shades with the buff yellow one.

One of the most unusual tendencies found in Auriculas is virecence, or the presence of chlorophyll in the flower petals. The normal petal cells are actually replaced by cell structures identical with those of the plant leaves. These petal-leaves bear veinings and corrugations similar to those of the true leaves.

The effect of this transformation is the celebrated green Auricula. The chlorophyll is often present in reduced quantities with the yellow
flavons, causing greenish yellows and drab greens. When overlayed with hirsutin, the effect is a blackish or muddy slate.

The chlorophyll of these petal-leaves is occasionally partially or even completely replaced by xantophyll, one of the coloring agents found in autumn leaves. It produces dingy whites, washed yellows, and greenish whites. It sometimes causes fading in virescence Auriculas and those colored by pelargonin or delphinin.

Besides the above coloring agents, many Auriculas are given a laced or edged appearance by meal. This meal consists of minute wax-secreting hair cells similar to those causing furina on the leaves. The edges often seen on Auriculas, particularly the green ones, are caused by an overlay of meal upon a green area. When the overlay is heavy, the edge is white; but when it is lighter, the effect is a grey edge.

White flowers are the result of an absence of all coloring agents.

**Controlling Seedling Damp-Off**

There are a number of precautions a gardener can take against the damping-off of seedlings. Before planting the seeds make sure that the containers are thoroughly clean by washing them in a solution of permanganate of potash. Sterilizing the soil and coating the seeds with a fungicide will also reduce the danger of damp-off. If sphagnum moss is available it can be used in place of sterilizing the soil. The United States Plant Introduction Garden at Glenn Dale, Maryland, found that by using a top layer of shredded sphagnum moss, from one quarter to three quarters inch thick, and sowing the seeds in this medium (which was put on top of badly infested soil for the experiment) seedling losses from damping-off were controlled.

Other measures are sowing the seeds thinly to allow a good air circulation at the soil surface, placing the seeded containers in a cool place where the air circulates freely and, when seedlings appear, gradually allowing only small amounts of morning sun. Avoid frequent, light, top sprinklings but keep the soil moist by placing the containers in water which method insures adequate moisture at the roots without excess surface moisture. A solution of permanganate of potash (enough to color the water a light purple, not more than one scant teaspoon to 2½ gallons of water) is a preventive as well as a mild fertilizer. Having a good fungicide on hand often saves a crop of seedlings especially in protracted sultry periods which is the type of weather conducive to damping-off.

**Note:** Mrs. Clarke has chosen the primula material for her article on page 99 from Mr. Frank F. Beattie’s article “Primulas That Flourish in Western Ontario” which appeared in the October, 1943 Quarterly. Mr. Beattie not only listed the many varieties of primulas that grow in his garden in southeastern Canada but gave a fair idea of the treatment and situations as applying to successful culture in the east. A more detailed article by Mr. Beattie on the culture of those types chosen by Mrs. Clarke will be published later.

Any plant that can survive the severe changes of seventeen Maine winters and summers and still retain the happy vigor of its youth, can surely be given unqualified recommendation. At least one plant of Primula auricula has been in my garden that length of time, now increased to a little colony. It is the first auricula that I grew from seed and is a nice, deep buff, ruffled, of the color called in the days of Parkinson, a ‘leather coat’.

This plant was the sole fertile seed in a packet purchased before I knew anything about Primulas or how to grow them successfully. Shortly after, a little catalog came from England titled “Douglass Gold Medal Auriculas”. The description of these lovely flowers made so deep an impression that an order was dispatched at once for seed. That was the beginning of an absorbing interest in auriculas. I still keep the little catalog, very tattered now, but the descriptions never fail to excite a desire to grow more and more of these flowers that have proven so very hardy and satisfactory. I wish all gardeners in the East could realize that the auricula, given just a little intelligent attention, is the one Primula to be counted on to live on indefinitely, as the foregoing should prove. By intelligent attention I mean to emphasize consideration about good drainage, water in summer drought, a little winter covering, etc. These, with some shade for a part of the day and a good soil full of humus and grit, will insure success.

Of the many hundreds of plants in the garden all were grown from seed by myself. Those who grow them know that they are rather slow in the first development, and patience is necessary. Having no greenhouse, I start the seed from early autumn into the first months of winter, and grow them on in the house during the winter. By spring they are fine, sturdy plants, and are large enough in early autumn to stay out in the open ground. I do not pamper them for I want them as garden plants, instead of specimen plants in a frame. All are absolutely hardy. The only thing gained by keeping them in a frame would be to shield them from spring rains, the storms being so violent at times that flowers are torn and shattered.

I prepare the seed-box with drainage in the bottom and unsifted soil to about one inch of the top, then sift a combination of sand and humus evenly over the top, press down firmly, sow seed and water the flat by immersing and cover tightly with a pane of glass. I do not cover the seed with soil at all, just press it down firmly. I have wonderful success with this method. If the seed is fresh I have seen germination start in three days.

The great color variation of the flowers is one of the exciting things about auriculas. Almost no two are exactly alike and there is always the possibility of one turning out to be a green-edged type. Probably the best green-edge is composed of a fine, white mealed center, or paste, then a zone of almost black and a pronounced green edge. Then, there are the green-edged fancies, which have yellow in place of the black zone.
These are very quaint and unusual flowers. The texture of the green flowers is heavy, and the bloom remains fresh for a long time.

Among the large-flowered types are some of the most delicate and appealing colors, such as pale beige and gray, colors not often seen in any flower. From the best seed some very striking kinds will result such as pure bright crimson, or Chinese lacquered with a pure white paste thick with meal; another, black with snowy paste, small, but very perfect and correct of form, thorn-eyed. One of the loveliest is a deep, pure, dark blue ruffled, with center like snow. Some have lovely yellow centers and the body-color shades from very deep out to a delicate hue towards the edge of the flower. These shaded flowers are very choice.

The plants vary greatly, too, in leaf and size. Some are really beautiful without the flowers, coated as they are with meal and the foliage so fresh and firm. Often a leaf will stand up at the back of the flower truss. One interesting plant had six or seven flower clusters and every cluster was surrounded by a little collar of leaves directly below the flowers making a perfect corsage. Not one was without the extra adornment of about five leaves, all high up on the stem.

In the Spring Flower Show, 1941, of the Massachusetts Horticultural Society, I staged an exhibit of one hundred auriculas in a little, rocky hill-side garden with evergreens. I was awarded the Bronze Medal of the Society, which is given only for horticultural achievement. I feel quite certain that it was the first time an exhibit devoted exclusively to auriculas had been seen in Boston. It is my hope to show them again, perhaps next year. I would be able to do much better another time with more plants to show Eastern gardeners the rare beauty and usefulness of this hardy and long-lived Primula.

**Growing Auriculas 100 Years Ago**

"Many elaborate directions have been given for preparing the soil for the Auricula; and while some writers, as Justice, recommend rotten willow-wood and old cowdung; others, as Emmerson, recommend bucklock's blood, sugar-bakers' scum and concentrated night-soil. The plants, however, will grow and thrive on any rich loamy soil, by merely turning the compost heap over with them; or, in a mixture of leaf-mould, or thoroughly rotten cowdung and loam. They will even grow well in heath-soil mixed with loam; and this is the soil in which they are commonly grown in the neighborhood of Paris."

—From Mrs. London's 'The Ladies' Companion to the Flower Garden,' 1846.

**For Eastern and Northern Members**

We are greatly interested in having a short report from eastern and northern members on the primroses blooming in your gardens in April, May and June, how they wintered and what protection, if any, was given. Please send reports to the Secretary, Mrs. S. R. Smith, Route 16, Box 102, Portland 2, Oregon, to be read at the May 16th and June 20th meetings of the Society.

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**PRIMULAS OF SWITZERLAND**

J. G. Bacher

My first acquaintance with that lovely queen of spring flowers, the primrose, began nearly sixty years ago in my father's old orchard. As a very small boy it was one of my great delights to go out in early spring and look for flowers that were usually to be found first under some apple trees of our small family orchard. First to show color were clusters of the common snowdrops, as dainty and charming as the first sunny days of spring for folks living in a cold climate. Then soon these snowdrops would be joined by little groups of the common muscari with their tiny cones of rich blue spikes of roundish bell-like blossoms, the flowers showing soon after the stems appeared above the ground and gradually becoming taller and more attractive. Within a few days the ground would be enriched by attractive groups of the yellow cowslips here, there, and everywhere underneath the old trees. That color combination of white, blue and yellow did have a strong appeal to my childish mind and left such a deep impression it has never been forgotten.

Most youngsters at that age delight in gathering these flowers, but mother's instruction was to leave them alone for she was the gardener of the household and picking flowers was taboo for us children. Each year when spring arrived with the thawing of the snow, we would try to outdo each other in finding the first flowers to tell mother about, and one certain spot in the orchard always produced the first blooms not long after the ground was free from frost. The cowslips, or Primula officinalis, with their one-sided clusters of yellow tubular flowers were to be found in many places, of course, and frequently in hedge rows and near streams where soil remains damp nearly the year around.

Later, as a student of the Garden College in Geneva, botanizing trips into the mountain regions were made with the classes. Acquaintance was then made with Primula farinosata, that dainty little pink-flowering species so frequently observed growing in open spaces and masses in damp, or wet draws along mountain streams and below glaciers. The very abundance and frequent occurrence of such colonies left us almost indifferent to its miniature charm.

However, when we reached the greater altitudes of limestone formations we did find great pleasure in discovering the yellow Primula auricula frequently oozing from the cracks of split rocks. No trace of soil could be seen, yet their deeply penetrating roots reached into humus deep down under the rocks and it was usually next to impossible to extract such plants without destroying them. Occasionally, of course, some would be found in drifts of stony rubble and such could be collected quite safely. Collecting plants, however, by student groups is not a policy in Switzerland for they believe too much in nature study and all we were allowed to gather were those to be used for herbarium specimens only. I can appreciate such practice much better now than I did then, but obedience to one's leaders is so deeply ingrained there that orders are carried out to the letter if one wants to be a first class scholar. Year after year groups of students can make their botanizing excursions to certain
spots and always find the same flora, learn the same lessons and find inspiration that often remains a lifetime as it has with me.

If only we could do likewise here, then we would have so much more of charm and interest in our superb region where the flora once was abundant and glorious but which is rapidly vanishing and can hardly be observed any longer except in the most remote and little known localities. It is a tragedy of our modern world and future generations will read with amazement of the disappearance of our finest native flora.

The mountain ranges of Switzerland are immensely diversified and so is its flora, and for the average garden student to follow up a definite plant family for study purposes is beyond his means since he must work to learn his trade. Books are the one link to a fuller grasp and occasional trips for observation and study. Primula viscosa is found on high ridges growing much like the auricula but with lavender flowers and rather sticky foliage as distinguishing features from the auricula which it resembled in other respects. It is P. viscosa that has served as one of the parents with the true auricula species resulting in the modern hybrid garden auriculas that are so popular, particularly in Great Britain.

Primula latifolia is also one of the Swiss species found chiefly in southeastern Cantons. Its foliage is larger than P. viscosa and the leaves are smooth while the flowers are of deep rose borne in clusters on stems much the same as P. auricula. The plant is without meal for that is a trademark of the auricula proper. In this same region one may find Primula longiflora which has some resemblance to P. farinosa but the flowers are much larger and the corolla, which is deep rose with yellow eye and red center, is borne on a long tube. Nearly all of the primulas grow at altitudes of from 5,000 to 7,000 feet. As the snow melts in the higher regions the first primula to be seen in bloom is usually the tiny species known as P. integrifolia, a very bold and attractive miniature with flower stems of a reddish color bearing two carmine-red blossoms of rather generous size for the two inch stem supporting them. These occur rather sparsely in the central ranges of the Alps along edges of moraines and alpine meadows.

One of the most delightful features of alpine primulas is the company in which they are found and which is so charming in many respects. In the highest altitudes the androsaces play the chief role of beauty queens while the primulas are princesses of the court. Then the pages come forth in the form of gentians such as Gentiana verna, bavarica, acualis, exsia—all glorious, intense blue producing such a marvelous contrast to the pink and rose colors of the primulas and the yellow of the auriculas. The carpets of Androsace helvetica with its star-like white flowers remind one of miniature pincushions studded with stars. Androsace glacialis, very similar in growth, is covered with tiny pink star-like blossoms. One also finds here and there in the highest regions that unforgettable blue Erirrichium nanum, a miniature forget-me-not-like plant that has a charm so unique and rare as to be called the treasure of the highest Alps. No one can visualize the exquisite nature of this plant unless it is seen in its native habitat. Under cultivation it proves the most obstreperous of all high mountain flowers. Perhaps this unwillingness to grow for us in the lowlands is due to its unique location near permanent glaciers where heat and dry air never strike it.

The growing of primulas may well become an art but so much richer will it be if they can be associated with their natural companions from the same regions. Then, in addition to the art element, will come the need for extreme skill, but the results will justify every effort put into the task.

Reginald Farrer on Erirrichium Nanum

Mr. Bacher's mention of erirrichium nanum makes Farrer's ecstasy appropriate here. "One pause, just to make sure of the bliss which is so hard to believe. Yes, this is no delusion...it is erirrichium itself. A calm glory of destiny fulfilled descends upon me. In another moment I am on my knees before the nearest tuft of blue, babbling inanities into its innumerable little lovely faces."


Seeds Now Available To Members

By writing to the Secretary, Mrs. S. R. Smith, Route 16, Box 102, Portland 2, Oregon, any one or all of the following seeds will be sent on request as long as any remain on hand.

1. Primula florindae from the gardens of Mrs. A. C. U. Berry.
2. Candelabra type Primulas pulverulentata (red), pulverulentata Bartley strain (pink), Bulleyana (buff) in a mixture from Mrs. John L. Karnopp.
3. Although Meconopsis Baileyi, the sky-blue Tibetan poppy, is a degeneration from primulas, it grows in companionship with P. florindae in Tibet.

An outline of P. florindae, its culture and seeding was given in the January, 1944 issue. All of the seeds offered here may be grown under the same conditions. Inasmuch as the seeds will not have the action of frost at this time, a better germination can be had more quickly by either scarifying or artificially freezing the seeds as discussed in the same issue.

Membership Dues to the New Treasurer

All dues, renewals and new memberships, will please be sent to the newly appointed Treasurer, Mrs. O. J. Zach, Route 2, Box 155, Portland 10, Oregon. For the greater convenience of members dues are now payable every January 1st.
European primrose enthusiasts, realizing the beauty and value of Julias, have been working with them for many years. They introduced such varieties as Wanda, Pam, Hellenae and Gloria many years ago, and later gave us Kinlough Beauty, Jewel, Mrs. King, Vulcan and many others.

But it has only been during the past few years that American primrose growers have realized what they were missing in not growing some of these hybrids. With the possible exception of one or two, no one took any interest in them as far as trying to introduce new varieties, until two or three years ago. One reason was that no one had a seed bearing strain, as few of the old varieties produced much, if any seed. The first varieties introduced were what might be called "one-colored"; that is, they were in shades of bluish or reddish-purple, and all acaulis type. Now we have them in a wide range of colors, both acaulis and polyanthus forms, including white, cream, yellow, blue, lavender, henna-red, crimson mauve and several shades of pink.

Listing only a few of the newer varieties, some of the best white Julias include Mrs. Nettie P. Gale which is a very vigorous grower with foliage of a heavy texture, large flowers of pure white which, under some soil and/or climatic conditions, turn a light shade of pink as they age and increase their beauty accordingly. It is an acaulis type. Schneekisen, given the Award of Merit in 1937 by the Royal Horticultural Society, England, is one of the most floriferous of the Julias. The large, pure white flowers cover the creeping plants from early spring to May or June, and again in late fall and practically all winter if given a little protection. Snow Bunting, as the name implies, has snowy flowers borne on short stems in the acaulis manner. The plant's habit of growth is very compact.

A real triumph was the breaking into the yellow and cream shades. Julias hybrid Dorothy was the first and the pale, primrose yellow flowers, deeply cleft and carried in an umbel on four to five inch stalks, give the effect of a dainty, miniature polyanthus. Lady Greer came later, is a polyanthus like Dorothy, but is several shades lighter, a true cream color.

Of the blue Julias, Kay was probably the first to be offered to the public and the large, blue flowers nestled amongst the crinkly, bronzed foliage, acaulis-like, was undoubtedly a sensation. Bunt is also a fine blue of a shade or two lighter than Kay.

The lavender Julias usually have a touch of pink which adds warmth to their beauty. Springtime is a strong, compact grower that carries its large, lavender pink flowers on short stems amongst the bright green foliage like an old-fashioned bouquet. This is not the European variety which is listed as Verwanli Springtime and introduced years after Oregon's Springtime. Roberta is also a good lavender that might be called orchid because of the touch of pink. The foliage is a beautiful, bright green and the blossoms are carried well above the foliage.

Dorette is a very new hybrid which has made possible another color to the Julias, being close to a henna-red. A polyanthus type, it is without a doubt one of the most outstanding introductions of the past several years.

Chief Multnomah was one of the first American introductions and served as ambassador in the east and mid-west to show primrose enthusiasts that the Julias could be grown in their sections of the country. Its ability to "take it" by withstanding more sun (without fading or burning) and drought, led the way for other Julias types. It produces large, purplish crimson flowers on six inch stems above glossy, bronzed foliage. Crimson Glow, one of Chief Multnomah's seedlings probably by Primrose Lodge, is a rich, deep crimson polyanthus Julias bearing its umbels on six inch stems above large, beautiful leaves. Like the Chief it is very drought resistant.

There are some good pinks and one of the best is E. R. Janes which could probably best be described as a glowing, shrimp pink.

Julias offer all this, and ease of culture, too. They are perennially satisfied as long as they have the cool, moist situations. Some are adapted to carpeting and all are excellent as edging plants and in the shady parts of rockeries.
The function of reproduction in plants is interesting not because of its difference from that of the animal kingdom but because of the marked similarity. A brief outline of the process is all that is feasible here and so much of interest is necessarily omitted. The pollen grains, containing the male cells, are developed in the anthers and are transferred when ripe by various agents to the stigma which is coated with a sticky fluid to hold the pollen grains and provide nutrient for their development and germination. From its position on the surface of the stigma, each pollen grain develops a long, slender tube which penetrates the stigma and grows down the style in order to carry the two sperm cells into the ovary. (For diagram showing these parts of a primrose floret see page 57, volume 1.) Once in the ovary, each tube approaches and enters an ovule, reaching the embryo sack which harbors the egg cell. When one of the male cells fuses with the egg cell, fertilization is complete and the prime mission of the plant's flowering has been accomplished. Blossoms then wither rapidly and the plant devotes itself to maturing the seed.

Plants are pollinated either by natural means or artificially, the most usual agents in nature being the wind for inconspicuous blossoms and insects for the more conspicuous equipped as they are with such attractions as color, fragrance and nectar. Artificial pollination, of course, is accomplished by individuals who select certain plants and place the pollen from one on the stigma of another, unless a plant is to be fertilized with its own pollen. The reproductive organs of the majority of plants are complete in each floret, that is each blossom carries both stigma and anthers and is therefore potentially independent of other plants for its fertilization. All primroses are of this type and present these organs in two different arrangements depending upon the length of the style, the long style projecting the stigma above the anthers and the short style keeping it below.

Although this is not meant for an article on breeding primroses, the season is at hand for pollinating and there may be those who wish to embark on this simple and fascinating venture for the first time. For those, the following abbreviated procedure is offered as one method of pollinating by hand. Taking the polyanthus as an example, the first step is to select the parents for form, color and size for the eventual attainment of all three. Those plants exhibiting all three characteristics at the beginning of hand pollination produce outstanding results in one or two generations.

When the blossom first unfolds from the bud is the ideal time to pollinate. The stigma is receptive, the pollen is still green, which means that it has not self-pollinated, and there is small likelihood that bees have had a chance to probe for nectar thereby introducing undesired pollen. Emasculation, or removal of the anthers from the plant, is simply accomplished by taking hold of the blossom with both hands, tearing it in half and pulling the floret, with anthers attached, from the calyx. This act also removes all attraction for insects.

The blossoms of the plant supplying the pollen, which are necessarily more mature to allow time for the pollen's ripening, are pulled apart in the same manner and each half of floret held so that the anthers spread apart like fingers. It is then very easy to rub the anthers over the stigma of the seed bearing parent when held in this position. In this way the stigma is completely coated with the pollen of the intended cross with small chance of foreign pollen finding a foothold. However, in true scientific work, the pollinated plant is bagged in cellophane or wax paper. Since there are five pollen-laden anthers to one stigma, an excess of pollen always exists. If the pollen bearing parent is outstanding enough to warrant its use in fertilizing many plants and there is need to hold it over, the pollens remains potent for days when put in a tightly covered jar and stored in the refrigerator.

It is unnecessary to remark that pollination should be done on a clear day, but even the clearest days in April develop sudden showers, in which case bagging will prevent the rain washing the pollen. Each plant that is pollinated should be labeled according to the cross made. In this way the identity of the seedlings is kept for future breeding purposes.

One of the marks of a well-bred primrose is the thrum-eye, the short-styled type of bloom that has the stigma hidden in the tube and the anthers in full view at the entrance. When crossing a thrum with a thrum, a very large percentage of thrum-eyed children is a natural result. This is called "illegitimate" pollination. Two other illegitimate forms of pollination that are possible but have little or nothing in their favor are a cross between two pin-eyed or long-styled types, and self-pollination. The first would be flying in the face of good form and the second, if continued for any length of time, would result in a loss of vigor. "Legitimate" pollination is the crossing of the long-styled with the short-styled, the pin with the thrum, or vice versa.

As pointed out by a keen student of plant breeding, this latter type of pollination was thought to be the only possible one by most of the botanists who expressed themselves on the subject. Credit goes to Dr. Helen M. Gilkey, Associate Professor and Curator of the Herbarium, Oregon State College, for finding the following reference in Knuth's Handbook of Flower Pollination, translated in 1909 by J. R. Ainsworth Davis of Trinity College, Cambridge, England. It will be noticed that the lower rate of fertility in illegitimate pollination is due to a mechanical impedance. The pollen grains of the thrum-eyes are longer while the stigmatic papillae of the same type is shorter, a case of putting a large thread through a small needle.

Reference: "Primula. The pollen grains of the long stamens are larger than those of the short ones, and the stigmatic papillae of the long styles are longer than those of the short styles. Darwin's researches showed that 'legitimate' pollination, in which the stigma of the long (or short) style receives pollen produced at the same level by the anthers of the long (or short) stamens, results in a much higher degree of fertility than 'illegitimate' pollination. . . . Legitimate unions were 11/2 times as fertile as illegitimate ones. These results were confirmed by the investigations of Hildebrand, who further proved that when flowers were artificially self-pollinated fertility was at a minimum."
THIRD ANNUAL PRIMROSE SHOW
APRIL 12th AND 13th, 1944

Any difficulties of the times seem to melt before the enthusiasm shown by expectant visitors, exhibitors, those responsible for the third annual primrose show and members generally. January brought the first flurry of inquiries on whether or not there would be a show, and since February several members within a radius of 250 miles of Portland have indicated their intention of traveling by bus or train with baskets of primroses to exhibit. Portland members with extra rooms are returning the courtesy by offering hospitality to out-of-town members and listing their names with Mrs. A. W. House, 3594 S. E. Franklin Street, Portland 2, Oregon, telephone Lancaster 3391, who will be pleased to have visiting members write or call her.

The show is planned for April 12th and 13th and will be staged at the Portland Art Museum, Southwest Park and Madison Streets. It will be open to the public from 12:00 noon until 9:00 p. m., Wednesday, April 12th, and on Thursday, April 13th, from noon until 5:00 p. m.

Amateurs, professional growers and garden clubs, whether members or non-members of the American Primrose Society, are invited to exhibit. The rules governing entries are omitted here due to limited space but may be had by writing the Secretary, Mrs. S. R. Smith, Route 16, Box 102, Portland 2, Oregon.

The classification for exhibits is as follows:

CLASSIFICATION

AMATEUR DIVISION

(Rare species and forms in following Amateur Divisions, Nos. 1 to 7 inclusive, must be shown non-competitively in educational exhibit).

DIVISION 1. ACAULIS (One plant in pot)

Class 1. Violacea.


Section A—Species, Educational Exhibit—Acaulis rubra (P. Sibthorpi). Section B—Hybrids


Section C—Double

Class 9. Colors and patterns may be shaded, penciled, ticked and/or striped.

DIVISION 2. POLYANTHUS (One plant in pot)

Class 1. Cowslip and variations, Educational Exhibit—Leucanthemum (Caucasian Oxlip).

Class 2. Oxlip and variations.

Section B—Hybrids


Section C—Double, Educational Exhibit

Section D—Bizarre

Class 11. Colors and patterns may be shaded, penciled, ticked and/or striped.

Section E—Novelties, Educational Exhibit.

Hoe-Plant, Jack-in-the-green, Green, Fantablon, Galluken.

DIVISION 3. JULEA (One plant in pot)

Competition

Class 1. Juliae.

Class 2. Hybrid (Known as Juliana forms)


Hoe-in-Head.

DIVISION 4. AURICULAS (One plant in pot)

Section A—Species, Educational Exhibit

Auricula.

Sectio...
SEEDING MEDIUMS

Most gardeners are experimenters. This is particularly true in regard to soil mixtures. Therefore, several members of the Primrose Society were asked to give their favorite seeding soils.

Mrs. S. R. Smith uses a combination of:
1 part screened sphagnum, 1 part sand and a little soil.
The sphagnum must be well screened or it clots on the roots, making transplanting very difficult. The young seedlings should be transplanted a little sooner than usual when grown in this mixture, but it is labor saving as the moss retains the moisture.

Mr. Stark has had success by sowing in the open ground, under the shade of tall trees. For seeding flats, he suggested:
1 part garden loam, 1 part sand, 1 part peat, or screened sphagnum.
Mr. Paul Van Allen sows the seed on a thin layer of sand over ordinary garden soil and covers it lightly with a little sand. He has had germination in 16 days using this method and particularly recommends it for auriculas.

Mrs. A. W. House sometimes sprinkles her seed on the top of old seed beds, with a layer of peat to hold the moisture if necessary. One must be careful, however, lest the sowings of previous seasons become active. Mrs. House recommends a teaspoon of permanganate of potash mixed in the soil, or watered in as this encourages strong root development.

Mrs. Peters sows in an equal mixture of peat and loam and has had little trouble with damping off. She lines the bottom of the flat with moss to insure moisture at the roots. She sows in February, protecting the seedlings with a cold frame.

Mr. A. W. Davis uses the “Davis Spoon Method”. He allows the seed to attend to its own sowing and does no soil preparation. When the volunteer seedlings poke their heads up, he comes along and scoops them up with his spoon. What could be more simple?

Mr. Ewell advised that the primrose seeds be rolled in red oxide. This positively prevents damping off and also colors the seeds a bright red, facilitating even distribution.

Mrs. J. L. Karnopp advocates that seed should be sown immediately upon ripening. The percentage of germination is naturally very high at this period, and strong plants can be had by the time winter sets in.

The reporter’s experiment for this spring was:
4 parts fruit pulp, 2 parts sand, 1 part peat, 1 part finely sifted charcoal.

—Reported from the Society’s February meeting by Donald O’Connell.

In An English Meadow

“And there are Lent lilies, lords and ladies, and ground ivy, which smells herby when you find it trailing about; and sweet violets, and blue dog violets, and primroses, of course, and two or three kinds of orchis, and all over the field cowslips, cowslips, cowslips—to please the nightingale.”

—From Mary’s Meadow by Horatia Ewing.
Primula scapigera is not yet in popular cultivation but its early beauty and ease of culture will, in a few years, make it one of the most popular Asiatic primulas. The plant is very common in Sikkim, northeastern India, and grows at an altitude of from 7,000 to 10,000 feet in the Himalayas. Seeds of P. scapigera were sent by a captain of the Indian Army to Mr. G. H. Dalrymple in England who introduced the plant into cultivation in 1934. Two years after its introduction, P. scapigera received the Award of Merit of the Royal Horticultural Society.

The flowers are not always a delicate, apple blossom pink as are those pictured above, but range on through the deeper pinks and rose to rose purple. This primula, like so many, is extraordinarily floriferous and the foliage is entirely hidden when in full bloom. This particular plant has four, tightly packed bud clusters waiting for a bit more warmth to break out almost simultaneously and smother itself in pale pink beauty.

The leaves are small with short footstalks and practically without meal. They provide a quick means of propagation for, when pulled from the plant in the spring and kept in moist peat and sand, they develop robust root systems in such a short time that the plants usually bloom the following spring.

P. scapigera and P. Winteri (P. Edgeworthii) are probably the two best known primulas of the Petiolares Section. But whereas P. Winteri develops crowns much as lettuce heads and is subject to crown rot when not protected from rain or overhead irrigation, P. scapigera seems quite indifferent to the type of moisture it receives being more of the loose-leaf type. It thrives in a cool, moist situation in well-drained soil rich in leaf mold.

PRIMULAS ON KISKA

Several months ago I participated in the Kiska campaign. The Island, one of the westernmost of the Aleutians lying midway between the Asiatic mainland and our own, is one of those typically swampy affairs covered with tundra on the lower levels and on the higher points with rock of a volcanic nature. At one end of the Island a mountain dominates the surrounding lowlands and, although not high in comparison with the mountains of the northwest, its bulk achieves a majestic aloofness due to contrasting terrain. In many ways it reminds one of Mt. Defiance.

At the base of the mountain is a large lake separated from the Bering Sea by only a narrow barrier, a rock bar worn smooth by the pounding of the surf. It was there, along the edge of the lake, that I saw this large colony of primulas which covered nearly fifty yards of shoreline and which was ten feet deep at certain points. When I came upon them they were seeding so I contented myself by picking a pocketful—which, unfortunately, never reached the States—and examining the foliage. The lower leaves were from eight to ten inches long and from three to five inches wide. The seed pods extended several inches above the tuft making it the tallest plant on the Island. Although I have no love for Kiska, I wouldn't mind seeing that patch of primulas in full bloom.

—Sgt. Edwin L. Bechtol, Bushnell Gen'l Hospital, Ward C-4, Brigham City, Utah.

Note: The strap-like leaves of this primula and its location near a constant water supply indicates that it belongs to the Nivale Section of the family. In all probability this is Primula eximia which is native to the Aleutians and Pribilofs and so named because of its exceptional size and beauty. Botanical description has the leaves somewhat shorter, a five inch maximum, but the difference could be possible in a cultivated specimen and plants growing naturally and undisturbed. Or it might be a variation of the type. The flower stalk is described as being shorter, from four to six inches. The six to ten flowers that comprise the umbel are purple and about three-quarters of an inch across; petals, oval to pointed and unleft.

Sgt. Bechtol's tunic with the pocketful of seed pods was left on Kiska after he was wounded and returned to the States.

To the Editor:

At your request I am sending you my method of scarifying primrose seed which, however simple, has produced most gratifying results to date.

I place the seeds between two layers of emery or sand paper (medi-
(Continued on Next Page)
1944-45 PROGRAM

APRIL, 1944
Election of Officers

MAY

Demonstration illustrating the adaptability of primroses in arrangements.

Mr. Carl Starker

Reports from eastern and northern members on primroses blooming at this time and their wintering.—Mrs. S. R. Smith.

Informal display of Auriculas, other European alpines and Asiatics.

JUNE


Mrs. Marguerite R. Clarke

Additional reports from eastern and northern members on their primroses.

Informal display

JULY and AUGUST

Plenics for members and their friends. Picnic places to be announced.

SEPTEMBER

Primula Sieboldii. Its native growing conditions, specialized culture in the Orient, types and varieties in popular cultivation in America. Culture, seed habits, how to propagate by root cuttings, summer dormancy.—Mr. Fred Borsch.

Early fall demonstration of dividing auriculas and polyanthus.—Mr. A. E. Brooke.

Preparing beds for fall planting.—Mr. Paul Van Allen.

Informal display.

OCTOBER

Asiatic primulas. Background, history, climatic conditions and descriptions of some of the well-known and favorite Asiatics. —Mrs. John L. Karnapp.

Report on observations and experiments made over the growing season and the primroses in their gardens.—Mrs. Ben Smith, Mr. R. M. Pugh.

Round table discussion on planting combinations for spring, 1945.

NOVEMBER

Old forms in double and single primroses. Old named varieties, florists' polyanthus, galligaskins, pantaloons, Jacks-in-the-green, hose-in-hose.—Mrs. Lou Roberts.

Observations, experiments and the primroses in their gardens.—Mrs. A. W. House.

Informal Fall Show.

To be announced in November.

JANUARY, 1945

Illustrated talk on auriculas and European alpines, use in rockeries and bedding. Study trips in Switzerland.—Mr. J. G. Bacher, Mrs. A. V. H. Turner.

FEBRUARY

Auction of rare seeds and plants.

MARCH

To be announced in February.

um) and rub gently with the fingers until I can just feel the seeds through the paper.

My first attempt was with seeds which had given me trouble in germinating the previous season, getting only thirty plants from approximately two hundred seeds. I put this down to the long period of time taken for the seed to reach me from England, October 1941 to April 1942. I only planted about one-fourth of the seed, keeping the remainder under refrigeration. With this latter I used the scarifying method and believe that every seed germinated. These were P. Lissadell Candelabra Strain, P. Asthore Seedling, P. Helodoxa, and P. Japonica White.

I had blooms from Lissadell Candelabra in October of last year. A thing done right today, means less trouble tomorrow.

May this help some other gardener to greater success.

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The American Primrose Society is a national horticultural society organized for the purpose of enjoying primroses mutually and as a center for the dissemination of knowledge. The Society offers to every member the opportunity to work in research and experiments; a voice in its government; the publications issued in January, April, July and October; especially fine or unusual seeds; the privilege of requesting information or articles of special interest; the beauty of shows and the enjoyment of private primrose gardens.

The publications are planned for the intimate reading pleasure of primrose hobbyists in all parts of the United States, Canada and Alaska and carry authentic articles from those sections. They are issued at advantageous periods for the primrose gardener and carry seasonal cultural information as well as articles of sentiment, travel, and exploration and more scientific pieces. They outline and illustrate how to use primroses in the garden and in arrangements: describe old European favorites as well as newly found species from Asia and America. Its readers are guided by growers and firms of high repute. The design is informal and friendly as primroses themselves to encourage friendships among those who share a mutual hobby.

The American Primrose Society also invites groups of primrose enthusiasts to organize and affiliate with the national group in Portland, Oregon.

Individual membership is $1.50 a year. For those who are especially desirous of furthering the objects of the Society, Sustaining Memberships at $5 a year and Life Memberships for a fee of $100 may be applied for.

The Corresponding Secretary, Mrs. G. H. Smith, Route 16, Box 102, Portland 16, Oregon, will gladly furnish information. If membership is wished, complete the application below and send to the Treasurer.

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