A Pictorial Dictionary of the Cultivated Species of the Genus Primula

DEDICATION
This volume of the Quarterly is dedicated in gratitude to Sir William Wright Smith and Harold R. Fletcher, Ph.D., D.Sc., because they are responsible for having revised and formulated the material from which the Dictionary is basically derived.

The Staff of the Quarterly has long been aware that it could not have edited the list of Species and Synonyms published in the 1953 Yearbook, if it had not been for the fine work contained in the Monographs of the Sections of the Genus Primula by Sir William and Dr. Fletcher. The Monographs, which took more than ten years to complete will be further described in the bibliography which will be in the October 1954 issue of the Quarterly.

Members from Europe, England, Canada and the United States, who realize the great work these two men have done for the Genus Primula, have petitioned the Board of Directors to grant Sir William Wright Smith and Dr. H. R. Fletcher Honorary Life Memberships in the A.P.S. These petitions were reviewed and unanimously and enthusiastically granted. An excerpt from Sir William’s letter of acceptance follows, “Be assured that I appreciate the honour suggested by the Board of the American Primrose Society in granting to Dr. Fletcher and to myself a Life Membership in the Society. I trust you will convey to the members of the Board, as well as the members in general, my appreciation of the honour which is proposed.” Dr. Fletcher writes, “Of course I will accept the Honorary Life Membership in the American Primrose Society. I am pleased and touched by this generosity and am just as honored to accept with Sir William the joint dedication of the next volume of the A.P.S. Quarterly.”

Short biographical sketches of both Sir William and Dr. Fletcher were published in the October 1952 Quarterly.

INTRODUCTION
The Staff of the Quarterly sincerely hopes that this Pictorial Dictionary will prove to be an important stepping stone for the work of others, for, as the late Lord Aberconway stated, “...gardening cannot, and botanical work will not stand still.” It is our belief that knowledge useful to gardeners should be freely disseminated, but since many illustrations are, and much of the material is elsewhere copyrighted, written permission must be given for reprint rights.
A great deal of work has gone into the compiling of the Dictionary, the Staff has given freely of its time and money to help publish it. Dr. Harold R. Fletcher, has helped raise the funds necessary for the engraving for the many illustrations, and, with Miss Ivy Spencer does the final proof reading, often under great pressure of time. Miss A. C. U. Berry has saved us many mistakes as she undoubtedly knows the species better than anyone in this country. Dr. Harold R. Fletcher, who is one of the two best informed men on the Genus Primula, has personally checked the list of species from which the names were compiled. Sir William Wright Smith has helped with illustrations as have the Royal Horticultural Society, The Botanical Society of Edinburgh, and Country Life. Leo Jellito, Walter Blasdale, Mrs. A. C. U. Berry, Kenneth Corrar, the Leys of Barnhaven, George Sherriff and George Taylor have added incomparably by providing illustrations. Our space is so limited that we can only mention the plant hunters who have brought these species to our gardens. We will endeavor, in the future as we have in the past, to have articles on their accomplishments. We are particularly grateful to the Royal Horticultural Society who have so generously given copyright privileges. We were very fortunate to get the work of the fine English photographer, David Wilkie. We acknowledge our debt to the botanists and herbarium specialists who describe and in a way immortalize each plant.

There are many others who should be mentioned and later we will have a column called "Further Appreciations." The fact is this: It has been a wonderful experience for the Staff to feel the spirit of good fellowship through a common interest in a peaceful work. Each one has humbly offered his experience to be a part of the whole which could not have been achieved by any one individually. The result is very informal. If you do not find a familiar species listed in the Dictionary please turn to the list of species and synonyms in the April 1953 Quarterly to see if it is listed there as a synonym.

All the botanical terms used may be found in Webster's Collegiate Dictionary which has illustrations of the forms of the leaves and the flower parts. Our thesis is that as expressed editorially in Gardening Illustrated, "Few things are more difficult than to make a scientific statement in non-technical language, but unless this difficulty can be surmounted it is quite certain that a great deal of scientific work will never be appreciated or applied." The Staff has compiled this Pictorial Dictionary in non-technical terms whenever it was possible to do so without sacrificing the explicit description. This work is primarily for the gardener, who, if he will acquire a working botanical vocabulary, will find it a blessing in excess of the measure of his efforts. Those who wish to find information in scientific terms may turn to the Monographs of Sir William Wright Smith and Dr. Harold R. Fletcher.

INFORMAL BIBLIOGRAPHY AND KEYS TO THE DICTIONARY

We will publish an "Appreciation of Reference Material" in April and a complete bibliography in October. We regret that space will not, at this time, permit us to do any more than mention the names of the authors and titles of the books which have been used for reference material in the Dictionary. The valid species are always indicated in this text with Italics. The numbers in parenthesis indicate the Section to which each plant belongs. The Key for the Sections immediately precedes the Dictionary. The letters which follow quotations indicate the names of the authors and the name of the publication in which the matter was originally published. This key may be found on page 19.

The Sections into which the genus has been divided are (1) AMETHYSTINA, (2) AURICULA, (3) BULLATAE, (4) CANDIDABRA, (5) CAPITATAE, (6) CAROLINELLA, (7) CORTUSOIDEAE, (8) CUNEIFOLIA, (9) DENTICULATA, (10) DRYADIFOLIA, (11) FARINOSAE, (12) FLORIBUNDAE, (13) GRANDIS, (14) MALA-COIDEAE, (15) MALVACEAE, (16) MINUTISSIMAE, (17) MUSCARIOIDEAE, (18) NIVALES, (19) OBCONICA, (20) PARRYI, (21) PENTIOLARES, (22) PINNATAE, (23) PYCNOLOBA, (24) REFINI, (25) ROTUNDIFOLIA, (26) SIKKIMENSIS, (27) SINESESE, (28) SOLIDANEOIDEAE, (29) SOULIEL, (30) VERNALES.

Pictorial Dictionary Of The Cultivated Species Of The Genus Primula

aeriantha (17) W. Kansu in Pine groves in light spongy soil on moss-banks of limestone. Scape up to 12" carrying a head or short spike of 2-15 lavender to blue "deliciously scented" flowers with drooping pedicels and deeply cut and lobed petals. Calyx cup-shaped with powdered bracts. Leaves in clusters with oblong blades up to 2" wide, distinctly crinkled and toothed at the margin, rounded or blunted at the apex and quickly tapering into the winged petiole ¾-2" long.

Agleniana (18) Mekong-Salwin divide 4000'. ... normally pale yellow, the corolla may be deep gamboge (var. atrocoracea), rosy pink (var. teharae), or ivory white (var. alba). (F) 3-8 fragrant flowers at least 1" in diameter, with a farinose eye, are held bell-like on a 10-18" stem. The leaves are lance shaped, toothed, 8-12" long, ¾-2" wide, tapering to a winged stalk of equal length. These plants are gregarious and are rather rare and difficult. Should have dampness during growth and dryness during dormancy. Plants saved by one in Cornwall under bushes from seeds broadcast by the late Mr. J. C. Williams. Lately re-introduced and grown in several gardens.

algida (11) Eastern European form of farinosa, yet distinct in its larger, thicker,
obtuse spathulate, finely toothed leaves, and its large flowers of deep bright violet (rarely white) held in a many flowered umbel. Scapes 2-8” in flower, up to 14” in fruit. Leaves including petiole 1/2-3” long, about 1” broad. Annual sowing of seed is recommended. “Seldom seen in cultivation, yet is easy once established and is worthy of consideration.” (C)

*Alliciae* (29) S.E. Tibet on grassy ledges at 1500’, Pale lavender to deep violet blue flowers, narrowly bell shaped with deeply cut corolla lobes, held in 1-sided clusters. Scape 2-8”, upper stem farinose. Leaves 1-1 1/2” long, toothed, tapering to a very short winged stalk, upper surface rough, lower surface covered with pale yellow farina. Rare.

*Allionii* (2) The 2-7 rose pink to white flowers, about an inch across, borne on very short scapes, cover their own mats of rosettes which are made up of glaucous, rather gummy, grey-green leaves 1/4-1 1/2” long. Rosettes should be taken off and struck as cuttings in sand after flowering and these, when rooted, are small enough to allow planting in small crevices where the roots can go as they wish. Dead leaves should be removed to prevent rot. It must be treated to perfect drainage. Sun or shade. January to April. “This precious Primula from the Maritime Alps may have watched Napoleon pass.” (F)

*alpicola* (26) S.E. Tibet. “A beautiful flower with a fragrance almost stupefying in its sweetness. The stem grows no more than 20” high, then sprouts out on one side a fountain of rather large, lolling, pale sulfur yellow flowers. It grows in sheets, of hundreds of thousands all up the wet valley, acres and acres of soft yellow radiance.” (KW) Var. alba (milky white), var. luna (delicate lemon yellow, very fine and called the “Moonlight Primula”), var. violacea (violet purple). Corollas enhanced by being heavily powdered by white farina. Stout short rootstock, leaves roughly toothed, elliptic, rounded at tip, 2-4” long; stalk winged, sheathing at base, up to 3” long. Likes a peaty soil and a little shade. Perennial. Comes easily from seed and plants can be divided. (see p. 18)

P. amethystina (1) Found on the Tali Range where the plants enjoy constant mist baths for several weeks during the growing season and are wrapped in a deep blanket of snow in the winter 5” stems, 2-6 fragrant nodding bell-shaped violet flowers, Leaves obovate-oblong, ob-tuse, denticulate, 3/4-2” long. Subspecies brevifolia (taller than the typical plant and with more numerous more irregularly lobed corollas) has been occasionally in cultivation. It has not been aclimated enough to set seed.

P. algida

P. amoena

*amoena* (30) Caucasus. 2-10” Polyanthus-like stem bears 5-10 narrow petalied wide-opened flowers of lavender and lilac shades with small naphthalene yellow eyes. Leaves abundant, narrow with rounded ends. A “perennial herb with habit of P. elatior with fairly stout rhizome from which spring numerous fleshy roots. Leaves only partially developed when the flowers open.” (F) An excellent species with a reputation for easy culture. Difficult to come by in this country. An English expert has found that *amoena* does not set viable seed in cultivation, but the Levy’s of Barnhaven raised several plants from seed set on a plant which was given them by Mrs. A. C. U. Berry. They used their famous freezing-hot water method which was indicated by the hardness of the seed coat and by the location of the plant in nature.

*anguifolia* (20) Mountain meadows and morains of the Rocky Mts., Colo. to N. Mexico. Very dwarf species, 1 or 2 wheel-shaped flowers on 3” stems. The pink flowers are large in proportion to the narrow 1-2” leaves. It prefers gravelly well-drained soil and seeks crevices in exposed places. “One of the gems of the genus . . . it’s roots are long and thick and appreciate a moisture source during the spring and early summer growth periods. Given this, it will not only thrive but bloom consistently as well.” (DO)

*anisodora* (4) Yunnan, China. 4-10” leaves without farina, long, narrowed to a winged stalk with rounded ends, rooted. Stout stems up to 24” high with 3-5 super-imposed umbels of 8-10 nodding flowers. Flowers funnel-shaped and deep purple, almost black. Aromatic. Of easy culture. Moist, cool position.

P. Anemone

P. aphelion

(2) “The chief station, I believe, is Mt. Orsago, in the N. Apennines. Surely that will tempt some foot loose wanderer to go there and send it back! It seems amazing that a plant growing only 2 or 3 days travel from London should still need reintroducing.” (WI). Leaves broad (glabrous hairs at the margins of the young leaves), oblong 1-3” long with flower stem twice as long, bearing umbel of 2-6 white-eyed pink flowers (rarely rose or violet). Neat growing, sun-lover. Likes well drained gritty soil.
apoclifa (17) High altitude meadow dweller from S.E. Tibet and Yunnan. Closely allied to muscarioides. Flowers stem up to 7" high covered with yellow farina at top and carrying short spike of reflexed, fragrant, violet flowers. The leaves are oblong to spatulate, obscure, crenate serrate, 2-4" long tapering to a winged stalk. For safety, seed each year and treat as a biennial. Deciduous with winter bud. Young plants should be grown on in small pots until they have formed good root systems. Planting out in permanent quarters is best done during the summer so that the plants may have the best chance of gaining a hold of the soil before the winter sets in. Their position on the rock garden should not be too high, and the sunnier parts should be avoided.” (C).

atrodentata (9) "...one of the commonest of early Primulas in the eastern Himalayas. Flowers vary considerably in colour, from purplish mauve and pale violet to pure white. The eye, however, is consistently white or pale cream. It is not always easy to obtain seeds of this abundant Primula, as cattle and yaks are fond of grazing the plants." Similar to denticulata except it is much smaller and does not have fleshy basal scales. Scape ½-6" at flowering. Spathulate leaves rough, hairy, toothed and often farinose, ¾-2½" long, ¾-3¾" broad. "In May the drier turf slopes of the moraines and banks are carpeted with fragrant Primula atrodentata (K.W. 5564) whose mauve mops borne aloft on powdered scents the air for yards." (K.W) A hardy rock garden plant. (see p. 25)

aurantica (4) "of the moist alpine pastures of the Chienchuan-Mekong Divide, first displayed its deep reddish-orange flowers in our garden in 1923, the year after its discovery by Forrest." (F) Dr. Handel-Mazzetti has written that it grows on limestone as well as on slate. "The leaves are broadly lanceolate, rather thin in texture, with fine-toothed margins and a deep-red midrib which merges into a short red petiole. The flower buds are deep red but the opened corollas vary from tawny yellow to deep orange-red. Although it suggests a small form of P. Baileyana, this species is readily distinguished by the purple calyx lobes, the red scape and petioles, and absence of farina. A still more remarkable feature is the substitution after flowering of one or more clusters of leaves for the uppermost whorl of flowers. These clusters readily yield new plants if detached and placed in moist soil." (B) Leaves 8" long by 2" broad. Plant about 16" tall, flowers carried in 2-6 whorls of 6-12 flowers. Likely dampness but will tolerate more sun than many of the Candelabras.

auricula (21) Perennial farinose plant. Silvery mealed leaves in rosette, broad spatulate to oblong, oblong-irregularly toothed, tapered to a short-winged, reddish stalk, 1½-8" long and %½" wide. Flower scape about 2" long never rising above leaves and bears an umbel of yellow flowers flushed with orange. Propagated by offsets and cultivated at Edinburgh on the face of peaty banks. (see illustration p. 25)

auricula (2) This plant and its hybrids were in cultivation in Vienna before 1570. Grows naturally in the crevices of calcareae rocks up to 7,000', and is found on the Alpine Chain, in the Black Forrest, the Apennines, and Carpathians. In this Linnean species lies the origin of the Garden Auricula. "Of all the alpines most precious and universal and easy and hardy is P. auricula with its huge mealy leaves, lying out upon the grey rock like fat hoary star-fishes; and its stalwart heads of blossom, mealy-mouthed, of the imperial Chinese yellow." (RF) "...still one of the best for cultivation either in the rock garden or in the Alpine house; the almost invariably sweet-scented flowers on their short, stiff stalks, the silvery foliage, and the rapidity with which this species forms flourishing colonies in pockets or crevices, cannot fail to recommend it." (C) Leaves 2-5½" long, 1-2½" wide. Scape 1½-8" in height bearing an umbel of several yellow flowers which have a band of white farina around the mout of the tube.

auriculata (11) Mts. of Turkey, Persia, Caucasus. Similar to P. farinosa but with no powder on leaves and taller. Reaches height of 18" when in bloom. Umbels of 8-20 flowers clear rose, reddish or bluish-purple with yellow eyes. Easily grown in moist well-drained soil. Does not compare with P. farinosa and P. frondosa in garden value.

Baileyana (25) S.E. Tibet. Leaves in open rosettes, 1-6" long, ¾-2½" broad at base narrowing to a rather pointed tip, margins toothed. slender 2-8" scape with numerous yellow to golden orange flowers with white or yellow eye. 1-7 flowers on an umbel. In cultivation it has attained sizeable clumps in a fairly feisty, cool situation. "...The Primulas (from seed, L. and S. 13268, P. Baileyana) planted experimentally outside in a scree soil in the sinks or in shady places seemed quite happy and one, planted in my new peat wall facing due west and much shaded by trees, made a lovely little plant and flowered well in the late Autumn." (CC:AGS)

batangensis (15) Yunnan, W. Szechwan. "...like a glorified Celsia. It is a yellow-flowere d cousin to malthaceae" (R.F). A deciduous perennial with a spreading tuft of kidney shaped, minutely toothed leaves, heart shaped at the base, with blades about 2½" long and 3½ wide, borne on slender stalks 4-8½" long. 1-4 scapes per plant, 10-20" tall, downy, floriferous for over ½ the length, bearing numerous yellow to golden orange flowers alternately or in semi-whorls. Corolla ¾/4-¾" across, with tube about the same length. Flowers July-September. Alpine house, rich soil with plenty of humus, free drainage, with ample water during growing period. Reluctant to seed in culture but may be propagated by root cuttings. Rare.

Beesiana (4) Mts. Yunnan & Szechwan. Ovate-lanceolate leaves up to 10" long and 3½ wide, rounded at apex and attenuated at the base with dentate margin. After flowering, leaves may elongate to 20", Scour flower scarps, farinose at nodes from which flowers are produced in super-imposed umbels of up to 16 flowers. Tube of flowers are orange and twice as long as the calyces, and the expanded flowers are rosary-carmine with a yellow eye and about 1" across. Easily grown in cool moist situations.

bhutanica (21) Assam Himalaya, E. Bhutan & S. Tibet at 10-14,500' on the floors of forests, where Rhododendrons grow, also on damp mossy banks. "...perhaps the most attractive of the whole section Petiolaris. Its flowers are usually
P. bhutanica
pale blue, but sometimes are a darker blue, always with a white eye. They are just over 1" in diameter, and are borne on a short scape which elongates as the seeds set. The petals, which are finely serrated, overlap each other to give a beautifully symmetrical flower. The leaves, which may be up to 8" long, are spoon-like and coarsely cut at the edges; at flowering time they are covered with meal which they lose during the summer when the midrib is clearly seen to be a deep red. By late August the meal has again appeared on the center leaves and later the leaves die away, being replaced by yellow farinose bud scales so that the plant in its resting stage during the winter looks somewhat like a bantam's egg. This species sets seeds fairly readily and they germinate quite freely." (DL: AGSB, 9/50)

blattariformis (15) Yunnanese limestone and near Muli in S.W. Szechwan at 6,500-12,500'. ... a lover of dry shade, nesting in the most secluded situations of arid rock gutters on the mountain sides, closed in more or less by sheltering scrub, or under the shade of heavy boulders on the banks of mountain torrents. (GF) The flowers are fragrant and are carried in rather one-sided whorls. The petals are pale or dark lavender, rose to purplish-pink, yellow or greenish eye. The scape is sturdy and erect 4-22" long. The leaves are hairy and are 1/4-6' long, including petiole. Forrest sent home seeds which were grown in a cool greenhouse and at Edinburgh, but it seems to need a dryer climate.

Boothii (21) ... a vernal species, coming into full bloom at the lower altitudes in early March ... As soon as the snow disappears, the pink flowers unfold. The corolla lobes are notched, and vary from pale to deep pink, while towards the white throat there is an orange-brown zonation or five spots. The precipitous slopes of the Nyam Jang Chu, which cuts through the Himalaya east of Bhutan, are a favoured home of P. Boothii. On the moss-covered, rocky ledges, sprayed with the tumbling waters of cascades, the species grows in astonishing profusion, and it may be found in such situations is immensely attractive. The Petiolariads are notoriously difficult to establish in cultivation, as the seed seems to resent being dried, and is naturally thrown while still greenish and fresh. Live plants of P. Boothii were sent home from Bhutan and S.E. Tibet in 1936, 1937, and 1938, and are at present in cultivation." (SxT: AGSB, 6/40) Scape at most ¾", flowers produced amongst foliage. Blooms tubular, an inch plus in length and fragrant. Leaves up to 6" in length and 2" in width. May be propagated by leaf cuttings, by division and by seed. Needs protection from rain during dormancy.

P. bhutanica

Boothii (21) Bhutan, Assam Himalayas, providing it is protected from excessive moisture.

B. burmanica 21 Bhutan, Assam Himalayas, can be grown in the open providing it is protected from excessive moisture.

b. bracteosa (21) Bhutan, Assam Himalayas, can be grown in the open providing it is protected from excessive moisture.

Balleyana (4) Moist mountain meadows of Yunnan in thickets on sandstone and on calcareous soil. Somewhat like P. Beesiana, but its ovate to ovate-lanceolate leaves are red midrib and irregularly dentate leaf-margins. The flower stem is up to 36" high and carries 3-7 tiers of crimson buds which open into fine orange flowers. "one of the best of the section, being good-tempered, free flowering and easily propagated ... As the flowers fade, a vegetative bud begins to grow at the end of the scape and if this is pegged to the ground, the little plantlet will root in some 3 weeks and may then be severed from the parent plants." (DL: AGSB 9/50)

The whole plant is covered with meal at flowering time. The flower stem is first short, later reaches length of 10-12'. Flowers (1" across) usually many in an umbel; pinkish-lic with yellow eye surrounded by white. Leaves variable as to form, the outer ones 2-6½" long, including petiole; ¾-2¾" broad; spathulate to obovate-spathulate, rounded at tip, tapering at base into broadly winged stem, denticulate at margin, midrib and nerves conspicuous.

b. bullata (3) Found on sheer limestone cliffs of Yunnan. Similar to P. Forrestii with rosettes of glabrous leaves. Powdered below with golden meal which also appears on the stouter scape which is 1-5" high and which bears heads of deep yellow Polyanthus-like flowers. A shrubby plant which resents having its old leaves removed or being drenched during the winter. The leaves are oblanceolate to lanceolate, 1/2-4" long, toothed, "no genuine cultural record." (F:FP1)

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P. calderiana (11) "...found by Forrest in Yunnan at 6-9,000'. The variation in height of this species is remarkable; it varies from 6-20'. The foliage is similar to that of P. farinosa, with the undersurface of the leaves covered with white meal. It is very floriferous, and carries a large head of white, fragrant flowers...proving quite amenable to cultivation in a fairly rich, cool soil, with a moderate amount of moisture in half-shade." (C&T) May be increased by means of seed and propagated from the leafy stolons which grow 2-7" in length. (see p. 18)

P. calderiana (21) Best plants found at 13,500' in Sikkim, Nepal, S-S.E. Tibet. Perennial plant with a disagreeable odor. The flower stem is 2-12" tall, sturdy; scape carries usuall y a single umbel of 3-5 rich violet-purple or rich maroon which are darker at the center and have yellow eyes. The leaves are rather lance-shaped, 2-12" long and \( \frac{3}{4}-2\frac{3}{4} " \) broad. Var. alba (white, often tinged with purple). Var. acanthescent (no scape; pedicels up to \( 4\frac{1}{2} " \)).

P. calliantha (18) Yunnan, Burma & S.E. Tibet. 'Our first acquaintance with this species in the field was a breathtaking experience, and the sight of huge tracts of hillside affame with its colour remain a picture of unparalleled beauty. ...with P. cbamaethattma it dominated the hillsides. The corolla is rich violet-purple with a large sulphury farinose eye—a most pleasing combination. 1-3 (rarely 5) flowers are borne on each inflorescence, which occasionally bears 2 whorls. ...its real home is at higher altitudes on rock ledges and moss-grown boulder scree, always to damp situations. It was noticeable that when lifted the plant often had established itself over a large stone slab, the roots being splayed out over the surface. In September abundant seed was obtained (#4745a), and it was then observed that the large compact resting buds ...were ready to receive their winter blanket of snow." (S&T:AGS 9/39) "...The leaves, beautifully crenulate, are coated below with greenish-yellow, somewhat fugacious farina, whilst the sturdy scape carries usually a single umbel of 3-5 rich violet-purple flowers each with a large sulphury-farinose eye. It is undoubtedly one of the loveliest of all Primulas and it is to be hoped that the small stock of plants now in cultivation may be increased." (F: JRHS 12/52) Scape 6-12", much longer when in fruit. The leaves have short winged stems which grow until they equal the blade in length. The blade is 2-8" long and \( \frac{3}{4}-1\frac{1}{2} " \) broad.

P. capitata (5) Sikkim, S. Tibet, Bhutan; common Himalayan plant at 10-15,000'. Leaves rather oblong spatulate, denticulate at margin. Flower stems are 4-18" tall, mealy toward tip, holding a disc-like head of many or few deflexed flowers; blue-purple to deep purple in color, with a yellow eye. Subsp. Craibiana (narrower than type with more definitely erose-denticulate leaves which are covered below with bright yellow farina; heads more globular). Subsp. crisipata (leaves entirely free of farina; larger, more open flowers; discoid head). Subsp. lacteocapitata (narrow leaves; globular flower-head; leaves coated with cream colored farina on lower surface; leaf terminal pointed). Subsp. Mooreana (stouter; leaves broader and more rounded at apex; longer pedicles; larger, more numerous flowers with dense crown of imbricated bracts; in cultivation for 30 years or more and probably more popular than the type). Subsp. spaerocephala (China; resembles crisipata; introduced 1908). "The type, P. capitata grows among conifers on damp loam and along marshy river banks. In cultivation requires a loose humus in half shade with good drainage. As their root system is very restricted, it is advisable to set plants close together, so they can resist the heaving frost action better and for this reason it is well to have a covering with evergreen boughs to ward off the sun after the ground has frozen." (J)

P. capitellata (11) Kuh-i-Jupar (Persia) and the neighboring ranges in moist alpine meadows 10-12,000'. A farina-bearing plant which varies in size (1\( \frac{1}{4}-1\frac{1}{2} " \)) high) according to the altitude. It is found in groups and the large 5-10 pink to rose flowers are carried in a dense cluster on stems 1-10" tall. The leaves are oblong-lanceolate and narrow at the base into a broadly winged, sheathing stem.

P. carniolica (2) Rare and confined to a few hill-tops in Idrían Alps, just N. of Trieste. Jelito claims that it is a lime lover and requires a very damp shady location while an English expert claims that it grows scrappily in its wet, natural habitat and does better for him in cool rich soil. The stout, erect flower stems are 2\( \frac{1}{2} -10 " \) high and they bear an umbel of 1-8 soft rose to lilac flowers which have a white past. The leaves are smooth and shiny green and are 3-6" in length, 3/8-1 1/2" broad. They are usually obovate to oblong and rather rounded at the tip. An excerpt from an old Flora and Silva follows, "Leaves bright green, smooth, shining, and undulated with clusters of 3-15 mauve-colored flowers in
April and May. Old plants form spreading tusks, our finest being more than a foot across. 

Caveana (25) Sikhim 14,600-16,600', Kharta Valley near Mt. Everest at 20,000'. A small, high Alpine species producing pale lilac-colored flowers (carried in an umbel of 1-9) which are fragrant and have lemon colored eyes. The stout, slightly mealy stems are from 1½-4¾" long. The leaves are dissectly white on the lower surface and are ¾-4¾" long including the petiole and about 1" broad. They are oblong or obtuse to oblong-obovate in shape, rounded at the tip, abruptly or gradually tapering at the base; deeply dentate, midrib conspicuous. Seed has recently been given out in England and it has germinated well. Corsar suggests that it be treated as its kinsman, P. rotundifolia. 

Cawdoriana (28) Introduced by Kingdon Ward in 1924 who found it growing on rocky slopes at 13-15,600' in S.E. Tibet. The leaves form a beautiful flat rosette, in shape obovate, oblanceolate or spatulate; blunt or rounded at tip; tapering to a leaf-stalk; margin coarsely dentate in an irregular way: ¾-1¾" long, ¾-2¾" broad. The flower-stalk is 2¾-4¾" tall and bears a group of 3-6 pendant flowers with purple bracts. The corolla is 1¾" in length, clasped by a cup-shaped calyx which is tinged either green or purple. Flowers are greenish-white below, violet-mauve above and have a large white eye. The petals are deeply cut into triangular lobes. . . . if treated as an Alpine house plant it appears to be relatively easy to manage. A compost consisting of equal parts of loam, leaf-mould and sharp sand, coupled with efficient drainage, and careful watering during the resting period, should insure success with this very lovely little Primula." (C) One expert writes, "unfortunately proved to be a biennial with us, it did not set seed and we lost the stock." Mrs. Crewdson, well known for her ability to grow difficult species writes, "Cawdoriana could not face the conditions of frost followed by a long drought." Jelitto tells us to give it winter protection by keeping it relatively dry, especially from overhead.

cernua (17) Yunnan & S.W. Szechuan in dry conifer and Oak scrub forests, on sandstone and calcareous soil. Somewhat similar to P. Viadis hut flowers are nodding, sweet-scented and borne in a tight truss of a deep clear blue with a hint of purple. The hairy leaves are distinguished by being obovate suborbicular with widespread limbs. They remain winter wet. What seed is set should be saved and this species like others in the Muscarioides Section should be treated as a biennial. They are quite hardy and will survive any kind of winter until they have flowered. . . . They like a rich porous soil with plenty of moisture during the winter. They also prefer half-shade." (C&T) The flower stem is 6-10" tall and is doted lightly with white meal at the tip. The leaves are ½-6¾" long and ¾-1¾" broad and form small rosettes.

chamaethauma (21) Burma-Tibet frontier & S.E. Tibet. "... it flowers early and covers steep open slopes where P. tsurutensis, P. veronica, P. Elizabethae, P. calliantha and P. Valentiniana also abound. We found a planting which was growing at 14,500' near Langon, where the hillsides were ablaze with its big violet flowers, each with a dull orange-yellow eye. As many as 15 flowers may be produced on a single peduncle. These are sometimes in full bloom before the peduncle even appears, packed closely together on longish pedicels. Occasionally the peduncle stands clear of the foliage." (L&S: AGSB 9/39) Short stout rootstalk; numerous roots; flower stalk 6¾" long. Leaves have elliptic or oblong blades which are ¾-2¾" long, ¾-1¾" broad; broad at the tip tapering to a scarcely distinct stalk; margins much lacerated; both surfaces sparsely sprinkled with minute, meal-producing, glandular hairs.

chionantha (18) N.W. Yunnan. "Found in open alpine pastures, along water courses, among high weeds, in particular among roots of the wild rhubarb." (J) H. Clifford Crook writes that this is the easiest of the Nivales to grow and that at Edinburgh it is grown on the shady side of a low rock so that the sun does not reach its leaves until afternoon. . . . The leaves are long and strap shaped and, like the flower stems, covered with golden meal, while the numerous ivory white flowers are borne in successive whorls as the stems increase in length sometimes to 18". (AGS: 12/41) The plant shows clearly that it requires a good rich soil and plenty of moisture. Floreney Levy cautions that "this glorious, regal Snow Primula with its large, glistening white, fragrant flowers on tall stalks, insists on very existence. The only life apparent at this time is . . . a tiny green bud among the withered foliage, which is revealed when the blue-violet flowers are faintly veined dark violet-mauve above and have a large white eye. The petals are deeply cut into triangular lobes. . . . if treated as an Alpine house plant it appears to be relatively easy to manage. A compost consisting of equal parts of loam, leaf-mould and sharp sand, coupled with efficient drainage, and careful watering during the resting period, should insure success with this very lovely little Primula." (C) One expert writes, "unfortunately proved to be a biennial with us, it did not set seed and we lost the stock." Mrs. Crewdson, well known for her ability to grow difficult species writes, "Cawdoriana could not face the conditions of frost followed by a long drought." Jelitto tells us to give it winter protection by keeping it relatively dry, especially from overhead.

cervia (L&S: AGSB 6/40) The leaves are slightl y puckered (almost like those of an African violet); oblong-lanceolate to oblong ovate; ¾-1¾" long; ½-¾" wide abruptly narrowed to a winged petiole as long as or longer than the blade, everywhere minutely downy. The corolla is funnel-shaped, about ½" long and as broad. The buds are at least as lovely as the flowers.
cool, heavy soil and is recommended for culture in the cooler coastal areas only." Blade 6-8" long, ¾-2" broad. Flower-stem stout; 14-28" tall, carrying 1-4 umbels filled with numerous flowers.

**Chimonogenes** (21) A E. Tibet; growing in clumps 6" in diameter, on open damp hillside or below cliffs and on slides. Dwarf in habit. The plant is only about 2" high and its flowers cover it. The corolla and lobes are of the "brightest golden yellow, richer at the throat." Before flowering the white bud leaves are tinged red, as are the leaves which develop simultaneously with the flower parts. The leaves including the stem are from 2⅓-3 ½" long, they are ovate to broadly elliptic, round at apex; coarsely irregularly dentate at margin. The plant in the picture flowered at Edinburgh and was sent from India by air-mail.

**Chumbi Valley** (26) Chumbi Valley, Tibet, 16-17,500'. This is a close ally of P. sikkimensis and it "recalls in many ways an extreme alpine and depauperate expression of this species—it is now definitely in cultivation, due to course of Ludlow & Sherriff." (F.S.R.G.C.) Flower stem 4-10" long, faintly farinose, carrying an umbel of 2-7 yellow flowers. Leaves including petiole ⅔-4⅓" long; blade ⅔-1 ¼" long and ⅘-⅞" broad; ovate-oblong or oblong to elliptic, rounded at apex; rounded, wedge-shaped or cordate at base; margin crenate-serrate; smooth, leathery, with no farina.

**Chungning** (4) Yunnan, Szechuan, Bhutan and the Assam Frontier growing in marshes in the forest at 9,500-10,500'. Closely related to *Cockburniana* but larger in all its parts (stem 30 plus inches). It is a neat plant, its flowers are a little paler orange and it will succeed under moister conditions than *Cockburniana*.

**Clarkei** (11) "This engaging little Primula is well known now, and is certainly one of the easiest and most satisfactory to have, either in the alpine house or out in the open garden. . . . it hails from Poosiana in Kashmir, from an altitude of 7,000', and blooms in March or April. The flowers are a true pink without a touch of blue, and have a white and primrose eye." (C.C. A.S.G.B 12/40) A small species, with a slender rootstock, girdled by a few basal scales which give place to conventional leaves when growth starts following dormancy. The leaves are scattered and do not form a rosette. The blade of the leaf is ⅞-¾" long and the leaf stems are 2 or 3 times as long as the blade which is ⅘-¾" wide. The leaves are orbicular or reniform or ovate, round at tip; cordate or truncate at base, finely toothed at margin. The flowers usually arise singly on stems 1¼-2¼" tall with no true scape, although sometimes a scape as tall as 2" is developed, carrying an umbel of 2-5 flowers. Parts or divisions of plant root easily, needs ample supply of moisture and balanced compost. This little plant, 12 crowded to a 10" pot and well grown, can steal the show.

**Clusiana** (2) Grows in the limestone mountains of Austria at 5,6,500' and is very beautiful but unfortunately is rarely found true in gardens. It has oval leaves of dark green, not dotted and gummy like those of *spectabilis* nor grey and stiff like those of *glaucescens* (the two kinds which often do duty for it in collections) but faintly edged with white, while the flowers are large, of bright violet rose, and composed of lobes divided to their middle, unlike those of *glaucescens* which are more deeply cut. Leaves are ⅓-⅝" long; ¾-1¼" broad; ovate to ovobovate, sharply pointed, blunter at tip. Flower stem: ⅓-⅝" long; glandular; carries 1-6 flowered umbels. "From its immediate allies the readiest means of distinction is the fringe of glandular hairs on the margin of the leaf . . . has a high reputation for its behaviour (in cultivation) as well as for the beauty of its large flowers with corolla-lobes so deeply divided as to give the impression of ten petals. Where their areas meet in nature it forms hybrids with *P. minima*. The influence of the latter is shown in the development of fine spiny teeth on the leaf margin. Such of the hybrids as incline to the side of *P. Clusiana* are conspicuous for the magnificence of their flowers . . . in an encomium by Farrer they are likened to as large as a five shilling piece (about 1¼") or even larger.

**Cockburniana** (4) S.W. Szechuan in wet alpine meadows 9,600-10,600'. Smallest Candelabrum which at the most measures 18", 2 or 3 whorls of fiery copper-orange flowers. The seed germinates readily and it is well to seed each year as it has "a way of dying off after a profuse blooming season, or of disappearing from damp, rich, or imperfectly drained soil in the winter." (R.F.) Leaves oblong to oblong-ovate, up to 6" long; ½"-⅝" broad; round at tip; near round, then abruptly cuneate or strongly tapering at base. Slightly lobulate and minutely denticate at margin, smooth and without farina.

**Concholoba** (17) Assam-Burma-Tibet frontier, on steep, grassy slopes amid dwarf juniper and rhododendron; 15,000'. Flower stem 2½-8" tall, with some farina, carrying a globe-like compact head of 10-20 flowers, the whole being some ⅝" in diameter. Corolla bright violet, more or less covered with white meal outside. Tips of corolla lobes or limbs are brought inwards forming a bell-shaped whole. The leaves are ½-⅝" long, ⅝-1¼" broad; oblanceolate-oblong, to oblong; rounded at tip, becoming slender as it enters the more or less well winged petiole; coarsely, irregularly dentate at margin.
conspersa (11) A Tibetan cousin of P. farinosa. Farrer writes that conspersa becomes heartily perennial in cultivation and that it is enormously larger than farinosa and almost as large as gemmifera. Another expert notes that it is a slender plant which maintains its perennial habit by forming basal buds for over-wintering. Mr. Cor- sar's experience has taught him to treat conspersa as a biennial because "though hardly in the sense that it can stand the lowest of temperatures, it will not survive the wet winters of the British Isles." The flower stem is 4-20" tall, pretty toward apex, floriferous and graceful, carrying 1-3 umbels, made up of 5-20 flowers, in color pale lilac to lavender-purple, with orange eye. The plant is inclined to make secondary inflorescences above the original, rather than to carry individual um- bels. Including petals, leaves are 1 3/4-4" long, 1/2-1 3/4" broad; oblanceolate to narrow elliptic; rounded or blunt at tip; crenate-denticulate at margin, mid-rib conspicuous.

Cuneifolia (8) Occurs on Attu of the Aleutian Islands and is a common plant of the alpine meadows in Kamchatka. The British and the Japanese agree that it is a hard plant to grow. It has been available from time to time from Japanese nurseries. A small tufted plant, typical of the Section, with woody, branching stems (2%-12") and short, leathery leaves with well developed petals, measuring at the most 3 3/4" long and 1" broad. It bears an umbel of 1-9 rose-red flowers which may measure close to an inch in diameter. Subsp. saxifragifolia has come to Mrs. A.C. U. Berry from Alaska, she has flowered it and it is still prospering. She treats it to perfect drainage in an alpine frame. She has shared her plants with others in the U.S. and in Britain in an attempt to keep it in cultivation. Subsp. hakusanensis produces a tuft of smooth, non-mealy leaves 1-2" long with thin, oval or rounded-oval blades tapering into short, narrowly-winged, wedge-shaped stalks; margins above the middle furnished with sharp, saw-like teeth. Flower stem 2-3" tall, bearing an umbel of 3-5 rose-violet blossoms on slender stalks up to 3/4" in length. Corolla nearly 1" aross, divided into rounded, very deeply cleft lobes; tube cylindrical, longer than the calyx.

Cusickiana (2) "... is one of our loveliest American Primulas, it grows in N.E. Oregon, in Union county and the Wallowa mountains; it is difficult to find, difficult to grow, difficult to bloom. ... you could pass it easily without recognizing it; as it goes dormant, it resembles a Dodecatheon, but the seed-pod is a true Primula one. (Mrs. A. C. U. Berry) "For this Primrose we are indebted to Mrs. Berry of Oregon, who 15 years ago sent seeds to Mrs. Crowson of Kendall. The seeds germinated and Mrs. Crowson has been clever enough never to kill the resulting plants. In early spring these plants break into growth, grow with great rapidity, and in 3 or 4 weeks' time decide that it is time to be dormant again, and die down as quickly as they have appeared. In 1947 Mrs. Berry sent to Mrs. Crowson by air mail a plant which in 1951 produced 3 flowers." (F:RHS) This plant may take 5 years from seed to flower. The photograph in the R.H.S. Journal shows stems more elongated than Mrs. Berry's plant which is pictured here. In nature this species is subjected to a thorough drying during the summer and it blooms while the snow water runs all around it. It seems to group around the rising base of a stone or on little hillocks and its neighbors are Dodecatheons and Sisy- rinchium grandiflorum. Cusickiana is a small species with slightly toothed oblong-spathulate leaves 3/4-2" long including petiole. The flower stem is 1 3/4-2 3/4" tall, the small umbel holds 1-4 flowers, which have a violet fragrance which has been known to help the plant hunter to find it. The corolla is deep violet, occasionally white. (See article in January 1950 A.P.S. Quarterly).

daanensis (2) W. Rhaetian Alps. Has been called cuneifolia for nearly a century. .... its single clumps of sticky-leaved russet glanded rosettes may be seen dotted over the topmost fells and crests. The most obvious place to see it is where it jumps to the eye on the top of Selvio, covering the little pothouse-crowned hill called the Dreipachsenspitze; but it also bejewels many other high moors thereabouts." (RF) Flower stem 3-4" tall, bearing a 2-7 flowered umbel of soft rosy-mauve to rose blossoms with a pure white throat. The corolla, 1/2-3/4" across, is divided into 5 broadly heart- shaped, notched lobes; the tube is cylin- drical below, dilated upwards, glandular and about 3/4" long. It is a perennial of
tufte d habit wit h oblong-wedg e shaped , distinctl y stalke d leave s 1-3" long ; margin s
furnishe d wit h shar p teet h towards th e tip ; bot h surface s densely clothed wit h reddish,
viscid, glandula r hairs.

daria (11) Moist open situation s
in the N.E. Caucasus at from 1-9,000'.
Will Ingwerson writes that it looks like a
robust plant of farinosa and that it likes
the same treatment. "It is altogether quite
a desirable plant."
deflexa (17) This beautifu l specie s
was discovered by Wilson in W. Chin a at
altitudes of 10-13,000'. The scape of the
plant pictured did not exceed 6" in height
but in nature it grows from 1-2' high.
The leaves are bright green and shining
and grow in a rather tufte d habit and are
narrowly oblanceolate, are blunt, and
only rarely pointed, up to 8" long and
1-1/2" broad. The scape bears a sub-globu-
lar head of crowded markedly deflexed
blossoms of dark blue or rose-purple, or
white, with a delicate blue eye. The cor-
olla is funnel-shaped, 1/2" long, and flares
gently into 5 notched and wedge shaped
lobes. (to be continued)
Pacific Strain of Polyanthus Primroses

by
Frank Reinelt, Capitola, California

My acquaintance with Polyanthus Primroses goes back to early childhood days in Czechoslovakia, where it would be difficult to find even the smallest garden without them. Besides, one finds them growing wild in the woodlands. My garden apprenticeship took place at a nursery attached to a cemetery where thriving on old graves year after year in the grass were white and lavender acaulis, considered rather difficult to grow here (California). Of course it rains there all summer, with cold snowy winters thrown in to complete the ideal conditions for naturalizing primroses.

After coming to California, I was fortunate enough to get a job on an estate with an old gentleman who was as enthusiastic about flowers as I and who had enough money for me to indulge in anything I wished for as far as breeding material was concerned. We bought seeds and plants from all over Europe, or from anywhere we could get them. Although I had many other irons in the fire, one of them was breeding Primroses, if one could call it breeding. The quantity I grew was comparatively limited, and I worked by selection only.

It was not until I came to Capitola in 1934 and opened a commercial nursery that I began taking the Primroses seriously. Seed was imported from all the outstanding sources in Europe, the best of which perhaps then was Sutton's and Blackmore and Langdon. However, the best plants I was able to collect came from the garden of Dr. Sydney B. Mitchell who in turn had received the seed from an English amateur, a man who raised pigs as a livelihood and Primroses as a hobby.

In my own travels whenever I saw a good Primrose on an estate or elsewhere I tried to talk the people out of it, succeeding most of the time. Victor Reiter in San Francisco had a large blue acaulis* which came from a packet of seed he bought from Vilmorin's, and which was his contribution to my material. Of the European strains I used mostly Sutton's Brilliance and Sutton's Whites. Mr. Hugh B. Logan from Inverness, who is an ardent plantsman and Primrose collector, gave me part of the acaulis* named varieties which he brought from Ireland. These were unbelievably large for that time, and I used them extensively in the beginning to gain size.

I was growing five to ten thousand seedlings every year, making a snails pace progress at first, but as I had more and more selection, the results were encouraging. Major N. F. Vanderbilt, an enthusiastic plantsman if there ever was one, introduced me to Mrs. Williams in Santa Rosa, where I saw a small garden full of magnificent Primroses, better than anything I had, and some that I would have given almost anything to possess. I gathered from her that she had been inter-breeding Primroses for years. She was by far the most successful amateur in that respect that I have ever met. It gave me an idea of what could be done and acted like a shot in the arm to my enthusiasm.

I kept raising larger and better generations each year, picking a few of the very outstanding plants and potting them in the greenhouses where I could cross pollinize them rain or shine and raise a new generation next year. The best of these were sold to Dreers in Philadelphia, who in turn sold them as Riverton Giants for years, and I plowed the rest under.

I well remember the first approach to pink which I raised by crossing whites with some of the magentas, and how wonderful they were then. Of course, compared to today's material they were hopeless. Gradually the progress began in earnest with the size and texture increasing. Pinks changed from magenta-blush to a quite pastel pink shade, techniically a diluted lila and not pink at all, since there is no pure red among the primroses, the color being similar to those of the irises and pansies.

My first blue Polyanthus had very weak stems with small flowers, and it took a number of years to breed large blue acaulis* with large yellow and red Polyanthus. In order to gain size, we had to wade through a sea of purples until gradually the blues started reappearing, and I felt, last spring, when I potted some of the selected clear blues, with stems as thick as a pencil and large heads carrying two inch flowers, that if someone had told me about Primroses like that fifteen years ago, I would have considered him a liar.

We introduced our strain publicly during the Golden Gate Exposition in San Francisco. After the war, the demand became such that I had to double the planting from year to year, and grew almost two hundred thousand last spring, the majority of which are distributed through wholesale channels to the nurserymen all over California, dug as clumps in bloom and placed and sold in flats. This, of course, gave me a chance to breed on a large scale and consequently progress has become more rapid.

By continuous selection and interbreeding, the individual colors are fairly stabilized, with the exception of the shades in pink and salmon pastel tones. The colors are gradually warming up also. Last year we had flame shades already as good as the red of Primula chimenis, which I hardly thought possible years ago. Rose has become more vivid, like one finds among Primula obconica. So far, the color has been associated with comparatively small plants and small flowers, but when developed in size should be brilliant.

For years I have been trying to rid myself of the magenta and there seems to be less and less of it gradually. Among the pink pastel several years ago, a plant appeared with a suggestion of the auricula pattern. Interbred with other material this came out in better and better form in the following generations. One plant this year had pink overlaid with carmine along the edge like we find in the large English pelargonium, something I never expected in Primroses, exceeding anything we have had so far in brilliance. As the breaks keep appearing, I am more and more convinced that, given time, and of course a sufficient quantity of seedlings, we shall duplicate every color and pattern in the whole Primrose family. Like Napoleon, I feel that God is on the side of the big battalions, and the larger selection we have to breed with the quicker we will get there. I have tried many other means suggested by science, like x-ray and colchicine, but believe from experience that there is no short cut that beats selective breeding.

In the beginning when I raised a good seedling I thought it worth propagating and naming. As better and better ones kept appearing, I had to discard the idea as hopeless from a commercial point of view, the same as we did in tuberous begonias and delphiniums. The progress by breeding is far more rapid than individual plants can be propagated. By the time one plant is propagated up to a hundred plants and can be introduced, it is hopelessly obsolete. This may not apply to Show Auriculas or rare species, but in Polyanthus which breed fairly true from seed I have found it to be true.

Seed sown in July and fielded out in October gives us large plants in bloom from the middle of February on as a rule. Last year was one of the exceptional years when we had plants in bloom for Christmas, rather a disadvantage from a business point of view as at that time there is hardly any market for them. Field grown seedlings are potted up and moved into the greenhouse where we do all of the pollinating. Outdoors, rain and fog reduce our possibilities of getting seed to practically nothing.

I chose the Polyanthus because of its wide adaptability to climatic conditions which most of the other species lack. Although they will perform better in the north where rains are the usual thing, they are rugged enough to take the semi-arid conditions of Southern California in their stride.

* vulgaris
Mr. Leo Jellito

Dear Editor and Members of the A.P.S.

Many thanks for your letter of the 26th of October requesting me to write about my type of work. Enclosed you will find a picture of myself, as you wished to have it.

My interest in Primulas was awakened when starting my apprenticeship as a gardener in 1913 under the guidance of the then well known Primula author, Dr. FERDINAND PAX, director of the Botanical Institute and Botanical Garden in Breslau. Even at that time, the Botanical Garden in Breslau could boast of quite a collection of Primulas. I was particularly impressed by the then new Primula juliae, the "carpet-primula," which was discovered in 1900 by Mrs. JULIA MOLOSSIEWICZ near Lagodech in the eastern Caucasus Mountains.

As a professional gardener I take great interest in botany. The embryo for the love of the Primrose was started in me by Professor PAX, and further encouraged when working with the great nurseryman GEORG ARENDS (the German Burbank) in Ronsdorf near Wuppertal. Mr. Arends was much occupied in creating Primula hybrids and in their culture. Therefore, in 1918, Primula X Helena was born here, a cross between P. juliae and one of our garden hybrids from P. acaulis (vulgaris). Mr. Arends has also produced P. arendsi (obconica) as one of our best potting Primulas. (In most climates a florist or hothouse Primula.) Working with Mr. Arends fanned my love for Primulas to an intense enthusiasm. Mr. Arends passed away in March, 1952 at the age of 88 years. I had the rare fortune to write the life memories of this great gardener, and it pleases me to have retained for future generations the valuable life of this God-gifted person. I shall take the liberty to send this book to the A.P.S. library. It is titled, GEORG ARENDS, MY LIFE AS A GARDENER AND HYBRIDIZER, and I beg those of you who are interested to turn to page 98 where you will find the caption, "My hybridizing with the Genus Primula."

In 1925 I was offered the proposition to establish a botanical garden in Essen. It was here I had the opportunity to devote myself to the Primulas, and had possibly at that time the best Primula collection in Germany. I received many seeds from Professor WILLIAM WRIGHT SMITH of Edinburgh, and simultaneously much seed was exchanged with all botanical gardens. My experiences in germination and culture of Primulas, written down in notes and small gardening publications, were published in 1937 in my book THE GARDEN PRIMULAS.

Also in 1957 I received an offer from Stuttgart to prepare a big garden exhibition, which opened in 1939. I was very much concerned to grasp the opportunity in creating on the 125 acre area a Primrose Garden which would comprise 2½ acres and show a complete collection of all the available true species and garden forms.

It is deplorable that the war has destroyed all this beauty. Six bomb craters were in this garden. Only in 1948 and 1949 was I able to start over again in the rebuilding of a Primula garden. Naturally it was very difficult because all plants were lost. I was able to increase the collection from year to year, so our Primula garden has become the mecca for enthusiasts today, and is again something to truly admire. The planting has been done with a natural point of view in relation with rhododendron, lilies and perennials, but Primulas are predominant. Many species and hybrids are still missing, in particular the more recent introductions from the Far East. This big exhibition park belongs to the city of Stuttgart. It is my duty as garden superintendent to provide for the complete planting and botanical supervision of this park, for the welfare of the people and also for nature study. Large plantings of perennials, annuals, roses, dahlias, tulips, etc., give the visitor the opportunity to make the acquaintance with new introductions, also giving the professional the possibility to make comparisons. We maintain a constant list of the more particular plants. It is also here that new roses and dahlias and other perennials are undergoing trials. This is my special work.

I am Editor of the weekly magazine THE SOUTH GERMAN COMMERCIAL GARDENER too, published by EUGEN ULMER, in Ludwigburg.

This is proof to you that I am a busy man. But I shall strive, time permitting, to act as your Regional Editor for Germany. I received your Quarterly volumes for 1955, for which you have my thanks. I was astounded at the careful and serious work you produce in the "Quarterly," and feel great pride to be included in this circle of workers. I will be glad to send you the illustrations from my book, THE GARDEN PRIMULA. I regret that I cannot send you the engraver's plates and thus save you the expense, but they were made in 1938, and were destroyed in September 1944 during a bomb raid. I also am glad to give you permission to copy the distribution maps on pages 14, 15, and 17, in the same book. These photographs I give the Quarterly without cost or obligation and hope in doing so to contribute towards this valuable work.

Sincerely yours, Leo Jellito

Hofersstrasse 2.
Stuttgart - N. Germany
November 18, 1953
Plants, as everyone knows, may be propagated from seed. However not all plants come true so we resort to division, cuttings, grafts, (budding is a form of graftage) and air layers or modifications of these. Many good books are available on the operations involved, so rather than talk about the operations themselves, a few hints on applying them to your growing needs might prove more helpful.

When the Editor asked me to write, she suggested that many people think the good growers have magic words or secret formulas to take the place of careful attention to watering and other details. To grow a plant well it is necessary first to find it's wants then supply them as often as needed. It sounds simple and really is. If you have a little guy you don't put off changing his diapers or feeding him just because you are too busy doing something else. So it is with your little plants. They are living things too and need the same constant care. That is half the battle.

Last year we had seedlings, sown in January while it was still cold and damp with short days, start to damp-off. We heard about a fine new fungicide so all the flats immediately were watered with it. We stopped the damp-off but also inhibited the germination of the seed. Come to find out, it produced iron toxicity in the soil. We have tried with varying success, potassium permanganate, Semesan, corrosive sublimate and many more. To date the best control was secured with Nattraphine which seems to stop bread mold, rot, etc., without hindering germination. It works on Primulas, Tuberous Begonias, Rhododendrons, Magnolias and others.

Keeping seed flats moist is always a problem. A few ideas that work, within limits, may help. For very fine seed of Rhododendron species, Begonia species, Primulas etc., I used 9" x 12" x 2½" seed flats and drilled a ¾" or 1½" hole in the center. Obtaining some braided glass wicks, I cut 6" lengths and unbraided about 2½" of one end, spreading these like a cart wheel on the bottom of the flat with the unbraided end through the hole. I fill these with good soil and set on a one pound coffee can filled with water. I sowed seeds carefully on top, firm with a flat board, and watered well to start capillary action. As long as the can had water, the seed were kept constantly moist and if shaded a little, need no covering except for those seeds needing dark to germinate. For these one fourth sheet of newspaper was just right. In damp weather you will have to watch that the air movement around the flat is good. Filling the flat clear full helps prevent stagnant air around the seedlings and resulting mold and damp-off.

Sowing in hot weather has its problems. I have a lot of seed sown under glass July 1st that is coming fine. I planted in 3" x 1¼" x 2¼" flats in compost and watered in (no soil over seed) then shaded with newspaper. First the weeds germinated and were pulled. When the Primulas started to germinate, I removed the newspaper and sprinkled plastic aggregate zonalite (expanded mica) over the seed just thick enough to cover the soil completely. This seems to let air to the seedling yet acts as a buffer against the drying of the soil by the sun. Mine seem to need water every 2nd or 3rd day when treated this way. My experience with germinating Primrose seed in hot weather seems to point to careful watering along with darkness until germination is well under way. This may not hold true for some of the "difficult" species, but all of the commonly grown sorts will germinate well even in hot weather.

Very fine seed in small quantities may be sown on a red brick set in a pan of water. The brick soaks up moisture and the plants don't dry out. A fine sprinkling of soil on the brick would allow the plants to get a little larger before transplanting. The drawback to this method is the small size of plants when they must be transplanted. Another good idea for seeds or cuttings is to line a flat with Polyethylene plastic. The corners may be heat sealed with an iron, covered with cellophane or folded with a tinsmith fold

Propagation by division of your best Primulas as well as the double sorts, species, Juliae hybrids and Show Auriculas isn't hard. First prepare your bed well and then water and water often. That's all. To prepare my beds, I spade in lots of humus—compost or very old manure is best. If you can't get old manure build a bin and get a load of fresh. In a year the top layer is fit and in a couple of years it will all be old. Sawdust is good and cheaper but you must use nitrogen with it. The soil bacteria that change organic matter to soil loses lots of nitrogen. As these bacteria are free to move about through the soil, they can obtain more nitrogen than the stationary plant can. A yellowing of the leaves of plants usually indicates a lack of nitrogen in beds where sawdust is used without additional nitrogen. So, the faster the bacteria multiply, and the quicker the sawdust becomes useful material for the plants. Ammonium Sulfate dissolved at the rate of 1 tablespoon in a gallon of water is a cheap source of nitrogen. Don't use a stronger solution or you may burn. Just use more gallons of it. After spading the beds well and raking, I divide my plants to single crowns and plant about 6" apart, as soon as the plants start to get to it, and water well immediately after planting.

It doesn't matter how rich your soil is if you don't water enough. The only way a plant can get food is in solution, so, no water, no food, even if the plant isn't suffering from dryness. It makes sense doesn't it? I seldom get around to any fertilizing after planting, but good soil to start with and water, water, water, surely produce fine plants.

The "Exceptions" of course are the difficult species. Finding exactly the right combination of moisture, light and soil is the key to their success. Here again the new plastic that holds water vapor and passes other gases is a help in the care of those extra choice plants. Take a handful of Sphagnum moss wring it out in a solution of Marine fish fertilizer, 1 tablespoon to the gallon of water, place on a 7" x 7" square of polyethylene plastic, plant the division in the moss, bring the film around the base of the plant and fasten with stretch tape or a rubber band. A whole flat of these may be kept in partial shade and require no further care till the roots show and are ready to set in the garden.

Fine results have been reported using a plastic sheet to wrap potted plants in when you go on a vacation. It should prove a blessing for those choice Primulas we receive through the mail partially dried out. Planted out they often dry out further before new roots become established enough to supply moisture. Try this: Cut a strip of cardboard about 3 times as long as the diameter of the plant. Tape the ends together to form a circle, tape the bottom edge of a sheet of plastic to the cardboard and tape the seam where the plastic sheet laps. Place this whole over the plant and sink the cardboard into the ground a little. Gather the top together with a rubber band or string. Then just watch how quickly the plant recuperates. It makes a miniature greenhouse which retains water vapor yet passes harmful gases.

While all these helps make propagating easier, constant watchfulness and the cleanest growing conditions are still needed in the battle against insects and fungus diseases.
The Study Group

One of the most interesting activities in the A.P.S. this year is the Study Group under the direction of Mrs. John Karnopp. The program for the January meeting will include a demonstration on seed planting and a talk on the American Species. The group will have an Auricula Day in February and all the phases of Auricula culture will be discussed. A Judging School will be held in March. A coffee hour discussion follows each meeting. The Study group meets the second Friday in each month at the Portland Public Library at 1:30 P.M.

Pointers on Permanent Soil Improvement

Charles Jamison, Portland, Oregon

I have been interested in soil structure and fertilizers since one of my teachers told me how man had, in many instances since time began, impoverished the soil given him and thus helped his civilization to falter and even to fall. As a young man, with my head in the clouds, I thought I would go forth in the world doing the best of all work, the saving, the development, and the improvement of the soil.

I still feel this way and I am grateful to be able to earn a living for my family and for myself while satisfying the wish of my youth. It has even proven to be good business practice to adhere to my early ideals. I soon became aware that the commercial fertilizers I was testing consisted of the three major elements only; nitrogen, phosphorous, and potassium, with an almost worthless filler as a carrying agent. I made up my mind to manufacture a product which would give the gardener his money's worth.

I knew that the soil needed many chemicals, sometimes for their own vitamin-like effect, sometimes to make another element or mineral available to the plant, and sometimes to encourage the bacteria to cooperate. For instance, a clay soil is a good soil, but when it becomes sticky, hard or baked, it is a sign that it is out of mineral balance and that the good food is locked up and is unavailable to anything planted in it. 95% of the bulk of a plant comes from the free elements it uses, such as carbon from the air, hydrogen, oxygen, etc., but the quality comes from the mineral elements that can be assimilated from the soil. Thus it is best to study the label on the sack of fertilizer you buy to see just what you are getting for your money.

There is no substitute for humus. The soil is a sort of beehive humming with innumerable workers, a million of which can be lifted between finger and thumb. They find the raw materials in the humus and among the soil grains and decompose both organic and inorganic soil matter for the use of the plant. Processed manure is a fertile and a safe sort of humus for general use.

Plants do not "eat," they only "drink," and the whole working balance of the soil depends on the presence of water, for without water the plants cannot absorb their nutrients in a soluble form, which is the only way food can ever be available to leaf surfaces and root hairs. Yet the soil in the ordinary vegetable and flower garden should at all times be adequately drained.

If you would start a permanent soil improvement program, do not expect a miracle to happen in the first season: nature does not work that fast on neglected soil. However, you will be well rewarded for your efforts, even on poor, heavy soil, if you will add fertile humus, a balanced mineral and element fertilizer, and good drainage material. The foliage and grass will take on a deeper green and your plants will show new sturdiness and depth of color.

In the next Quarterly I will tell you about the advantages of using natural ground phosphate and answer any questions you may send in.

American Primrose Society Show

It is not too early to give consideration to the plants you are planning to "Show" this year. It is a pleasant responsibility to help popularize the Primula by showing our best plants (of course, they never seem "good enough" until after you have seen the others). THE AMERICAN PRIMROSE SOCIETY SHOW, APRIL 22-25, will again be held at Gresham at the Annual Spring Garden Show as it was last year. We are very fortunate in getting Mrs. T. W. Blakeney for our Show Chairman. She and her co-worker Mrs. H. A. Hartsborn did very well indeed by the Society last year as the Gresham Show was a success in every way. It takes a great deal of work as well as organization to put on a fine display and Mrs. Hartsborn and Mrs. Blakeney need a great deal of help from members, they did too much of the work by themselves last year and they have been promised cooperation both in the way of plants for the display and in the donation of labor for the project itself.

Auricula Culture

Mrs. Ben Torpen, Beaverton, Oregon

We regret that the following paragraphs were omitted from the beginning of Mrs. Torpen's article in the October 1953 Quarterly, page 46.

These questions are often asked, "How shall I take care of my Auriculas? When shall I repot them? What potting soil shall I use? How deep should they be placed in a pot? How much water should they have? Should they have sun or shade? Can they be grown in a greenhouse? Should they have heat in the winter?" . . . We shall attempt to answer these questions and others that may arise in the minds of those who have fallen under the spell of these interesting and exciting plants.

June is the month when Auriculas should be repotted. Care should be taken to get everything in readiness for the work. Compost should be made in advance, pots cleaned, and plenty of crocks (pieces of broken pots) ready so that the work may be carried on without delay once started. Here at Woodland Acres we use a compost of equal parts loam, peat moss, and well rotted cow manure, well mixed and screened. This compost is made up well in advance of potting and allowed to mellow. No artificial fertilizers are used. These proportions and materials are given as a guide, for growers must rely on what is at hand and materials vary in every part of the country. It is suggested, however, that the fertilizers used be organic rather than commercial or artificial. If bonemeal is the only available organic fertilizer use the steamed meal rather than the raw. Whatever ratio is used in making up Auricula potting soil, care must be taken to see that the compost is light enough to allow the water free exit through the soil. It is fatal to an Auricula for the water to stand around the crown.

A duplicate set of pots may be kept on hand to speed the process of repotting. Or perhaps the grower may have one or two dozen extra pots on hand to start the work. In any case be sure that the pots are clean and sterilized and that all pots just emptied are cleaned thoroughly before they are used again. It is a simple matter to clean pots if they are put to soak in a tub or bucket of water for a few minutes. A stiff brush will remove any dirt or scum which may have collected and a small amount of household disinfectant, added to the water, will sterilize them quickly.

Soak all pots before they are used, otherwise the moisture is drawn from the compost which causes a void between the pot and the soil and makes efficient watering impossible. The water simply runs down the inside of the pot and leaves the soil as dry as before although the top of the soil may be wet.
Of Interest to Members

This column has been cut because of lack of space. We must wait to write about Rae Berry and her collecting trips and the exciting new Primula from Alaska which she has sent to Dr. Fletcher at Wisley. There have been some fine additions to our library which will be listed in the next issue. The Friday Harbor Primrose Society has sent in information on growing hints from their locality and we hope to print these together with a picture of the group. There is a wonderful prize from England for the best Auricula. The story of this prize, which is a fine antique, will be published with illustrations in the Year Book.

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( ) R.H.S. Dictionary of Gardening, 4 volumes, 1951 @ $55.00 Complete
( ) Webster's Collegiate Dictionary @ $5.00, $6.00, $10.00 & $12.50
( ) Cultivated Species of Primula by Walter C. Blasdale @ $7.50 Each
( ) Album of Arrangements by Carl Starker @ $7.50 Each

Gills will be glad to fill orders for books from any publisher.

Name: ____________________________
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( ) Cash ( ) Charge

The J. K. Gill Co.
408 S. W. Fifth Ave. Portland 4, Oregon

Alpenglow Gardens News

We have just mailed our supplementary lists containing many rare Primulas including named Show, Alpine, Garden and Species Auriculas (please see our advertisement in the October 1953 Quarterly, page 69). We also have many other fine Alpine Plants, Border Carnations, dwarf Shrubs and Seeds in our list and if you have not received your copy, please ask for one, it is free.

Although Show and Alpine Auriculas can be shipped at almost any time, we suggest shipping the first few months of the year before the plants are in full growth.

Alpenglow Gardens — Michaud & Company
1504 Trans-Canada Highway, R.R. 10, New Westminster, B.C. Canada

FREE SOIL ANALYSIS

both N.P.K. & soil acidity tests to anyone who will buy $10 in merchandise from our complete stock of garden equipment and supplies. ($2.50 regular charge.)

10% off on VLATERTH to A.P.S. MEMBERS

Bring your Quarterly with you and show me this ad and I will give you 10% off on the most complete fertilizer on the market today.

ADVICE GIVEN FREELY

whether you are a customer or not. I try to keep up on all the latest developments in soil improvement and am constantly testing new theories.

CHARLES JAMISON
6429 S.E. Powell Blvd. Portland 6, Oregon

Telephone, TAbor 7023 (closed during January, call SUNset 7705)

Please read our advertisement on page 32

HELEN'S PRIMROSE SEED

"Extra Special" Polyanthus Seed — Surprising Size
Mixed packets $1.00
Mixed Garden Auriculas
Pastel to deep shades $1.00 per pkt.
(all carefully hand pollinated)

16601 N. E. Halsey Portland 20, Oregon

YOU ARE INVITED TO SEND FOR
our
1954 CATALOGUE
of
Pedigree Flower Seeds
from
World Famous Growers
Sent post free on request.

One of our specialties,
Primula Acaulis
Grandiflora

Georg Hampe's strain
The beauty of these Primroses is the result of long selection work by a gardener to whom it has been a labour of love. Their easy culture and many possibilities make them a subject of unusual interest. In shade places these Primroses are wonderfully decorative, their richness of colour and their early blooming make them a favourite used in the garden, as pot plants or plant material for flower arrangement. Diseases and insect pests are unknown.

5701 Red 5703 White
5702 Blue 5704 Yellow
5926 Mixture of listed varieties

Large Export Packet Price 1 Dollar including air-mail passage.

GEORGE B. ROBERTS
SEED MERCHANT
AVERSHEM, KENT. ENGLAND
THE WORLD’S GREATEST BOOKSHOP

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* FOR BOOKS *

Bookbuyers throughout the world turn to this
Bookshop as a knowledgeable source of
information on all their book requirements.

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New, secondhand and rare Books on every subject. Stock
of over three million volumes. Quick postal service.

119-125 CHARING CROSS ROAD, LONDON, ENGLAND

The Alpine Garden Society

Members of the American Primrose Society would find much of interest in the
Quarterly Bulletin of the Alpine Garden Society.

The genus PRIMULA is of outstanding importance to all rock gardeners and new
introductions (of which there have been several in the last few years) are fully
described, usually with photographs.

In earlier volumes there have been numerous articles on European and Asiatic
Primulas and the separate numbers are mostly available.

The subscription is One pound per annum, payable on the 1st of January but
in earlier volumes (of which there have been several in the last few years) are fully
described, usually with photographs.

Apart from shows and meetings in which Overseas Members are unable to take
part, the Society has recently inaugurated a Seed Exchange in which Overseas
Members have certain priority, whilst such Members can utilize the services of the
“panel of experts” and are welcomed on the Society’s Continental tours.

Subscriptions should be sent to the Secretary, C. B. Saunders, Husseys,
Green Street Green, Farnborough, Kent, or to Dr. Worth as above.

THE SCOTTISH ROCK GARDEN CLUB

Annual subscription $1.50 personal check or bank draft. Two journals a year.
Frequent articles on Primulas, liberal seed exchange. Seeds of 72 varieties of
Primula distributed last year. Write for membership forms and for information
to—Major-General D. M. Murray-Lyon, Honorable Publicity Manager, 28a
Inverleith Place, Edinburgh, 4, Scotland.

Seasonal Notes from Barnhaven

With frogs and robins singing a siren’s
song and the primroses allowing them-
selves to be deceived, we must remind
ourselves to beware of the false spring
as we approach the new year, and to be
ready for danger of plummeting tempera-
tures, without snow, in the months just
ahead. Not only is this true of the
Oregon country; we hear that the east
and mid-west, too, are having primroses
in bloom in the winter. There is a good
degree of safety if you have mulched be-
tween and around your plants with mu-
crinum, Blue Whale, compost or well-
rotted sawdust, but it is well to have on
hand, in lieu of snow coverage, boughs or
other light, airy material to cover
plantings quickly should need arise.

Here at Barnhaven it seems even more
like spring with the immediate need for
transplanting some 25,000 seedlings, seed
of which we sowed two months ago to augment some of the color series which
might run low in the spring shipping.

There was a time when blues and pastels
germinated more slowly than others, like
all highbreded flower seed, but in re-
cent years we find these come along
more quickly than the reds, with no
lottering around. For this relatively
small late fall sowing, we used flats in
stead of benches, so that the flats could
be kept in the covered A-frame with
heat if and when temperatures drop to
25 degrees. And we decided to make
the experiment recommended by a Bri-
tish Columbia customer, so placed the
planted flats in a large freezer for a
week or two months after sowing. This
is the period in which root-weevil dam-
age may occur. Between this Quarter-
y and the next is the period in which root-weevil
damage, if any, will become apparent. Watch
for signs of diminishing or yellowing foliage—usually in the lower leaves.

At Barnhaven we keep a bottle of 1/200 solution around
the plant holding up the leaves to get
close to the crown, allowing it to perco-
late down among the roots, for weevils
are killed by poison and not on contact.

We give Blue Whale a great share of the credit for the wonderful, compact,
rugged top growth and heavy root
growth in that larger crop, and, of
course, have used the same proportions in this supplementary one. Should you
wish to know, this mix is: 1/2 top soil,
screened, 1/4 sharp sand (we use the
coarse fill sand rather than mason’s sand) 1/4 peat and 1/4 Blue Whale.

That highly-bred seed is often slower of
germination than common seed, and
profits by a frosty push or two, is now
pretty well known, and certainly by
mid-west, too, are having primroses
in bloom in the winter. There is a good
degree of safety if you have mulched be-
tween and around your plants with mu-
crinum, Blue Whale, compost or well-
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are killed by poison and not on contact.
Dear Friends:

Did you know that I am not a fish? I am a mammal and for this reason I can give your gardens a product of definitely great value. From pole to pole I range the ocean, gathering up vitamins, which I now bring to you, processed and prepared with the highest technical skill. If you would grow your plants and flowers for health and beauty, use this Organic product, which I bring to you.

Sincerely, your good friend,

The Blue Whale

P.S. I am proud to tell you that something new has been added to the BLUE WHALE BRAND Sundried Sphagnum Moss. Blue Whale has always been rich with the vital elements for which I am famous for my ability to produce, but now the baleen and bone have been added by a process which renders them immediately and continuously available to the plants which are planted in Blue Whale. The Whale Soluble might be termed the "essence of the whale," the Baleen is equivalent to Horn and Hoof found so beneficial in famous English potting composts. Just think, if you use Blue Whale you are giving your plants a complete diet of what they need by nature's own balanced bacterial method without the laborious and unpleasant duty of working with barnyard manures. Blue Whale is a complete compost free from weeds and disease. This Blue Whale Organic Compost is almost 100% potential Humus and provides ideal conditions for the life in the soil which is the answer to the growing of healthy Plants, Flowers or Vegetables.

I am happy in the knowledge that I have the ability to be of the utmost service to you.

Distributors:

Chas. H. Lilly Co., Portland Ore.
The Western Seed, Denver, Colo.
Capital Nursery Co., Sacramento, Cal.
Seeley's, Fresno, Calif.
Antonelli Bros., Santa Cruz, Calif.
Garden Seed & Feed Co. San Mateo, Calif.