The Journal
OF
The Scottish Rock Garden Club

Obtainable from
Squadron Leader J. J. BOYD-HARVEY, Hon. Secretary,
Boonslie, Dirleton, East Lothian
PRICE 2/6, post free 2/9

VOL. V. PART 1 No. 18—April 1956

Photo.—R. B. G., Edinburgh.

Fig. 1.—Trillium ovatum.

Photo.—R. B. G., Edinburgh.

Fig. 2.—Saxifraga strigosa.

The Journal

OF

The Scottish Rock Garden Club

Editor—J. L. MOWAT, University Botanic Gardens, St. Andrews

Chief Contents

VOL. V. PART 1 No. 18—April 1956

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Editor's Notes

THE CLUB's new President can be a stranger to very few, if any, of the members. His great energy and drive have shown themselves over many years as manager of the Club's advertising and publicity, as a regular and prolific contributor to the *Journal*, and a willing and popular speaker at group meetings in many parts of the country. Even overseas his correspondence with our more distant members must have made him many warm friends. On behalf of all Club members we wish him well in his new duties, confident that his keen enthusiasm will ensure for the Club the same unhalting progress that it has enjoyed over the post-war years.

With some associations elevation to the presidency is often promotion to a more or less semi-honorary office in token of respect and past works, and involves little more than the chairing of committee meetings and an address at general meetings. S.R.G.C. presidents of past years, however, have built up a tradition of unflagging industry in Club affairs which makes the presidency more like a sentence to a term of hard labour.

It is most encouraging to all who have the Club's welfare at heart that its membership continues to increase steadily, albeit in some areas a little slowly. Particularly enheartening is the fact that the number of overseas members keeps growing, and we wish here to record our pleasure in the correspondence received and in the active interest our fellow members and friends outwith Scotland take in all Club matters.

In this respect readers of this issue will see that unless some serious "pulling up of socks" is done by "home" members they may soon be outnumbered by contributors from other "areas." We say "areas" intentionally rather than "countries" because the fellowship of rock gardening disregards national boundaries.

It will also be seen that contributions cover a wide field of matters relating to rock gardening, ranging from descriptions of the plants in their native habitats to the problems of cultivation and soils and, when the perfect plants are ultimately achieved, their recording by their happy owners by means of film and camera.

It was a happy coincidence that after the harrowing tale of his troubles by "Locum tenens" should come a very professional-like contribution by T. C. Clare, written with the express purpose of advising members in their photographic problems. Mr. Clare is not a professional photographer and makes no expert claims, but is a keen amateur eager to learn by trial and error and pass on his learning to others.

For a year or two it has seemed to us that there was a distinct possibility that the Club was approaching what might be called "saturation point" with regard to its shows, and that there was a danger that a sort of stagnation might set in. When shows are only building up it is not too difficult for an enthusiastic show committee and secretary to maintain and surpass the previous years' attainments. There inevitably comes a time, however, unless new factors can be introduced, when this becomes increasingly difficult even with the whole-hearted co-operation of show secretary, committee, and members (the support of ordinary members is most important), and shows are in danger of landing in the "doldrums."

Fortunately for the health of Club shows two new factors have recently appeared which should ensure an added and continued interest. For a year or two now the **National Trust for Scotland** has held a **Scottish Rhododendron Show** in conjunction with one of our Club shows, alternating between Edinburgh and Glasgow. This year Rhododendron Shows are being held both at Edinburgh and Glasgow. We take this opportunity of commending to members the fine work of the **National Trust for Scotland** and wishing their two shows every success.

The other new factor should arouse even more renewed activity among members. At Glasgow and Edinburgh Shows last year the plants brought forward to the **Joint Awards Committee,** meeting in Scotland for the first time, were very satisfying both in quality and quantity. This year the **Joint Awards Committee** meets at Glasgow and Dundee shows, and it is hoped that members will do their utmost to surpass last year's achievements. These meetings bring out the cream of the country's rock plants and their growers, and all members should make an effort to be present at Club shows, where even the most experienced often finds that he has something to learn from "the other fellow."

After the wonderful but devastating summer of last year, whose drought lasted in many parts of the country well into the autumn and early winter, nearly the whole country is again in the grip of a prolonged spell of frost and snow as we write these notes in the latter part of February. Temperatures this winter have fluctuated erratically, commencing with a—for us an unprecedented—severe cold snap in October. Since then there have been spells of almost summer temperatures alternating with sudden drops to the neighbourhood of zero or below. Plants are truly amazing in their powers of recovery ; how any of them at all survive the many rapid changes from one extreme to another is almost beyond comprehension.

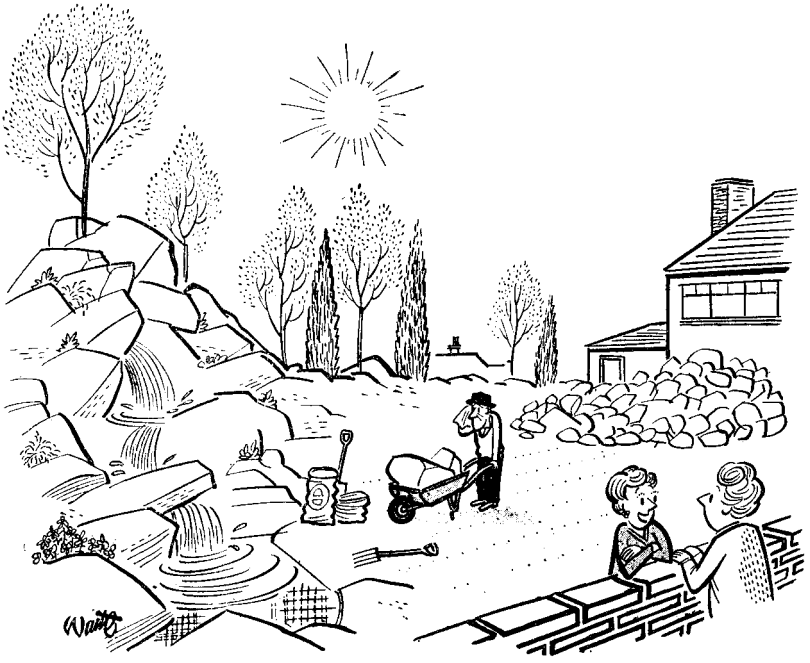
The Council have given much thought to the possibility of increasing the number of the Club's annual publications, and with this end in view a number of proposed small economies in the set up of publica- i ons were gone into very carefully. Recent increases in printing costs,

however, and the increased postal rates which came into force in January, will more than eat up the small economies made in set up. With our present membership the postages alone for each issue of the *Journal* will now amount to considerably over forty pounds ; most regretably this in itself is a strong argument against increasing the number of issues per year.

During the past year the Editor has received much interesting correspondence from Club members in many parts of the world, and enquiries from the Pentland Firth to Gibraltar and the western seaboard of North America. He welcomes this correspondence and thanks all who have written in the fellowship of the Club, asking for the understanding and forgiveness of any whom he has not been able to answer personally.

On behalf of all fellow members he thanks those who have helped to contribute to the interest of the *Journal* and assures them of the warm appreciation of the Club.

April 1956.



" Mind you, I think up all the ideas for him."

Reproduced by permission of the proprietors of PUNCH.

Correction

MANY MEMBERS will have noticed in the Year Book that in the schedule for Edinburgh Show is a statement that the **JOINT ROCK GARDEN PLANT COMMITTEE** will meet there. This, of course, is wrong, the notice having been left in from last year by an oversight.

The JOINT ROCK GARDEN PLANT COMMITTEE meets this year at **GLASGOW** on 17th APRIL and at **DUNDEE** on 13th JUNE.

Club Christmas Cards

These cards, which this year will be made from figs. 15 and 16,* will be on sale at 9/- per dozen (in not less than dozen lots). Members are asked to order as early as possible from the Hon. Treasurer, Mr. Stewart Mitchell, 1 Muirfield Crescent, Dundee.

Steadily rising costs make the production of the *Journal* increasingly difficult, and the active participation by members in the Christmas Cards scheme is vitally necessary if colour plates are to be continued and other illustrations maintained in our publications.

*See Page 64.

The American Rock Garden Society

Probably most members are aware of the existence in the U.S.A. of a Society comparable with our own. Some members may have wished to join this Society, but have been deterred by the apparent difficulty of transmitting their subscription.

We understand that this difficulty is not insuperable. Permission has to be obtained from the Exchange Control in the first place and evidence has to be supplied of the existence of the Society and its membership fees. Having secured sanction, the member obtains a draft from his Bank and forwards it to the Society. In practice it would probably be best first to consult one's Bank, which could supply advice and the appropriate forms.

The annual subscription is 3½ dollars, or 10 dollars for three years if paid in advance, and the Secretary, who will send further particulars, is Mrs. D. E. Hansell, 19 Pittsford Way, Summit, New Jersey, U.S.A.

In addition to its bi-monthly Bulletin, the American Society has a Seed Exchange in operation and issues special plant leaflets under the name of Saxiflora.

Seed Distribution

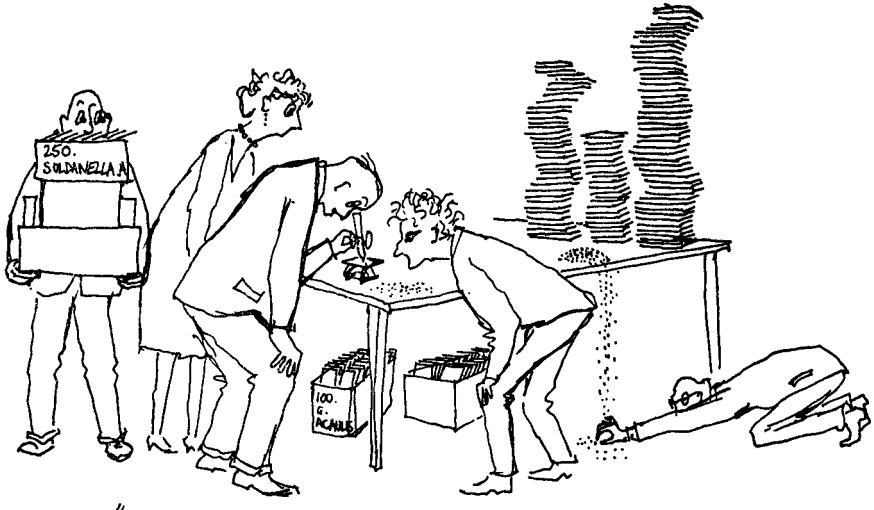
THIS YEAR there have been applications from 500 members, and it is estimated that, by the time distribution is completed, approximately 10,000 packets of seed will have been sent out. I am deeply indebted to six members of the Club, who gave magnificent help, often driving on icy roads and through blizzards to do so. Without their help, it would have been impossible to accomplish the work.

It is hoped that many more members will send in seed next Autumn, thus keeping pace with the increasing demands, and adding variety and interest to the list.

C. E. DAVIDSON

Letter from member

MR. J. SAVIGNY writes to the effect that, if any member would like to have seed of a particular Tasmanian plant, he will do his best to obtain it. Members wishing to take advantage of this kind offer should write direct to Mr. Savigny, at 62 Cameron Street, Launceston, Tasmania.



Seed distribution—preparing for packeting.

New to My Garden—Part 1

By D. M. MURRAY-LYON

LAST YEAR (1955) I had a number of plants flower in my garden for the first time—not necessarily new plants, or new to me, but new to my garden. Perhaps a description of some of them would interest other members who would like something "new to their gardens."

Most, if not all, of the plants are obtainable from nurseries, or else seed of them has been offered in our Club Seed Exchange List.

Androsace foliosa is larger than any other member of the family I know. The leaves, up to an inch and a half long, are all basal, but do not form a real rosette ; they rather resemble mertensia leaves. The flower stems, about three or four inches long, carry quite large umbels of flowers which are pink with a little yellow in the throat. They are quite attractive, though perhaps without the special charm of the more dainty species. It is an easy plant in a not too poor scree. So far I have not tried to propagate it, and I do not know if any method other than seed is possible. It is frequently confused with *A. strigillosa* which, however, has violet-purple flowers.

The Adenophoras are first cousins of the Campanulas and flower late in the season, July/August. *Adenophora coelestis* (see Fig. 3) has narrow, rather hairy leaves, mostly on the lower part of the stems, which rise to twelve or fifteen inches. At the end of the stem, in a loose raceme, are the inch-wide nodding bells. The colour of mine is a good blue, but I believe there are forms with white or purple flowers. It is a native of Szechwan in Western China and is quite hardy. A well drained, not too dry soil, or richish scree suits it. The plant dies right down in winter. Propagate by seed, or by division as growth starts in spring.

A. tashiroi is from Japan and is more or less a smaller edition of the previous plant, and has large pale blue flowers.

Campanula nitida (Synonym *C. planiflora*). The white form of this campanula is quite common, but the type form with powder-blue flowers is seldom seen ; why, I don't know, as they are both equally attractive and easy. The synonym planiflora is quite an apt description, as the flowers are plate, not bell-shaped. Both forms have rosettes of shiny green leaves crimped at the edges. The flowers are borne on stout stems up to four or five inches in height with me, but "according to the book" to nine inches ; mine are grown in scree. They are not fussy and do well in any reasonably well drained soil. Divide about April for increase.

Campanula - ? - var. Covadonga. The query mark is NOT a misprint, for the pundits are still arguing as to whether this is *C. scheuchzeri* or *C. linifolia,* while I got it as *C. stenocodon* ! Anyway, there is no argument about the Covadonga part of its name, for it was collected by Joe Elliott near a place of that name in the Calabrian Mountains

in Northern Spain. It is rather like our own Scottish Bluebell, but only about four inches tall and not so inclined to run. The bells, up to four to each wiry stem, are a rich royal purple according to the original finder. Personally I would not describe mine as royal purple, but rather a violet purple, anyway not so deep as royal.

Whatever the colour, it is very attractive and free flowering, and so far with me a good doer in rich scree. It looks as if it would divide easily. It received an Award of Merit in 1939.

Dianthus inodorus is frequently listed as *D. sylvestris*, because according to Farrer in *The English Rock Garden*—"It is never found in woods." In the Alps it usually grows in dry sunny places, so a scree is the answer here. It forms a grassy tuft from which spray out arching stems carrying large pink flowers. The colour varies considerably in different plants ; in a good form it is a really good clear pink.

It may be propagated easily from seed in spring, or from cuttings in July or August.

Daphne verlottii is according to some botanists merely a form of *D. cneorum* ; if so, a very desirable form. It is found in the Pyrenees and also in Bavaria. It is smaller in all its parts than the typical *D. cneorum*, and its flowers are less closely clustered. The buds are ruby, and the open flowers a very pleasant soft pink and sweetly fragrant. It flowers freely over quite a long period, starting in May. It is said to be at its best in nature growing in fairly rich loam, well drained, of course ; so perhaps some extra loam added to the scree mixture would be a good idea when planting.

Slow growing and prostrate, like all forms of *D. cneorum*, the lower branches tend to become naked with age. In these circumstances a top dressing is appreciated, and a flattish stone on top of that encourages it to layer itself. This is the best way to propagate it too. If the lower surface of the shoots are lightly scraped with a knife, and a little Seradix hormone powder dusted on, it aids rooting, I think.

Diplarrhena moraea var. alpina : *D. moraea* is the wild white flag iris of Tasmania which grows about two feet tall and is very attractive, but perhaps a little large for the rock garden. The alpine variety is much smaller, its stiff iris leaves being only about three or four inches long, and the flower stems not much longer. The flowers are three-petalled, white with a faint blue flush and gold markings—really rather lovely and unusual looking ; I did not measure the flowers, but from memory I should say they were over an inch across. I have had the large form for a number of years growing in scree, and Colonel Dundas has had a great clump of it in his Perthshire rock garden for years, so it is hardy all right. There is every reason to suppose that the alpine form will be equally hardy. I have one plant in the alpine house, and one outside in scree, and it is the latter which is looking the healthier, even after 21° of frost lately.

Propagate by dividing dormant roots about March, or sow seed in spring.

Erigeron aureus is one of the most attractive of my newcomers, with the advantage of a long flowering period, last year from May to November, in spite of being allowed to ripen seed. It is a small daisy, forming tufts of hairy grey-green spoon-shaped leaves. The stems also are hairy and in some lights have a kind of violet sheen on them. The flowers are carried at the ends of these two- to three-inch long stems. They are many-rayed and a sparkling gold. It thrives in scree and may be raised from seed.

Lewisia nevadensis is rather like a small *L. brachycalyx*, and has a few needle-like leaves and a carrot root. The flowers are white and are produced in spring ; after they fade the whole plant disappears below ground and does not reappear till winter. Scree conditions satisfy it, though a vertical crevice is probably safer. In very wet districts a sheet of glass to keep off excessive rain might be a good idea. All lewisias come from North America, and those of this type like sun, and comparative drought during their resting season, but they do not seem to appreciate a complete baking like some species tulips for example. It comes easily from seed, I am told.

Tulipa urumiensis, although introduced to this country in 1928, is still rare. It comes from Lake Urumia in North West Persia, and is one of the smallest tulips, and I think one of the most attractive. The bulb is small and dark brown, and from it at ground level emerge two to four crinkly leaves, dull green with reddish markings at the edges. The flowers are produced in April or May ; at first they are urn shaped, but in the sun they open flat and wide. The outside of the flower is yellow marked with green and red, the inside is a clear yellow with the sheen of a buttercup. According to "Grey" it is difficult to keep, but my one bulb last year gave me two flowers, and produced a second bulb—probably beginner's luck ! Not allowing it to set seed may have had something to do with it too.

I grew it in a four-inch pot and gave it a thorough baking under glass all summer. It is the type of bulb I think which would respond to the pot and plunge technique. That is, pot up in September, plunge the pot outside in your scree, leave it there to flower and then lift it for summer baking.

Phlox divaricata is the wild "Blue Phlox" of North America. There it is a woodland plant, which gives us a clue as to the treatment it is likely to require here. Certainly one of my three plants which was in a sunny scree looked so unhappy last summer that I had to move it. A moist but well-drained soil with plenty of humus in it, and shade from the mid-day sun, seems to be the answer. It is a variable plant and I have three forms of it, all from different sources.

They are all attractive, and vary only in their height and the shade of blue of their flowers, which are an inch across and carried in clusters. Mine all flowered about the end of June last year. The form *canadensis* is said to be about six inches tall compared to the nine inches of the type, and my plants agree with that. My third plant I got under the name *P. divaricata var. bourkei* and it was said to come from British

Columbia ; its flowers are a very nice blue, rather the shade of *Plumbago capensis*. There is a form called *laphamii* which is said to have broader petals of a better blue, but I have not seen it. I read somewhere lately that this Phlox did well as cover for dwarf narcisii to grow through, and it sounds a good idea. The flowers are said to be fragrant, but I did not hear of that till after they were over, and I had never got down on my knees to smell them, so I cannot confirm. Propagation—short cuttings of non-flowering shoots in May/June. Possibly some of our members in Canada or U.S.A. could give us more information about this phlox and its different forms. They might even be able to send us some seed for the next seed distribution.

Phlox stellaria erubescens; that is the name I got it under, but I can find it in no book of reference. I did find that *P. bifida* was the up-to-date name of *P. stellaria*. That does not solve the problem, though, for *P. bifida* has "deeply notched white flowers"—my plant has lavender-blue flowers. If "erubescens" refers to the stems I can see a slight reason for the name, for they might perhaps be considered as inclining to be reddish. I got it from somebody, who got it from somebody, who got it from Holland, and I have been unable to get any further information about it. If any of our readers know anything about its correct designation, pedigree, etc., perhaps they will write a note and send it to the editor.

In habit it is rather like *P. douglasii*, with the same woody stems and narrow, hard leathery leaves, but perhaps not quite so prostrate. Whatever it is, it is a good doer, flourishing in scree and having a long flowering period starting in July. I should say it is a good garden plant and it is certainly not difficult to propagate. On arrival I found two shoots broken ; I cut each in two, stuck them in sand and they took root and flourished.

Ranunculus x ahrendsii is a rare natural hybrid between *R.R. gramineus* and *amplexicaulis*, which are found in the Pyrenees and Southern Alps. As might be expected of the offspring of such parents, it is a most attractive plant, with greyish leaves and pale sulphur yellow flowers, resembling *amplexicaulis* rather more than the other parent.

It is less tall than either of its parents, being only about four or five inches high. It is perfectly hardy and is flourishing in a richish scree. I have not tried to propagate it and can find nothing about it in "Hills." The method for both parents, however, is division of the dormant roots in September. That ought to be suitable for *R. ahrendsii* also.

All the plants I have described so far require a well-drained sandy soil in sun—scree plants in fact. The next five are more or less woodland plants requiring a moist but well-drained soil, with plenty of peat and/or leaf mould in it.

Cypripedium montanum is a Lady's Slipper from North West U.S.A., and I was lucky to have roots of it sent me from Montana in October 1954. It has proved quite easy both in the Alpine House and outside in what might be called open woodland conditions, i.e. shaded from the hottest of the mid-day sun. I dare say in the west it might not

object to full sun, so long as the soil remained moist. The stems are well clothed in leaves and rise to twelve or fifteen inches. Each stem carries one or more large fragrant white pouched flowers, with twisted brown sepals.

A point to be remembered in planting is that the roots go down a very short way, but spread out laterally just below the surface. Leaf mould is the important ingredient in the soil ; it is said, too, to appreciate rotted pine needles. The roots can be easily divided, but each piece must have a dormant shoot bud. Plant with the bud poking through the soil. The best time to do this is in early spring as the roots are just starting into growth, though it may be done also in September or October.

Trillium ovatum (see Fig. 1) is another American woodlander ; over there it is known as a Wood Lily. It is a beautiful plant which is quite easy in a peat bed or other cool moist spot so long as there is reasonable drainage. Like all its family it has three petalled flowers, and these are carried in a whorl of leaves at the ends of the stems, which are about a foot high. On opening, the flowers are a clear white, but change with age to a deep pink or wine colour. It is a native of the western seaboard of America from British Columbia to California. Roots may be divided in August, and must not be allowed to get dry in the process. They are also quite easy from seed ; I had to wait five years, though, for mine to reach the flowering stage.

Dicentra cucularia, another North American, belongs to the family Papaveraceae. It is one of the Bleeding Hearts, but a very small and frail one, being only three or four inches high, and its leaves are much divided. The flowers are a creamy or pearly white, with yellow tips, and are out in June. It should be given a spot sheltered from the wind, and from the hottest of the sun, and it likes a good deal of leaf mould in the soil. Propagate by division in April or July.

Saxifraga strigosa (see Fig. 2) is not strictly new to my garden, as I have had it now for a year or two. It attracted a certain amount of notice, though, at the 1955 Haddington Show, so I am including it. Farrer is very uncomplimentary about it in *The English Rock Garden,* so much so, in fact, that I doubt if he is referring to the same plant.

It is a native of the Himalayas, where it was found by Ludlow and Sherriff, who sent home seed of it some years ago under the number 13317. It belongs to the *Boraphila* section and is a neat low-growing plant. Above rosettes of slightly hairy elliptical leaves rise three-inch stems, bearing many flowered sprays of starry soft yellow flowers.

It is an attractive plant with the added advantage of flowering in September/October, when flowers, especially yellow ones, are not too plentiful. It has proved to be hardy both in my own garden and in the Royal Botanic Garden, growing in well-drained but moist peaty soil. In a well-known Tyneside garden it is seeding itself on a damp wall. It is offered in the catalogue of at least one of the nurserymen who advertise regularly in our *Journal.* It should be carefully labelled, as it disappears below ground entirely for the winter and reappears rather late in the spring.

(To be continued)

Notes on an Anatolian Journey

By W. SCHACHT, University Botanic Garden, Munich
(Translated by Helen and Edward Kemp)

THE DARK green massive Cypress groves greeted us as we sailed up the Bosporus into the Sea of Marmara. Our object was to visit the Bithynian Olympus. When we had reached the Port of Yalova we went for a short stroll along the shore and found the beach bordered by *Convolvulus soldanella*, with large pink flowers ; dazzling white *Matricaria maritima* ; *Glaucium flavum*, with huge yellow poppy-shaped flowers, and gentian blue *Anchusa italica*.

At mid-day we boarded a bus which carried us over hilly picturesque country reminiscent of the Balkans. We travelled along dusty roads past olive trees that looked like old gnarled grey-leafed willows, and fields where carmine purple *Gladiolus byzantinus* grew wild. The dragon arum *Dracunculus vulgaris*, here about a yard high, grew in great drifts in almost tropical luxuriance at the foot of a hill. Nearby, as if to greet us from home, there were dog roses, *Rosa canina*, smothered with flowers. There was so much to see on this journey that almost before we knew it the bus was surrounded by the bustle of the streets of Brusa. Brusa is a very picturesque oriental town founded many centuries ago and even today, despite the many modern buildings, it has preserved its ancient appearance. It is set on a green mountain slope of the Bithynian Olympus which dominates the whole landscape. Between the buildings and near the many mosques there are huge Planes with light green crowns, and dark, tall, almost needle-pointed Cypresses that rival in height the slim, light-coloured minarets. But before we climbed Mount Olympus, we visited a mountain village called Inkaiya to see an ancient Plane tree. The stem of this giant has a circumference of some 36 feet and the diameter of the crown is about 150 feet : it is the most massive tree that I have yet seen. The stem is sound and smooth and each of the wide spreading branches is itself the size of a large tree.

The Bithynian Olympus, not to be confused with the Thesalian Olympus of Northern Greece, is called Ulu Dag in Turkish and is 8202 feet high. The lower region of the mountain is ringed with a woodland belt of *Castanea sativa*, *Tilia tomentosa*, *Fraxinus ornus*, *Pyrus elaegrifolia*, *Cercis siliquosa* and *Cistus tournefortii*, and various deciduous Oaks. The undergrowth consists of *Corylus avellana*, and often climbers like *Lonicera etrusca* twine through this vegetation, forming impenetrable thickets. Higher up is the territory of the fine-needled grey-green *Pinus halepensis* and also the broad-crowned dark green *Pinus nigra pallasiana* which, especially when isolated, form very picturesque widely spreading trees. Finally, just below the tree line, in the zones of higher atmospheric moisture, woods of oriental Beech, *Fagus orientalis*, occur. In Spring sunshine these Beeches with their light green, fresh young leaves contrast beautifully with the sombre

trees of *Abies bornmuelleriana* which grow up between them. This thick-needled Abies, reminiscent of *A. nordmanniana*, also occurs in pure stands on protected slopes on Mount Olympus up to an altitude of six thousand feet, where it suddenly thins out and occurs higher only as solitary wind-swept veterans of the storms. Then there is the territory of the dwarf Juniper, *Juniperus nana*, which spreads its mats of grey-green needled branches over wide areas. The view is now up over huge lichen covered granite slabs, past solitary storm battered Abies to the snow clad peak of Mount Olympus itself, dazzling in the sunshine and crowned with billowing cumulus clouds. At this time of year there is no purpose in reaching the summit as the flora there, *Draba olympica*, the downy *Alopecurus lanatus* and many others are still resting deep under snow ; but around us, where the scorching rays of the sun have melted the icy covering, the flowers of Crocus and Scilla already appear. These heralds of Spring gleam on the black dripping wet soil between the grey-green wiry tufts of *Festuca punctoria*, pearly with spray from the melting snow. Indeed the wide open Crocus flowers often stand in pools of icy cold water—*Crocus gargaricus*, small and golden, *Crocus chrysanthus* var. *coerulescens*, lilac purple and yellow throated, and interspersed everywhere *Scilla bifolia*, celebrating the end of the long alpine winter. A little lower in open Beech-Fir woodland we found already the white starry blossoms of *Ornithogalum montanum* ; the pretty rose coloured *Lamium bithynicum*, with its whorled flowers, and a pale blue cluster of Muscari. We were also delighted by the little reddish-violet, *Viola olympica*. The yellow of *Hypericum rhodopaeum* shone bright in the open sunny places. This pretty cushion plant that we have learned to value so much in the Rock Garden was already known to me in Bulgaria where, as implied by its name, it occurs in the Rhodope Mountains, but it is indeed nowhere so prolific as here in the Bithynian Olympus. The classical St. John's-wort of Olympus, *Hypericum olympicum*, was not yet in bloom, but we found in sunny places many of these shrubs with their small grey-green leaves and we pictured the effect of their big yellow flowers. *Hypericum calycinum* is also uncommonly abundant. It is a shrub with oval leaves and huge yellow flowers and is used in the garden mainly as a carpet under trees, where in normal years, with protection from the winter sun, it remains evergreen. I was astonished to find this shrub growing not only in shade but also in full sunlight. In laying out a garden, one should therefore be able to use it on steep ground and on the crest of sunny slopes.

On the journey back from Olympus to Istanbul we visited Büyükada Island in the Sea of Marmara. The rich merchants of Istanbul have their summer houses here. Cedars, Eucalypts, Palms, Albizzias, Hibiscus and Roses adorn the gardens which lie along the shore in terraces, and huge cascades of *Mesembryanthemum acinaciforme*, *Rosa banksiae* and *Lycium halimifolium* stream over the walls. In the borders there are Stocks in quite unbelievable luxuriance and *Gazania rigens*, a beautiful South African composite that makes soft green carpets

which, in Summer, are covered all over with orange-yellow flowers. The Eastern and Northern slopes of this hilly island are covered with *Pinus halepensis* var. *pythyusa*. Their broad crowns with glimmering clusters of fine grey-green six-inch long needles give a light shade and welcome protection from the scorching sun. The South and West side of the island, where the sun beats down on the rocky slopes, has been conquered by the maquis. This evergreen Mediterranean scrub consists here of *Arbutus unedo*, *Calycotome spinosa*, *Juniperus oxcedrus*, *Erica arborea*, *Phillyrea media*, wild olives and *Cistus villosus*. Unfortunately the Cistus flowers were already over : only here and there were a few pink flowers with their creased petals still blooming at the tops of the grey-green bushes about 3 ft. high. How beautiful it must be when all the thousands of Cistus adorn the poor rocky soil, but unfortunately the flowering period is short. Now there were only *Lavendula stoechas*, a lavender with reddish-violet bracts in slender spikes, and *Lonicera etrusca*, a twining honeysuckle which spreads its pale yellow flowers over the shrubs. The stalks and panicles of *Avena fatua* also gleamed pale yellow. This long-awned wild oat grows everywhere on the way and sways to the rhythm of the sea breezes.

There is a beautiful view along the rocky coast where, in bays between reefs of rock, the sea—now green, now blue—surges with white-crested waves.

The next step in our journey was the Amanus Mountains, which lie near the Syrian border at the North East corner of the Mediterranean. To save time we travelled by plane and covered the distance of 500 miles from Istanbul to Iskenderun, with a halt at Ankara, in $3\frac{1}{2}$ hours. On May 27th, a beautiful sunny morning, we boarded a plane of the Turkish Air Line which makes this daily flight. Soon after taking off we were over the roofs of a suburb of Istanbul and saw the unique position of the town in the Bosporus, the Golden Horn, and then we flew over the blue-green mirror of the Sea of Marmara. Soon the coastline appeared and also the little town of Yalova and the Isnik lake.

On the following day a car brought us to a small village situated on a mountain slope of the Amanus range and from here we continued our climb on foot along a wide road originally intended for traffic and built by a French engineer when this corner of the country belonged to Syria. From this road we found it easy to botanise. We traversed an area of maquis where the rocky slope was covered mainly with *Poterium spinosum* and *Quercus coccifera*, amongst which we found to our great joy many interesting plants. The most striking of these was a very lovely Linum with pale rose flowers of a silky sheen, and *Convolvulus cantabricus* with pink flowers on slender shoots—a plant, moreover, that is hardy with us. The white umbels of *Orlaya grandiflora* and the the brownish-red pagoda-like inflorescences of *Acanthus syriacus* were also very fine. I was also delighted to see *Michauxia campanuloides*, a beautiful biennial of the Campanula family, growing in limestone crevices and sending up flower stalks often three feet high.

The whole plant is bristly. Unfortunately, not a single flower had as yet opened, but they are white or pale violet and very characteristic and fascinating with their reflexed corolla lobes resembling a Turk's cap. Higher still, the maquis flora was enriched by *Arbutus andrachne* with its reddish-brown bark and white pendulous flowers, *Styrax officinalis*, *Daphne gnidium*, *Phillyrea media* and *Pinus brutia*. In open places sparsely colonised with *Euphorbia tinctoria*, *Astragalus* species and a few grasses we discovered, to our surprise and joy, *Iris persica*. The small sickle-shaped leaves had already begun to wither and the plants could only be found with great difficulty. *Iris persica* belongs to the Juno section of the genus, all of which are Spring-flowering and magnificent plants for the conoisseur. These Irises occur from the Eastern Mediterranean to Central Asia, with only one species—*Iris alata*—occurring further westwards in Spain, Sicily and North Africa. *Iris persica* (Fig. 5) is a very variable species. There are yellow and olive-coloured local races, but most of them appear in all possible shades of blue and are beautifully flecked. Everywhere, on hills and mountain slopes in Asia Minor, I sought out this beautiful Iris and dug patiently 4-6 inches deep in the stony ground for the small bulbs of hazelnut size. Despite all care, the thick fleshy roots always broke off and this invariably weakens the plant. In Spring, we awaited with suspense the flowers of these Irises collected in various widely separated localities. Since the death in 1928 of Walter Siehe, the engineer of the Taurus Road, who, as an amateur botanist, lived in Messina and described and introduced many varieties of *Iris persica*, these beautiful floral treasures have not been cultivated in Germany. Unfortunately, in our climate they are not quite winter hardy and they require, like all Juno Irises, a completely dry and warm summer when resting. In the Amanus Mountains we also found *Iris sisyrinchium*, a small corm-rooted Iris widely distributed in the Mediterranean region, and dark green grass-like tufts of *Iris cretensis*.

Higher still, in open woods of *Ostrya*, *Quercus* and *Crataegus*, *Helleborus vesicarius* grew in masses. This Christmas Rose, endemic in Northern Syria, has small greenish-yellow flowers, and is all the more astonishing for its light green bladder-like fruits, reminiscent of Paprika. But the greatest surprise was a species of Verbascum which carried, on unbranched inflorescences of more than four feet, flowers three inches across (see Fig. 6). These beautiful plants colonised a mountain slope by the hundred, contrasting with the flowers of *Vicia tenuifolia* which formed clouds of pink between them. Above, on wind-swept ridges and between rocks, there were prickly mounds of *Acantholimon olivieri* (= *A. venustum*). *A. echinus* and *Astragalus angustifolius*. In more sheltered places the bright yellow drooping flowers of an Onosma species gleamed against its bristly grey-green leaves, and plants of *Salvia cryptantha* with striking large flat bright yellow calyxes covered many square yards. Here and there we saw the leaves of a species of Colchicum and a few of the large bulbs which grew very deeply between rocks were laboriously dug up. For digging up all the various

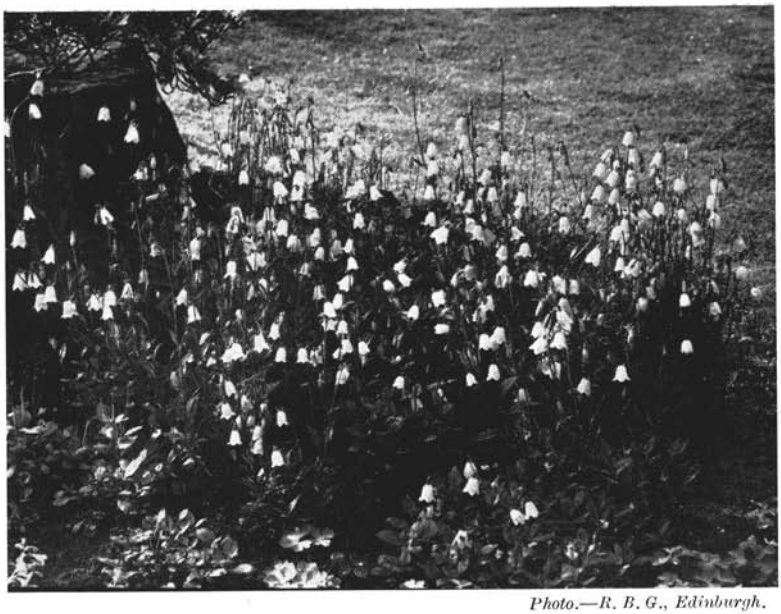


Photo.—R. B. G., Edinburgh.

Fig. 3.—Adenophora coelestis.

Photo.—T. C. Clare.

Fig. 4.—Cyclamen x Atkinsii.

Fig. 5.—Iris persica var. sieheana. *Photo.—W. Schacht.*

Fig. 6.—Verbascum sp. *Photo.—W Schacht.*

Photo.—T. C. Clare.

Fig. 7.—Sanguinaria canadensis fl. pl.

Photo.—T. C. Clare.

Fig. 8.—Primula aureata.

bulbs and tubers, we used a very strong iron tool like a flattened spoon at the point and with a firm wooden handle. This tool was made by Attila* and proved its value ; with my trowel I could dig up little in the stony ground.

The Amanus Mountains offered me yet another pleasant surprise in *Prunus prostrata*, a dwarf plant covered with small pink flowers and growing on ridges out of cracks in the rock. Years ago I came to know this small mountain shrub on the top of Mount Athos and I was glad of this unexpected encounter here. We found shelter from the quickly descending night in an unassuming but clean inn near a rushing stream in the village of Attik, with its flat-roofed mud and stone-built huts.

(To be concluded)

*Curator of the Botanic Garden at Istanbul

Pest Control

On the last day of winter, they call Setouban,
The Japanese have a remarkable plan
For ridding the soil of all pests
As the next day is Spring where the farmers must sow
And if demons remain, why then nothing will grow,
They just frighten these unwelcome guests.

White beans must be spread through the house, far and wide,
Right into the corners where demons might hide,
And there they remain through the day—
For though these small creatures are evil and bold,
Yet the sight of a tiny white bean I am told
Will be certain to scare them away.

At nightfall before the futons have been spread
And 'tis certain these mischievous sprites have all fled,
The housewife will sweep all her floors.
She will search very carefully over the ground
To make certain that every white bean has been found
And secretly thrown out of doors.

The very next morning the farmer can sow,
For now it is safe for the new crops to grow,
And on this day of Spring it is nice
To feel certain that nothing is hid in the soil
To bring him disaster by trying to spoil
A harvest of millet or rice.

New Plants from Turkey—Part 3

By HENRY TOD, Ph.D.

THIS THIRD part must start with a catalogue of losses which makes somewhat depressing reading. The winter of 1954-55 was very severe here and was followed by a very erratic spring, mild damp weather alternating with cold and dry with sudden heavy frosts, and this seems to have been more than many of these plants could stand. This was a pity, since the very hot, dry summer would have been ideal for them could they have survived until it began.

Most of the shrubby and sub-shrubby plants succumbed, such as *Phlomis nissolii*, *P. monocephala* 16334, *Dorystaechas sp.*, *Paracaryum racemosum*, and *Origanum laevigatum* 16371. A more serious loss was *Hypericum aviculariifolium* 18387, a really delightful plant which just hung on between life and death right into May, when it finally died.

Of the "silvers" *Tanacetum* 16368 died in the open, even under a sheet of glass, but survived in the (completely unheated) Alpine House, whereas *Salvia montbretii* and *Lysimachia serpyllifolia* both died in the Alpine House. Another unfortunate loss was *Salvia caespitosa*, which had formed a most magnificent tuft about a foot across. This died in spite of a tent of glass overhead, and cuttings taken the previous summer damped off completely and were lost, as it is a hairy plant.

The plant reported in No. 14 of the *Journal* as *Inula heterolepis* has turned out to be a rogue. It ceased to be "mildly invasive" and became quite frankly a fiend, and coarse at that, once it became fully established. It turns out that it is a Pulicaria, widespread over Europe, and Dr. Davis swears he did not collect it intentionally. Presumably it came as seeds sticking to the Inula seed—which did not breard.

Three plants fall to be reported this year, although one of them flowered first last year but was not seen. This was *Rosa sp.* 16412 ; last year's blooms were buried in between two bushes and were not noticeable. This year they were in full view and showed as of the wild rose type, a good clear pink, about two inches across. The bush is about two feet high, and grows densely, the flowers being in a cluster at the end of the shoots.

The second flowering plant is *Arenaria sp.* 18398, which is a very neat little plant with clear green leaves, rather reminiscent of thyme, and flowers of a good solid white, fully half an inch across, lying closely on the tufted growth of the plant. The whole plant is about four inches across and about one inch high. Altogether this looks to be a useful addition to the rock garden, and it managed to come through last winter's "stress and strain" and thrived in the summer heat. It was in full flower by mid-July and flowered on for a couple of months.

The third plant is not a flowering one, but is a most striking plant for its foliage. This is *Chamaepeuce sp.*, which is understood to belong to the Thistle tribe, and to have rather uninteresting flowers, but the

leaves are very fine. It forms a big rosette of intensely spiny leaves, deep green with a snow-white mid-rib, the individual leaves being up to eighteen inches or more long and three inches wide across the full width of the spines, though the blade itself is not more than one inch wide. The underside of the leaf is snowy-white and has a felted look.

Four other plants were omitted in earlier articles through an oversight, though they flowered some years ago for the first time. Two of them are not new plants, though they are not well known and fall into the group of "re-introductions." The first is rather a nice little plant, *Campanula cymbalaria*, which has a neat, tufted growth and wide-open lilac-blue bells carried clear of the leaves. It is either monocarpic or else short-lived ; the plants that were in flower two years ago vanished completely and it seemed as though it was another loss, but last summer a good crop of self-grown seedlings appeared, so that it seems to have settled in. It is very liable to loss from slugs, which seem to find it irresistible—like so many of the genus.

The second of this type is *Sedum sempervivoides*, which made an appearance on the Show Bench at Haddington a few years back. This is definitely monocarpic and most unfortunately did not set any seed. It is a most perplexing plant, for, from the time of germination of the seed until it finally breaks into flower, it is quite indistinguishable from a Sempervivum of the *acuminatum* type. It develops steadily until it forms a rosette about two inches across, then rests at that size over-winter and in mid-summer the centre of the rosette develops into a flowering shoot which rises up to four inches or so and then bursts into a brilliant scarlet bunch of quite obvious Sedum flowers. Altogether it is a rather attractive plant and one whose loss is regrettable.

The first of the other two is *Celsia sp.* from Haruniye. This is one of Peter Davis's "oddities," but it may be just that its proper habitat has not been found. The first flourish this plant produced came as a distinct shock. It was growing as a seedling in a seed-box and had formed a neat rosette of slightly leathery, hairy leaves, of a deep green colour. From this rosette long thin whippy shoots grew upwards at a fantastic speed and, apparently, started to climb on some wires in the roof. Next these shoots developed the characteristic yellow blooms of the Celsia and Verbascum group all along their length—dozens of them. All this was under glass, and next season some of the seedlings that had not flowered were tried out of doors. They made rather stockier growths but still had this rather vague aimlessly-sprawling style of growth and flourish, died down at the end of the season, and were protected with straw under a cloche. The next spring up they came again and repeated the process. Colonel Lowndes got a few of these seedlings and has reported that on lifting one he found a large root reminiscent of a Dahlia tuber.

This is definitely an odd plant but it may well be a cliff-dweller—no Notes arrived with these seeds, incidentally, and possibly if this whippy

growth lined with flowers were to appear from a vertically-placed rosette, it would look a lot better than it does arising from the flat ground. This will be tried in a future season as Dr. Davis has told the writer that a number of these plants do grow in this way and are much finer than they have been obtained under more normal growing conditions.

The last plant is one which, alas, has also been lost entirely. Firstly, it does not like the winter wet very much and, secondly, it is another plant which is irresistible to slugs. They finally wiped it out completely in spite of slug bait and various other dodges and it must be recorded as a loss. It is *Petromarula pinnata*, which is allied to Statice. It makes a tuft of rather fleshy pinnate leaves from which rise the flowering shoots which bear light blue flowers. These are reflexed and rather resemble small blue Dodecatheons. The flowering shoots rise to about a foot or so high, though older plants are reported to become much larger. This plant seems to be reasonably hardy as it came unscathed through fairly severe frosts, probably because the growth above ground is completely deciduous, and it rests over-winter as a rather fleshy root.

It is curious that so many plants which have a milky sap, as Petromarula has, seem to draw slugs from astonishing distances and over severe hazards and they will often cross poison bait to eat the plants before they finally die—by which time the damage has been done. Equally odd is the fact that if such a plant can be protected by some means until it has developed several more or less mature leaves, it seems to be much less attractive and will usually manage to survive and grow on to maturity. Perhaps some zoologist may have a good explanation for this—the writer certainly has not !

The Helichrysum described in the April 1955 *Journal* lived through all last winter and spring in the open without any protection at all, so it, at any rate, must be thoroughly hardy. Thus, at least one of these fine "silvers" is a really reliable plant—most of the others, it is to be feared, require some care, as will have been seen from this report. Another completely hardy plant is the *Teucrium chamaedrys* pink var., which came through unscathed, as did an unflowered Acantholimon.

Another plant which was growing well, but was lost through the depredations of slugs, was *Michauxia tchihatchewii*—a quite unpronouncable name ! This year a plant of this flowered most magnificently in the garden at Boonslie—it was given to Mrs. Boyd-Harvey as "a dwarf plant of some sort." This hardly fitted, since on flowering it was some five feet high ! It is, however, a superb plant with the long branches covered with the typical Michauxia flowers, so closely packed that the starry white petals were touching all the way up the stems. *Michauxia campanuloides* flowered well here this summer—the heat was a great help to it—and in this species the astonishing form of the flower can be clearly seen, as each flower opens to a white star three or more inches across with a most peculiar bunch of stamens and stigmata in a long yellow furry bundle which protrude in the centre

of the star. The whole flower develops as a long pointed bud which suddenly breaks open, the white petals rolling back to form a slightly reflexed star. The one at Boonslie had literally thousands of flowers on its stems, each about an inch or so across, while in *M. campanuloides* there are only a dozen or so well spaced out, each on its own flower-stem. *Verbascum splendens*, reported before, was even finer, as it also revelled in the heat and produced its flowers much more rapidly and more at once than in previous years.

It seems likely that if these plants can be coaxed through the cold and damp of the winters and springs of our climate by just a little protection, they will do themselves more than justice in a hot dry summer—when we get one !

To a Plant-hunter

You travelled far in cold and heat,
Climbed fearlessly the mountain track,
With laboured breath, and aching feet,
To bring this lovely treasure back.

Now, on my rockery, the sight
Of one small bud, just showing blue,
Has made me wish that my delight
Could someway be made known to you.

R. M. H.

European Primulas

By DAVID LIVINGSTONE

IN RECENT years I think that there has been a tendency for rock agrdeners to neglect our European primulas in preference for their Asiatic cousins. It is not easy to understand why, because the former are, generally speaking, much easier to cultivate and in the main are very rewarding with their flowers. *P. pubescens* "The General" which is illustrated (Fig. 15) is typical of the stronger growing European primulas. Some writers and catalogues have given this variety a bad name by saying that it has a weak constitution. I have not found it so and the plant illustrated does, I think, prove my point. The photograph was taken in the garden of our President, Major-General Murray-Lyon—its name is only a coincidence ! Indeed, the European primulas are ideal plants for the beginner and there is room for a good selection in every rock garden, no matter how small. They are, too, good subjects for pot culture in cold frames, being brought into the alpine house or cold greenhouse only for the flowering period.

The majority of the plants which I shall name can stand a fairly rich diet whether in the open rock garden or in pots, but all must have quick and free drainage. Generally speaking, a compost somewhat of the nature of two parts good fibrous loam, two parts well rotted beech or oak leaf mould and one part coarse silver sand will be found to be acceptable. When dealing with certain kinds such as *P. allionii*, "Ethel Barber," *bileckii* and *forsteri*, some small stone chips can be usefully added to the compost. With one or two exceptions to be noted later, all may be planted in full or nearly full sun, provided always that their roots have the cool shelter of a rock. I think that is important. If your plants are grown in pots they must not be allowed to dry out and they should be given filtered shade in very sunny weather, much as is obtained by placing slats of wood over the top of the frame. Pot grown plants should, I feel, be re-potted every year and those grown outside should be divided every two or three years, depending on their vigour ; these operations are best carried out immediately after flowering. There is only one thing I should add to these very general notes. The strong growing kinds will respond well to some well rotted cow dung mixed with the compost.

Primula allionii is a cliff dweller in nature and is usually found on a site facing north. It forms low mats of pale green sticky leaves grouped in rosettes from the centre of which come the flowering scapes early in spring. The scapes are short and each one will bear up to six or seven flowers, which are comparatively large, and which in a well grown specimen may cover the entire plant, thus obscuring the leaves. The flowers are very variable in colour and form and it is advisable to choose your plant when in flower. Good rose-pink forms with crimped or waved petals are available and these are my favourites. There is also a white form but very often it is spoiled by the faintest tinge of pink. *P. allionii* is not an easy plant in the rock

garden as it must have a shaded position, very free drainage and an overhanging rock or projection of some sort to shed rain away from its leaves. In a pot, however, it is easier, but one must be careful in attending to its needs. Partial shade in summer, free drainage, a gritty compost and watering by plunging in winter are the main requirements. One must also remove dead leaves carefully—a pair of tweezers are best—to prevent mould and decay arising. *P. allionii* is an excellent subject for the careful gardener and provides a test of one's skill. For those who are not able to devote too much time to the cultivation of their plants, or who feel that they do not have the necessary skill, I recommend P. "Ethel Barber," which is a hybrid of *P. allionii* and which is only slightly larger in its growth and habit. Its flowers are perhaps a bit too near to magenta in colour for some people but it is nevertheless a good primula and can be grown out of doors or in a pot with much less care and attention than its illustrous parent. I have seen *P. tyrolensis*, another saxatile species with somewhat the same habit as *P. allionii*, recommended as an easier subject than the latter, but I have had no experience of it and cannot comment. I think it is rather too difficult to come by.

In their excellent little handbook on European Primulas, the Ingwersons write of *P. apennina*, "We await its re-introduction with impatience." I've had it for a year or two now but I cannot write of it with that enthusiasm. Its nearest relative in my collection is *P. villosa*, which is, of course, much better known and which I reckon to be the better plant. *P. apennina* has flowers of varying shades of pink borne on short scapes and its leaves have brown hairs on the margins. It seems good tempered enough in the general conditions of soil and situation outlined at the beginning.

The silver-leaved *P. auricula albo-cincta* is worth its place in any small collection of European primulas. It is fairly vigorous in its growth, carries its yellow fragrant flowers in umbels on five- or six-inch scapes, and presents no special difficulties. Its flowers are enhanced by a distinct white eye.

For those who are unable to do the well-known P. "Linda Pope" as well as they would like, I recommend P. "Barbara Barker," a seedling from that hybrid. It lacks the mealy leaves of "Linda Pope" but its flowers have the same symmetrical form, are almost the same colour, are larger and are more freely borne. This is indeed a plant which should be more widely grown.

The natural hybrid, *P. berninae*, "Windrush variety," is a gem of a plant, not exacting in its requirements, being satisfied with the general treatment already described. It is small, compact in its growth and its rose-pink flowers with white eye are freely produced. This is an excellent primula for cultivation in a pot for exhibition work. It is equally useful for the small rock garden or trough.

Another natural hybrid, *P. bileckii*, which has *P. minima* as one of its parents, is a more satisfactory plant than the latter. It is tiny in

growth with small deeply notched leaves and masses of almost stemless flowers which are, I think, magenta in colour, although some say purple. *P. forsteri* has the same parentage and is slightly larger in growth. Its flowers are pink and are, I think, borne on slightly longer stems which make the plant look not quite as neat as *P. bileckii.* Both are good plants for the early shows and do well outside too. In some years both flower intermittently all summer after the spring display is over.

P. carniolica is a delicate looking species which appreciates just a little shade. Its leaves are long and narrow and its flowers, pale pink in colour and slightly tubular in shape, are borne about five or six in number on a six-inch long scape. This is a fine plant for the enthusiast who wishes an extensive collection of European primulas, but those who wish to have only a few varieties for a wealth of display should look elsewhere for their choice.

We now come to one of the very best European primulas, *P. clusiana,* which is very free flowering and which in my experience must have full sun. It is variable in colour, pink, carmine and magenta, but always with a white eye. It quickly makes clumps of glossy dark green leaves which are covered in spring by the comparatively large flowers, borne four or five to a short scape. Its flower buds are often visible in the rosettes of leaves in the autumn but they stay there unopened until the better weather of March arrives. This is a good show plant for the earlier shows.

My next plant, a natural hybrid, is mentioned only because I think members should be warned off it. *P. deschmanii* has *P. minima* as one of its parents and it is even more shy with its flowers. It grows well but its flowers, pink in colour and tubular in shape, are rarely produced and when they are they cause nothing but disappointment. I can only describe them as "squinny."

P. farinosa is a British native, being found wild in England mainly in the Dales of Yorkshire, I believe, and was recorded a long time ago as having been found at Dolphinton, near Biggar. It is also found widely on the continent of Europe. Its small leaves are densely covered with farina, as are its short flowering scapes. The flowers borne in compact heads are lilac pink, always with a yellow eye. It should be given a rather cooler, moister situation than most. The best effect is obtained by grouping. Very similar to the former but more robust in its growth is *P. frondosa,* which should be given a drier situation than *P. farinosa.* It should also be planted in full sun. A close relative of these two is our own *P. scotica,* which is found growing in short turf often near the sea shore in Sutherlandshire and in a few other situations in Northern Scotland. It is very small in stature and its tiny rosettes of grey powdered leaves are close pressed to the ground. It bears little trusses of bluish/purple flowers with golden eyes. It is not too difficult to grow, given a good sandy loam and not too dry a position. Mr. Tom Anderson of Guardbridge is, I hear, a master grower of this

little Scottish gem. It seems to grow better and live longer for him than for anyone else. All three are not very long-lived—*P. frondosa* perhaps living longer than the others—and it pays to sow seeds every year to keep a supply of plants going. They will all flower in their second year of growth, some indeed may even flower late in their first year. All three die down to resting buds in the winter and care should be taken to see that the dormant buds are pressed back into the soil after frost, which tends to loosen them.

Concerning the French Forms of Gentiana acaulis

By R. RUFFIER-LANCHE
(Institut et Jardin botanique alpins du Lautaret)

The tremendously variable behaviour of the so-called *Gentiana "acaulis"* is a well-known fact in gardens. Articles on the subject of its flowering or non-flowering performances appear at frequent intervals in the specialised press. The latest article I have seen on this topic is that by A. T. Johnson in the *Gardeners' Chronicle* of 11th February 1956, where it is said that *G. "acaulis"* loves hard ground and companionship. That is true, generally speaking, but not always, as one will see.

If, for the rock-gardener, there is only one *G. acaulis*, for the botanically minded people that name covers many more or less typified entities. But botanists do not agree on the status of these entities, some regarding them as good species, others as mere forms merging into one another. True, these forms are not always easy to separate by their morphological characters only ; but we have found by experiment that they are possibly more clearly defined by their ecological, i.e. their cultural requirements: and it is that, I think, that can make rock-gardeners interested in our experiences concerning the collective species.

In an attempt to disentangle the nomenclature of the group, and to ascertain the geographical distribution of the forms, we are collecting at the Institut alpin du Lautaret as many forms from as many known native localities as possible. We keep them in the garden to observe them in a living state.

The collection is still not complete, and some forms have not yet had enough time to settle : but there are some facts, seen in plants in cultivation in the garden, or noted in the wild, which I would like to emphasise. For practical purposes I will treat the French forms of *G. acaulis* as species and take them in order of their geographical distribution, from the most widespread to those most localised.

Gentiana clusii, Perr. et Song., is the form with the largest geographical area. It is abundant in the Central Alps, extending eastwards to the Carpathians ; it is somewhat rare in the French Alps, where it is only abundant in the Haute-Savoie and Savoie "Departments," being

absent in most of Savoie. It is very rarely found in the other parts of the French Alps, but it is known also from the Pyrenees. This species is not too difficult in cultivation, being an inhabitant of alpine meadows, generally on calcareous soil ; even so, it is not too easy, for it is an alpine and sub-alpine species from elevations of between 1200 and 2500 m., though at times found much lower. It is not, however, to be recommended, as its vigour is not of the best, nor is the foliage. Botanically, it seems to be very nearly related to what is known as *G.* "*excisa*" in gardens.

From the Cevennes, we grow a form known as *G. costei* Br-Bl. This form is generally regarded as a sub-species of *G. clusii* but, from its morphological as well as its ecological characters, we regard it as a form of the *G. angustifolia* persuasion, and doubt if it is entitled to a name of its own.

Gentiana alpina Vill. is, at the same time, the most southern and the most alpine of the group. Particularly abundant in the Pyrenees, and known also from Spain (Sierra Nevada), it has a restricted distribution in the Alps. Not rare in the "Massifs" of Pelvoux, Grandes-Rousses and Belledonne, it becomes rare near the Mont-Blanc region, and still more rare in Switzerland, where it occurs only in the most western part. Very rarely found under 2000 m., it can ascend to 3000 m., and more.

Gentiana alpina is readily recognisable by its flowers, always really "acaule" or nearly so, and by its small foliage, undulate and yellow-green, often making large patches. In our opinion, it is the most difficult of the group to keep in cultivation, difficult even at Lautaret, slightly above 2000 m. altitude. This species is intolerant of calcareous soil, forming mats on decalcified and very humus soils, among lilliputian grasses. This state of affairs is regrettable, for *G. alpina*, even if it does not have such large flowers as the others of the group, makes fine mats of small foliage and is more alpine not only in distribution but also in appearance.

We found it, at about 2200 m., near the Col de la Croix de Fer, growing near to *G. kochiana*, but readily distinguishable. True, there were some forms of *G. kochiana* showing some "blood" of *G. alpina* ; we are experimenting on them, to see if they are hybrids, or what ! These two species, *G. alpina* and *G. clusii*, are the most distinct of the group, and easily recognisable by their morphological characters.

Gentiana kochiana, Perr. et Song., is the species generally met with on the main range of the French Alps. Not rare in the Pyrenees, it is very plentiful in Dauphiny and Savoie. Rare in Switzerland, it is said to go as far east as the Balkans and the Carpathians, but it is open to question if this is true *G. kochiana*. From its given habitats it would seem more akin to *G. angustifolia*. By the way, the *G.* "*acaulis*" of the Col du Lautaret is *G. kochiana* : there is no other gentian of the group at or near to, the Col. In France its general distribution follows more or less that of *G. alpina*, but at lower levels. It grows by the thousands in alpine pastures, always on neutral or acid soils made

of stiff loam and/or humus ; it is rarely found under 1500 m. and ascends to nearly 3000 m.

As a garden species it has many drawbacks : its flowers are of a blue much stained with violet, its foliage is always of a dull yellow-green, and the plant does not make large tufts. Above all, it is, with *G. alpina*, the most difficult—not only to flower—but even to keep alive.

Generally speaking, *G. kochiana* is not too difficult to distinguish from *G. angustifolia* by the colour of its flowers and foliage, the pattern of its leaves (broader in relation to their length), and the fact that it never makes big clumps. Sometimes, however, it is not so easy, but the two species do differ, not only in their geographical distribution, but more so by their behaviour in the garden as well as in nature.

Gentiana angustifolia Vill., to which I come last, is the best all-round species from the gardener's point of view. This is an inhabitant of the low sub-alpine meadows, copses, and light woods, always on calcareous substratum. Also, in contrast to all other forms of the group, it is often found thriving in the fissures of rock, where it behaves as a true saxatile. It is also found on the more or less sliding screes so often located at the foot of calcareous cliffs, where it grows in seemingly pure rock debris with no soil at all. It is especially abundant between 800 and 1800 m. I have never found it above 2000 m., where it is rare, but I have found it near Grenoble at 350 m., near cornfields and vineyards. It is very doubtful if it exists in Switzerland. In France *G. angustifolia* is about the only species to be found in the strictly calcareous districts of Grande Chartreuse and Vercors. Northward it extends to French southern Jura. It does not exist in the main central chain of the Alps ; from Vercors it goes southward to the Maritime Alps, where a form, that seemingly does not merit a name, has been described as *Gentiana ligustica* Chop. et De Vilm. This last form, coming as near the sea as the hills above Menton, grows there from sub-maritime regions at 400 m. upwards in woods on calcareous rocks. *G. angustifolia* is also known from the Pyrenees, where a form, if at all distinct, has been given the name of *G. occidentalis* Jakow. In the Pyrenees it is again an inhabitant of calcareous soils at moderate heights.

As I said above, it is not always easy, when one does not know the geographical origin of the specimen, to separate *G. angustifolia* from *G. kochiana* ; but, as can be seen, its soil requirements are very different from those of *G. kochiana*. This latter is a strictly acidophilous alpine and high-alpine plant, and never grows on loose soils nor in woods, but only in alpine meadows and in pastures. *G. angustifolia*, on the contrary, is always on calcareous substratum, and is particularly abundant in light pine or beech woods, where it is to be found with such things as *Convallaria majalis, Polygala chamaebuxus, Arabis stricta*. It is still more abundant, and particularly spectacular, on more or less moving screes, where it sometimes makes patches several feet across, these patches separated by tracts of bare soil. For example, I saw it between the Grand Veymont and Mont-Aiguille growing with such things as *Coronilla minima, Eryngium spina-alba, Globularia*

nudicaulis, Allium narcissiflorum, Genista pilosa, etc. The most remarkable fact about *G. angustifolia* is its stoloniferous nature : it is not exceptional to see in nature specimens several feet across made of only one plant. *G. kochiana* makes mats of a few inches only, and *G clusii* still less.

To my mind it is the easiest species of the *Gentiana "acaulis"* group. In fact, when asked if a plant was *G. kochiana* or *G. angustifolia*, I have sometimes replied : "Plant it ; if it does grow, it is *G. angustifolia* ; if it doesn't, it *may* be *kochiana.*"

It might be thought that these two species, morphologically so close, are only ecological forms or "ecads," i.e. if planted in another soil and situation they would revert to the type characteristic of that situation. In our experience this is not the case : at Lautaret we have *G. kochiana* and *G. angustifolia* growing side by side in the same soil (neutral) and with the same exposure. They maintain all their distinctive features, and even reveal another one, for *G. angustifolia* is about two weeks later in flowering than *G. kochiana* in these conditions.

Another point, which shows how ecologically distinct *G. angustifolia* is from other members of the group, concerns the viability and germination of its seeds. *Gentiana kochiana, G. clusii* and *G. alpina* rarely succeed from seed ; to obtain any germination they must be sown in autumn, so as to get the benefit of winter frosts, or they must be given refrigerator treatment, for they need "post-maturation" under cold conditions. Even so, the germination is not assured. An interesting experiment was made by Professor Favarger on the germination of gentian seeds with post-maturation treatment under cold *and* moist conditions. The results varied with *G. clusii* from 100% success to nil ; without treatment from nil to 0.2%. From nine sowings of *G. clusii* made without treatment I never saw a single germination (sowings made between February and April) in the first year, and not even one in the second and third years.

G. angustifolia, tried many times, grows well from spring sowings of seeds kept in ordinary conditions, i.e. in a bag in a heated room. The same applies to *G. " ligustica."* It must also be added that *G. angustifolia* is one of the most beautiful of the group, the blue of its flowers being of the best and the plant very floriferous.

As to *Gentiana dinarica*, Beck. as I saw it in gardens, I cannot tell it from *G. angustifolia*, but I have never seen it growing wild. As we have been unable to get *Gentiana dinarica* from a known natural source, may I appeal to any of the Club's members who may be able to help us in that way ?

There remains *Gentiana excisa* Presl. Botanists cannot agree on its status. For some of them it is synonymous with one, or more, of the other known species ; for others it is a hybrid between *G. kochiana* and *G. clusii* ; for yet others, and in particular for Jakowatz, author of a monograph on gentians, it is a garden form known only from British gardens, whose origin must be sought in a "mutation" that took place under garden conditions.

Mount Egmont, New Zealand

By R. B. COOKE

ON OUR way south from Auckland, after leaving Te Kuiti, the road winds through the hills, and Tree-ferns grow by the roadside in great profusion. Many stops were made to admire them and also the great variety of trees and shrubs. Then on reaching the coast we got our first view of Mount Egmont, and what a view it was ! A long stretch of picturesque coast line, with a very blue sea and line after line of great white crested rollers surging towards the shore and, crowning all, the isolated conical peak of Egmont rising to an elevation of 8260 feet. It was a never-to-be-forgotten sight.

After leaving New Plymouth our road took us round the east side of Egmont, where on one stretch it was lined on both sides with a scarlet Montbretia (probably an Antholyza) growing up through the brambles and bracken. In other places we passed orchards with Belladonna Lilies growing under the trees as Daffodils do with us, and even in one place a clump by the edge of the road, all in full flower and in various shades of pink. Both these are natives of South Africa but often by the roadside in New Zealand aliens are more plentiful than natives. Our destination was the Dawson Falls Hotel on the S.E. side of the mountain and at an altitude of 3075 feet, but we could only stay the one night on account of an engagement further south.

Very fortunately for us the following morning was clear and bright, so we set out at once after breakfast on a walk towards the summit. It was the 23rd February, so we did not expect to find many alpines still in flower. The path was well graded and to begin with was through a tunnel of greenery, as the trunks and boughs of the trees were thickly covered with ferns and mosses, with the exception of the Fuchsias (F. *excorticata*), which were kept bare by their reddish flaking bark, so these made an attractive contrast to the greens of the others. Besides the ferns and mosses on the trees there was a curious member of the Lily family, the Astelia, which has narrow leaves sometimes up to 5 feet long, and now and then they so covered dead trees that at a distance they looked to be still alive. Unfortunately their flowers have no, or little, decorative value. They also often grow on the ground.

One of the first plants we noticed by the path side were the leaves of *Viola filicaulis* and *V. cunninghamii*, two out of the three native N.Z. violets. Of course their white flowers, or white striped with violet and yellow, were long over, but we managed to collect some seeds of the former. Another was a miniature gunnera (*G. monoica*) with leaves only half an inch in diameter, a very great contrast to some of the South American species. There was also a small flowered Ranunculus (*R. hirtus*) of no garden value. As we climbed higher the trees gradually became lower and lower, till at about 4500 feet they were only low bushes. Of course they were all, or nearly all, new species, to those found lower down, but it was all so gradual that one did not notice

when one species ceased and another started. Various Olearias, Senecios, Coprosmas, Veronicas (Hebes) and one of the strange Dracophyllums were noted.

Flowers, too, began to appear. One which was very attractive was a bushy eyebright covered with large white flowers. This we made out to be the perennial *Euphrasia cuneata.* After a great deal of hunting a few seeds of this were found, which were sown after getting back to this country. They germinated well, but one after the other all the seedlings died with the exception of one, which at the time of writing is only just alive. No doubt this was owing to the want of a suitable host to which to attach their roots. Two different Pratias were seen with their pale lobelia-like flowers. A plant with an especial appeal to the lover of alpines was *Forstera bidwillii* and its variety *densifolia.* This has firm overlapping leaves and large white flowers, reminding one somewhat of those of a mossy saxifrage, but it belongs to the Stylidiaceae, a totally different family. Two uninteresting Epilobiums were seen in flower and an odd flower or so, on *Helichrysum bellidioides.* The Celmisias were over, as was also the handsome *Ranunculus nivicola.*

The red berries of the Gaultherias were lovely. They probably were *GG. antipoda, depressa,* and *rupestris.* The New Zealand Gaultherias are said sometimes to have their calyx-lobes unaltered in fruit and so not to be berry-like. This happened in the garden with me this year and I am convinced that dryness at the roots is the cause, as I had both types of fruit on the one plant, the berried type being the first and the dry type the second when the plant was suffering from the drought. Coriarias were conspicuous with their very shining black berries. *C. angustissima* seemed to be the commoner, but *C. thymifolia* was probably also there. Some Gaultheria and Coriaria berries were collected and the seeds from them have come up well.

At about 5000 feet we had to turn back, although it was hard to do so, as we were reaching a more grassy and rocky mountain side, but we could see, even if we raced back to the hotel, we would be very late for lunch. When we did get back we experienced the usual N.Z. kindness, for we found that our lunch had been kept for us. As soon as this was over we had to say goodbye, we felt all too soon, to this very enchanting mountain and its flora.

Northumberland.

Photography

I OFTEN hear gardeners trying to explain to other gardeners how lovely a particularly dead-looking plant had been when it was in flower. Of course, the cure for this is to be able to show the visitor a coloured photograph. They might then believe you.

Last September my wife went to England to visit friends and left me with the task of trying to produce such a photograph.

I was told to use her camera, because it takes a decent-sized photograph, whereas mine is one of those miniature affairs. Hers is undoubtedly a nice camera, though rather ancient. It is shaped like a box and is of the type called Reflex, which means that if you can find the right knob and press it, the top flies open and you peer down into some frosted glass which displays the picture you are about to take. Then by moving a lever about everything comes into focus.

Having loaded her camera with the coloured film, my wife thrust it into my hand and drove off in a cloud of dust, remarking that I would find the legs of the camera in one of the drawers of her desk.

I was now on my own, so I studied the problem with care. Of course, to get a really good photograph the sun would have to be shining on the plant and the day would have to be dead calm, in fact the sort of weather we had been having for nearly two months, much to my disgust as a fisherman. Moreover, I discovered by careful observation that, owing to the proximity of some tall elm trees, the sun could only reach the plant between 11.30 a.m. and 12.30 p.m.

It then rained for two days, but the third day dawned bright and clear, with not a cloud to be seen. Unfortunately this did not last, and by 11.30 great clouds were rolling up, but there was still a chance.

I seized the camera, and the camera legs from the drawer in the desk, and hurried to the rock garden. Now a word about those camera legs. Subsequent examination shows that they were made in Germany, but the maker's name is not disclosed. When fully folded they fit beautifully into a little case about eight inches long and three inches across—most ingenious—but it is when opened out that they can drive anyone completely crazy. Each light tubular leg is like a telescope made in ten sections (each about five inches long) to pull out of each other, and they do pull out to a total length of about four feet if you do it right. When each section is fully extended a little stud pops through a hole in the previous section, to hold it in place, and this stud has to be pressed with a thumb or a finger before the section that is out will go back in. That is what is supposed to happen, but in this particular model some of the studs were not in line with their little holes. I hope all this is clear. I did not know any of it till I reached the rock garden that morning. I should add that across the top of the legs is a metal bar out of which sticks a screw which fits into a screwhole in the bottom of the camera.

The treasured plant to be photographed was in an awkward position among some rocks, with several boulders just where the camera legs would have to go in order to get a satisfactory close-up. I did not think that there would be any difficulty over this with those special telescopic legs. In haste I screwed on the camera, pulled out the legs a bit and plomped them onto the bouldery ground. Immediately one leg jammed fully out. The next just slid in and out as I moved the camera about, and the third disappeared completely into its original casing. Thereupon I sat down to wipe my brow and discovered that the sun too had completely disappeared.

That, of course, gave me more time. With much patience and control of my temper, I did eventually get the camera nicely fixed and the legs more or less behaving. Then I found that focussing was not as easy as it looked. In the frosted glass everything seemed to be in focus until you superimposed a special magnifying-glass gadget, designed to help you with the finer points. This showed everything out of focus and seemed to vary according to whether I had my spectacles on or off.

Just about then I felt a warmth on my neck and, behold, there was a rift in the clouds and out came the sun. Without more ado, I pressed the button with a sigh of relief.

The thing to do now was to change the aperture and the exposure, wind on to the next film and take another photograph. Here I got another shock. I knew which was the knob for winding on the film, but I simply could not find the little red window which tells you when the next film is in place. At last, by a process of elimination, I established that, as it was neither on the top nor on the sides of the camera, it must be on the bottom—and the camera on its legs was but two feet off the ground. This might have been all right on a flat lawn. By lying on my back I could possibly have seen through that evil little window, but not in the rock garden. I have already mentioned the boulders, but there were also some of my wife's precious plants all round about. So there was nothing for it but to unscrew the camera from the legs and (bearing in mind what I have already said about those legs) you can well imagine that it was literally a shattering process. I am proud to say that I did it, not only once but six times, and finished the whole film.

I then returned to the house exhausted and in need of a pick-me-up. That satisfactorily accomplished, I removed the film from the camera and thought that I would test the shutter to see if everything was working nicely. It was, but in an inflexible manner. Whether I set the exposure to 1/25, 1/100, B or T, pressing the button produced the same little blink of light for every position.

I can do no more now until the film is developed and then perhaps I shall be able to add a postscript to this little story.

"LOCUM TENENS"

Later : I regret that the postscript is unprintable.—L.T.

Photo.—T. C. Clare.

Fig. 9.—Primula bhutanica.

Photo.—T. C. Clare.

Fig. 10.—Saxifraga x Faldonside.

Photo.—Mrs. Nimmo Smith

Fig. 11.—Alpine Botanic Garden, Lautaret.

Photo.—R. B. Cooke

Fig. 12.—Primula aff. wigramiana.—P.S. and W.6025.

Fig. 13.—Iris histrioides major.

Fig. 14.—Iris reticulata v. "Cantab."

Some Rocky Mountain Penstemons

By C. R. WORTH

As a topic for further notes on Rocky Mountain plants, your editor has suggested the genus Penstemon, perhaps not realizing the magnitude of the task he has proposed. There are somewhere between 235 and well over 300 species in the genus, depending on whether one accepts the viewpoint of Keck, or that of Pennell, the two specialists in the taxonomy of Penstemon. Of these, only one is extra-American ; the eastern species are mostly tall, weedy, pale in color ; a few range into Mexico, or northward into Canada, but the bulk of the genus has its home between the eastern foothills of the Rockies and the Pacific coast. Unfortunately, with the exception of the shrubby species of the North-west, and the more or less tender Californians, the ones best known in cultivation are among the least attractive.

During my first few trips to the Rockies, my interest in the genus was casual, and confined to those species which seemed of merit for the rock garden. Then, in 1946, at the behest of the American Penstemon Society, I collected seed of every species encountered. In 1947 Amel Priest, an Iowa farmer who was greatly interested in the horticultural possibilities of the genus, and I spent five weeks and covered some 5000 miles in the rich Penstemon country of the south-western states, and had remarkable success in locating a number of little-known species. On these two trips, seeds were collected of some seventy or eighty species (not all were in identifiable condition) ; these were widely distributed, in this country and abroad, but a disappointingly small number succeeded in cultivation, even in the Rocky Mountain region. The failures cannot be laid entirely to inexperience or ignorance, for several who received seeds were expert cultivators of the western flora. Apparently even some species of wide distribution have special needs which will require considerable investigation before the plants can be dealt with in gardens.

Because of the great number of species which I have encountered, involving many sections of the genus, it seems best to confine my comments, for the present at least, to the smaller types of especial interest in the rock garden, although none is easy, and one section is of extreme difficulty.

The greatest treasures are, to me, embraced in the section Ericopsis (of Keck). These are all small plants, heath-like as the section name suggests, with rather small narrow flowers, miniatures perfectly suited in size and habit to the rock garden, and with the look of hard-bitten alpines, although mostly they are plants of sagebrush slopes, and only one or two ever reach the sub-alpine zone. For some years a number of species prospered here, especially in the sand bed, until an unusually severe open winter which did great damage to most woody plants killed off my entire collection ; apparently I shall never be able to replace them except by going after them myself.

The best known of the section in cultivation is *P. crandallii*, which I have met only once, growing in light shade at perhaps 9000 ft. in southern Colorado. It made loose-growing mats six or eight inches high, with short, narrow leaves, and small flowers of a good blue. (In all this section the flowers are less than an inch in length, and at most a quarter-inch across, borne in loose slender racemes of varying length). Keck makes *P. xylus* synonymous with this, although to my eyes it is a quite distinct plant. Confined to the uranium region of south-eastern Utah, at 6000-8000 ft., usually in open places or among sage-brush, it makes mats a foot or much more across, with stems three to four inches long. The leaves are about one-half inch long, almost rectangular, of an almost blackish green. The deep blue flowers are often borne in great quantity, although in one season I could find few plants that had bloomed.

P. abietinus is far more like the *P. crandallii* I have seen, but a much more amenable and free-flowering plant (*P. crandallii* has a reputation for shy bloom in eastern gardens), best described as a soft-leaved six-inch heath with pure light blue flowers. It is confined to a single valley in central Utah, if indeed it still survives, for when I last visited the station a road was being constructed through the only stand of the plant. It had been an easy and enduring garden plant here until the winter which destroyed it.

P. caespitosus typicus I have found in south-western Wyoming, out of bloom, a rather loose and relatively tall (6 to 8 inch) mat, not nearly as attractive as any of its sub-species. Of these, the first I met was *P. c.* ssp. *perbrevis*, dotting the floor of a hot arid valley in central Utah, with broad mats barely half an inch high. The rhomboidal leaves of dusty green are often no more than one-sixteenth inch long, while the relatively large deep blue flowers are borne singly in profusion. After several failures, I succeeded in establishing it in the sand bed, where it flowered and spread mildly until that disastrous winter. Similar to it in general style of foliage, but upright in growth, a tiny bush three inches high and sometimes twice as much across, is *P. c.* ssp. *suffruticosus* of sub-alpine elevations, and so far as I know confined to a single small range of peaks. It grows in loose limy soil under spruce and aspen, and has proved completely intractable in the garden. Its flowers are of medium blue. *P. c.* spp. *desertipicti* grows, as its name states, on the Painted Desert of north-eastern Arizona, and also to the south of the Grand Canyon. We found it in open spaces among pines, where it forms mats to two feet wide, but not over an inch high, with leaves much wider than "linear-lanceolate to lance-ovate" (Keck). On most plants these were of a soft blue, on others green. In the garden all became soft grey-green, and took on russet tints after frost. The tiny flowers are more inflated than are those of other species, and are pale blue.

P. thompsoniae ssp. *jaegeri*, an endemic of the Charlestons near Las Vegas, proved extremely difficult to find. After long search Mr. Priest

discovered it, but when he called me over I could not even see it until he pointed it out. It grew under trees in rather dense shade, with only three or four practically prostrate stems of three inches or a bit more, and rather irregular quarter-inch leaves of a pale bluish shade. Its flowers are said to be purple, but it did not survive to bloom in the garden.

P. acaulis I have never found, nor has anyone, even Mrs. Marriage in her mile-high garden, had success with it. The plant suggests a rather small *Silene acaulis*, with deep blue flowers. It comes from the northern base of the Uinta Mountains, on the Wyoming-Utah state line.

I grow a plant obtained from Claude Barr as *P. procumbens*, which Keck makes a sub-species of *P. crandallii*, although it is utterly distinct in appearance. It is perfectly prostrate, procumbent, spreading into mats a couple of feet across, with tiny dark leaves and flowers which are so hidden among the foliage as to be quite inconspicuous. Tried in several locations, it is happy only in very sandy soil, in full sun, on a southerly slope, and probably is undeserving of the space it occupies.

There are two other species which I have not met—*P. teucrioides*, occasionally available, and little known *P. retrorsus*. This last I sought in vain : it is reported as growing on small hillocks, but either I selected for inspection the wrong ones of the myriad in that locality, or it has been exterminated by grazing.

Placed in this same section by Keck are Pennell's "Laricifolii," of which *P. linarioides* is the one I know best. This looks very much, at times, like *P. abietinus*, but is a variable plant with a very wide range, from Colorado to Nevada, and south almost to the border. The base is woody, with needle-like leaves on thin stems which range from two inches to well over a foot in height. The flowers are bright blue, over half an inch long. Many of the forms which I have seen are gawky and undesirable. *P. l.* ssp. *compactifolius*, from northern Arizona, with leaves of delicate blue, and ssp. *coloradoensis*, are really lovely. The plant is often found in coniferous woods, but may appear in grassy meadows, among sagebrush, or on rock outcrops.

P. laricifolius, of Wyoming, is somewhat similar, but usually more of a cushion plant, with its flowering stems rising several inches over a compact two-inch mat of grassy leaves. It is variable in color, and I once collected plants with pure pink flowers. In the garden they all bloomed white.

Similar to the Laricifolii in foliage and growth is *P. pinifolius*, although it belongs to a small and remote section (as yet unpublished, I believe) of only three species of Mexico and the border. It seems to be a scarce plant, which I believe even Ripley and Barneby sought in vain ; I have looked for it in several reported stations, but encountered it only once. Mr. Priest and I, following the instructions of Gladys Nisbet, authority on New Mexican Penstemons, penetrated a canyon

where Mrs. Nisbet told me she had found it within a half day's walk from her car. After we had walked perhaps half an hour, the canyon forked, although Mrs. Nisbet had not mentioned this. While we debated which course to follow, I climbed a small buttress to see which looked the more promising, and found the prize in bloom at my feet ! There were only a few plants, however, and prolonged search revealed only an isolated specimen here and there in the remainder of the canyon, which yielded nothing else of interest. The two or three plants which we took established readily, and like so many New Mexican plants of limited distribution, have proved vigorous and hardy in my garden, where in crevices in light shade they make loose mats two feet across, completely undamaged in the winter that ruined my other miniature penstemons. *P. pinifolius* flowers quite freely most seasons, but its airy inch-long orange-scarlet tubes never make a real splash of color. Like all the species mentioned so far, it is not generous with seed, but comes with extreme ease from cuttings.

A most remarkable group of miniatures, the section "Aurator," would offer extremely valuable material for the garden if only they would live in cultivation. *P. cobaea*, most easterly of the section, seems quite amenable, but may grow as much as two feet tall. The corolla is an inch and a half long, much inflated, and in the so-called "Ozark form" of a most brilliant purple, above rather deep green foliage. *P. eriantherus* is occasionally available and should be most attractive, but I do not know it, nor its behaviour under cultivation. My love is for the completely intractable species of the deserts : *PP. moffattii, dolius, nanus, concinnus, tristis*, and others—little plants of two to six inches, with rather long and narrow basal leaves of various shades of grey, and short spikes of relatively enormous flowers, in, I believe, assorted shades of lavendar and lilac (I have never seen more than the wilted blooms). They grow on lava flats, in sandy soil between low hills, or on steep dry banks, always where there is little rainfall. The plants brought home seemed happy at first, but failed with the advent of fall rains, and seed got nowhere. Unfortunately, most of them grow in less frequented regions, and there is little likelihood of the casual collector's encountering them, so that it may be long before they are again available for trial.

What of the shrubby species, of which British gardeners are so fond ? They are, with few exceptions, plants of the more westerly ranges, and only two or three species stray into the Rockies. *P. fruticosus* I have found in Montana and Idaho, a loose and rather coarse bush of a foot or so, with big flowers of lavender. *P. montanus* is one of the very few alpine species of the Rockies, a plant of the high slides in Wyoming, Idaho and northern Utah, although south of Jackson Hole and the Tetons it descends to within a few yards of the road. It is a most variable plant, forming a loose prostrate mat, with thickish holly-like leaves covered, as a rule, with grey bloom, and often almost crystalline in appearance. The flowers are enormous, cool pure lavender to reddish purple. Once, in the mountains above Big Lost River (which

is fully a yard wide) in eastern Idaho, on a very steep slope just below timberline, I found a strange shrublet, only three or four inches high, with smallish leaves and relatively large flowers of most brilliant gentian-blue. It was utterly unlike anything else I have ever seen, and I was convinced that it was a new species, but to my disappointment both Keck and Pennell determined it as *P. montanus*. I am not entirely convinced, for I have known even Pennell to err on pressed material, which is, in the case of Penstemon, often deceptive in appearance. Unfortunately *P. montanus*, in its common forms as well as the strange blue one, seems very difficult in cultivation, and I am not sure that anyone in this country has been successful with it.

While on the subject of shrubby species, it may be well to quell any longing for *P. microphyllus*, "shrubby prostrate, with tiny thick clustered leaves and larger flowers"—of yellow, by the way. All would have been well had Clay omitted "prostrate," but he is not the only one who has been deceived on this point by herbarium material. Even so, I was not fully prepared for the plant when we found it : a dense shrub four or five feet high, and as much through, very free flowering ; but growing at the bottom of dry washes, far south and at low altitudes, so that habitat as well as size will make it forever a foreigner to any but Mediterranean rock gardens.

Among the other small species, brilliant blue *P. nitidus* and *P. angustifolius*, perhaps the most brilliantly beautiful of the genus, are reasonable in behaviour and reasonably available, although their life in gardens is unlikely to be more than three or four years. They usually remain at about six inches, with long basal leaves, often blue-glaucous, and buds toned with pink, while the open flowers equal the best gentians in the intensity of their blue. Somewhat taller, to perhaps a foot, is *P. lentus* of eastern Utah, with a sub-species *albiflorus* (confined, so far as I know, to a single station where it is fortunately plentiful), whose flowers are white with a pink spot. Of the various species of this section which we brought back, the only one remaining in cultivation seems to be *P. pachyphyllus* ssp. *congestus*, a taller plant, to two feet, which as I recall lacked the brilliance of the smaller kinds.

Some of the most beautiful coloring is found in the 'Glabri,' but these are mostly taller plants. Among the dwarfs, *P. alpinus* has long been available from Colorado, and in 1939 E. J. Greig introduced *P. uintahensis*, a name which still appears in lists, although it may not represent the true species. I once spent a week at 10,000 ft. in southern Utah, on a dreary high plateau, vainly seeking *P. parvus*, of which only a couple of plants have ever been collected. Priest and I collected a few seeds of *P. speciosus* ssp. *kingii*, a foot-high form of a very showy species, at a high altitude in western Nevada, and later an even more dwarf alpine form in the eastern part of the state. We also found *P. keckii*, a still smaller plant which I believe belongs to this section, over a considerable altitudinal range on Charleston Peak ; its flowers, of light blue, are in keeping with the size of the plant. Unfortunately nothing came of all these efforts. As the taller members of this section

are among the most amenable in cultivation, it is greatly to be regretted that the dwarfs have proved so elusive ; it seems likely that they should eventually become garden-wise.

Easiest of all the genus are the clusterheads, but except in forms of minute habit, they are also the weediest—barring the Eastern species—often suggesting a very gawky phyteuma of brilliant blue. About all that is in their favor is the brilliant color, but because of their adaptability they are the most likely to be available in seed, under their true names or others. *P. albertinus* is perhaps the most pleasing of the "Proceri," for it stays dwarf and the heads of small flowers seem proportionate to the size of the plant. This I have never seen in the wild, so far as I know ; I have collected seed of many apparently distinct types of this species, some of which have not been identified. The best that I have seen is *P. aggregatus* of central Utah, where it paints the sub-alpine meadows a vivid deep blue in very late summer ; it makes leafy mats a foot or more across, with stems one to two feet high. *P. watsoni* is a more slender, and less leafy plant, with very narrow tubes which are deep blue with red base, externally, and pale blue within—not a showy plant. As for the rest of the many species of this section, they are best passed by, except when seen in bloom.

Of the closely related "Humiles" the tale is better, for flowers are larger, and often the plants are more compact. *P. humilis* itself is a most widely distributed and variable species which makes a very dense basal tuft of rather small spoon-shaped leaves, often no more than two inches high, yet as much as a foot across, with flower stems from two to six inches high, bearing a few moderately inflated half-inch flowers anywhere from azure to blue-lavender in color. It is a plant of moderate elevations. *P. brevifolius*, regarded by Keck as a sub-species, is no more than six inches high, but entirely too leafy to be an attractive plant. The only other sub-species, *P. obtusifolius*, I have seen only in Zion Canyon, where collecting is prohibited ; it proved to be a very neat little plant, only six inches high, with spade-shaped basal leaves of bright glossy light green. It has not been in cultivation so far as I know.

P. deustus, shrubby, with tiny holly-like leaves, has little dull yellow-white flowers and is generally regarded as not worth growing, but I find the plant rather attractive out of bloom.

P. whippleanus, one of the most widely spread species, usually is found just below timberline. It has widely tubular digitalis-like flowers, and is reasonably dwarf, usually about a foot. While greenish forms are reported, all that I have ever seen, in many localities, have been a deep black-purple that I find attractive. For some strange reason, this plant whose wide range and choice of moderately moist locations indicate that it should be quite adaptable, has not been successful in gardens.

I must mention *P. harbourii* of another section, which I have never seen in the wild, but which Mr. Priest sent back to me from a later

trip. This is a Colorado plant, a true high alpine, with small flowers, apparently not especially attractive. It did not remain with me long enough to bloom.

This account passes over regretfully the brilliant red and pink species which are too tall for the rock garden, and often too intractable, yet cannot omit *P. cardinalis*, an extremely scarce species of southern New Mexico. From its provenance it should be among the most difficult, yet it has been happy in my garden, making three-foot towers of densely crowded pendant carmine bells, looking like an attenuated kniphofia. The one plant I collected survived for a number of seasons, flowered profusely, and left children to carry on. I wish that *P. eatoni*, of very wide distribution, would do likewise, for it is even more brilliant, but it will have none of me.

It may be that the names used here will cause some confusion, for Keck, whose nomenclature I have followed, is addicted to classing as sub-species those entities that have long been recognised as species. In general, in looking up a name in a seed or plant list, or in a popular work of reference, it will be advisable to search for the sub-specific name only.

Groton, New York, U.S.A.

SANGUINARIA CANADENSIS

Sanguinaria canadensis is a native of North America, including, as its name would lead one to expect, Canada.

Its roots are fleshy and bleed if damaged, hence its name. It disappears below ground, probably during October, and does not reappear till spring. Sometime in April as a rule, from the creeping roots emerge single upright palmate leaves, lobed and scalloped and of a pale grey-green. The flower stems at first are wrapped around by the leaves, which gradually open and release them. The stems grow to about four inches in height, and bear in April or May single large white flowers something like an anemone.

There is a double form (*S. canadensis floro-plena*—see Fig. 7), with flowers about the size of a golf ball or slightly larger. Although not as a rule partial to double flowers, I must admit this one is most attractive, and the flowers last much longer than those of the single form. If happy it flowers quite freely. Both single and double forms like the same conditions, leafy or peaty soil retentive of moisture, and part shade. A position in a border amongst dwarf rhododendrons suits them well. They may be divided in October or March.

Edinburgh. M-L.

Dwarf Conifers—Part 3

By ROGER WATSON

Picea abies : the specific name "Abies" is now used in place of the better known "excelsa," and among its dwarf forms will be found some of the most interesting rock garden conifers.

P. abies var. pseudo-Maxwellii, a conical or sometimes round-topped bush, of yellowish green foliage which is partly appressed to the branches, is very slow growing and rather rare in cultivation.

P. abies var. pygmaea is a rare and extremely slow growing form with "monstrous" branches, carrying both long and short branchlets with the buds crowded at the tips. Its annual growth rate is about half an inch—a good pan plant.

P. abies var. Gregoryana is a tiny form, making a bun-like plant, extremely slow growing with glaucous green short leaves. Very rare in cultivation, the plant usually seen is the quicker growing *P. abies Gregoryana var. Veitchii.*

P. abies var. humilis is another tiny form, even slower growing than the last, making a tiny bun-like plant, with very dense blue-green leaves. Both this and *P. Gregoryana* are good pan plants.

P. abies var. nidiformis is a curious and uncommon form, which develops with age into a nest-like habit with a dense mass of short crowded shoots, and no leader shoot. The deep green foliage is also very dense, and it makes a most useful plant for the small rock garden as it is very slow growing.

P. albertiana var. conica, the well known and popular dwarf form of the Alberta Spruce, keeps its perfect conical shape as if it had been regularly trimmed. One of the most useful of dwarf conifers, it is rather susceptible to cold winds, and soon suffers in dry conditions.

Picea glauca echinaeformis, a very rare dwarf form of the North American White Spruce, forms a very dense cushion of short stiff branches, thickly clothed with fine short foliage of glaucous blue green. Very slow growing, it makes an excellent pan specimen.

P. mariana var. nana, an extremely rare form of the American Black Spruce, is appearing in cultivation again ; I saw it on the stand of a famous nursery recently. A very slow growing globose plant with blue-green fine foliage, it is also a good pan plant.

P. omorika var. nana is an extremely rare dwarf form of the Serbian Spruce which I do not think is in general cultivation, but may be sometimes found. It is a great treasure, and a beautiful plant. A slow growing rounded bush of stiff branches and blue-green foliage, the branchlets are tinged with purple.

Pinus montana var "Gnom" is a form of *Pinus montana* which is sometimes found under the name "Den Oudin's variety," as it was introduced by the Dutch firm of that name. It is the smallest form of that species which can be very variable in habit. This form makes a close,

compact, and very slow growing rounded bush of stunted and gnarled appearance, with blue-green needles.

Pinus nigra pygmaea is a dwarf "monstrous" form of the Corsican Pine forming a head of short stout branches with twisted dark green leaves giving the plant a curious stunted appearance. It is rare in cultivation.

Pinus sylvestris var. beauvronensis, possibly the best of the dwarf pines, this form of the "Scots Pine" is said to have originated as a "witches broom" in the south of France. It forms a slow growing bush of short thick branches and deep green leaves. A good plant for pot culture, it is one of the best for a trough garden.

Pinus sylvestris var. pumila is usually found under the name of *Pinus wateriana*, and I obtained it as such. It makes a rounded or bluntly conical bush, and is reasonably slow growing. It can be kept very dwarf by "pruning" which in this case consists of shortening to half their length the young shoots, or "candles" as they are known, in early summer.

Pseudotsuga glauca var. fletcheri is a very interesting dwarf form of the North American Pseudotsuga, which is rare in cultivation. It makes a rounded flat-topped bush of almost horizontally placed bran ches, and deep green leaves, arranged in "herring bone" fashion. An attractive dwarf conifer, it is usually found as a grafted plant, but is slow growing enough for a pot specimen for some years.

Taxus baccata var. nutans is an extremely slow growing, sparsely branched, tiny form of the Yew, making an irregular bush of rather upright habit with dark green foliage varying in size. It is very rare in cultivation.

Taxus baccata var. cavendishii is a low-growing spreading form which is very near to *T. baccata repandus* : indeed, it would need an expert eye to distinguish the difference between them. It has very dark green sickle-shaped leaves, and with age conspicuous red berries which, however, are not regularly produced.

Thuya dolobrata var. nana, sometimes listed as *Thuya laetevirens*, is very distinct, as the foliage is scale-like, completely adpressed to the branches, and light green in colour. It is very slow growing and takes many years to reach its ultimate height and spread of about two feet.

Thuya occidentalis var. "Rheingold" is a popular plant. A dwarf form of the North American "Arbor Vitae," it makes a rounded bush of bright yellow adult foliage, which retains its good colour the whole year round.

Thuya "Rheingold compacta" : under this name I have a plant, similar in colour to the popular "Rheingold," which has made in ten years a dense bush of about one foot in height and the same in diameter, with juvenile heath-like foliage. At intervals near the top of the plant an adult-foliaged shoot appears which must be cut out.

Thuya occidentalis var. ohlendorffi is a curious dwarf form listed sometimes as "var. spaethii," and is very distinct with upright slender

branches clothed in awl-shaped foliage, which is juvenile. Sometimes normal adult foliage appears at the tips and this should be cut off. A very slow growing form, it should be propagated from juvenile-foliaged shoots as cuttings, which strike fairly readily.

Thuya occidentalis var. globosa is a dwarf, globose form of very dense upright branches and closely packed flat branchlet sprays and partly adpressed bright green foliage and keeps well clothed right to ground level. Slow growing, my plant of this at sixteen years of age is a perfectly rounded bush of about two feet.

Thuya orientalis var. decussata, a rather rare form of the Chinese "Arbor Vitae," makes a round topped pyramid bush of very glaucous heath-like foliage, turning to a beautiful purple shade in winter. These juvenile forms of *Thuya orientalis* do not like cutting winds, and a sheltered place is best for them.

Thuya orientalis var. meldensis, a broad pyramid of very crowded branches and intermediate foliage of a lovely grey-green, is looser in habit than the preceding form, and is very rare in cultivation.

Thuya orientalis var. "Rosedalis compacta" is a well known and popular form making a perfect ball-like plant of very dense habit, with bright green heath-like foliage which turns plum purple in winter. The young shoots in spring are creamy white. It should be tied up with a piece of green string in winter, as winds and snow will weigh down the branches and spoil its shape.

Thuya orientalis aurea nana is usually found under the name *Th. or. minima aurea,* and is a good dwarf conifer for the small rock garden, as it is quite slow growing, with stiff upright fan-like branches and golden-green foliage all the year round.

Thuya plicata var. rogersii, a popular and good dwarf form of *Thuya lobbii,* makes a broadly conical bush of bright yellow foliage. This colour is maintained all the year, and it makes a very decorative form for a bold position.

Tsuga canadensis var. albo spica is a rather rare form of the North American Hemlock Spruce which makes a loose bush of pendulous branches, the young foliage tipped white. It should be planted with due regard to its pendulous habit, and makes a good specimen in a large pot.

On looking through my list, all of which plants with the exception of Juniper echinaeformis are in my possession, there are no doubt many omissions of good forms. I have small young plants of several forms, but have written only of plants which are of sufficient age to show their characteristic habits. I hope that this very "unbotanical" short survey will interest members in collecting these fascinating dwarf forms of the great arborescent trees. Great interest will be found in searching for them, and growing them either in the garden or as specimen plants in trough gardens or pans.

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Photography of Alpines for Reproduction

By T. C. CLARE

I AM SURE that many members will have been disappointed from time to time with the quality of the illustrations in our *Journal*.

Now in my opinion the articles in the *Journal* are always of such quality that they deserve good, even if not absolutely first class, illustrations. Who is to blame ? Is it the Editor ? Of course not ; he can only publish what he is given, as his very limited budget precludes him from buying more than an occasional picture from the professionals, and in any case the rare species he so frequently illustrates have very likely not been photographed by a professional photographer. Is it the printer ? To a limited extent, perhaps ; but then our industrious editor spends a lot of his time complaining to the printer, who frequently replies that he cannot make a "silk purse out of a sow's ear. Could it be the block maker ? It could be, of course, but it almost certainly is not. Again the block maker can only reproduce the material he is given, so by a process of elimination it comes down to us, the members, who take the photographs. If we send in an unsharp, badly lit, and poorly printed picture, the editor either has to accept, and print it, or return it. He frequently has to use unsuitable pictures to illustrate special articles, as he is unable to get what he needs elsewhere.

So, if we want better illustrations, and I am sure the vast majority of us do, the matter is literally in our own hands.

Before trying to say how to improve our photography, let us see what the block maker and the printer require to produce a good illustration. First the size of the print. The larger the better. Try and make it a whole plate ($8\frac{1}{2} \times 6\frac{1}{2}$ inches) and make a $\frac{1}{2}$ plate your minimum. Block makers loathe anything smaller ; and the print should be on glossy paper, preferably glazed. If those who do their own enlarging have not got a glazing machine, any photographic firm will glaze a print for you for a few pence. Now for the quality of the print. First and foremost it must be sharp, and I do mean sharp. Secondly, the print should carry the full scale of grey tones from almost black in the deepest shadows (if there) to practically white in the fullest highlight (again if there is one). The reason for this is as follows. The half-tone block will only reproduce about half the number of grey tones that a bromide print will, and for this reason a lot of the quality of any print is bound to be lost in the reproduction, which means that to get a good illustration we need a first class print.

Before we can arrive at a print we need a negative, and a camera to produce it. Let us take the camera first. As to negative size, anything from 35 mm. (Leica size) upwards will produce work of excellent reproduction quality, assuming it has a decent lens. Of course, the

coupled rangefinder, which is combined with the focussing lever, or the reflex, give their owners an advantage over those who have to work with a tape measure, but so long as the simpler camera can be stopped down to F.16 or lower, and has a short focus lens, it is quite capable of producing excellent plant pictures. Make certain, though, whether the measurement is meant to be from the front of the lens, or from the focal plane, which is where the film lies in the camera body, to the subject. When measuring, remember always to measure from the camera to the front of the subject, as the depth of focus is several times deeper beyond the point of sharpest focus, than it is nearer to the camera. For the miniature user (35 mm. and 6 x 6 cm. cameras) use the finest grain film you can get. I know this means sacrificing some speed, and using longer exposures, but alpines are nearly all small, and need a fair degree of enlargement ; and the moment grain begins to show we start to lose detail. The slow Panchromatic films of any of the leading firms are suitable. Ilfords F.P.3, Kodak's Panatomic X or Plus X, Agfa F., Adox K.B. 17 for 35 mm. or R.17 for 120 size. For those who want super fine grain negatives Ilford Pan. F. 35 mm. only, or Adox K.B. 14 35 mm. and R.14 for 120 size are about the best available, but they are rather slow. The Ilford is Weston speed 16, and the Adox film Weston 25.

The exposure should be on the full side, fully enough to make a good bright print on normal printing paper. It is really necessary to have an exposure meter, and use it intelligently. For instance ; see that the light reaching the meter is that reflected from the plant and its immediate surroundings, and does not come from a bright sky ; and when taking a real close-up, take a reading 2 or 3 inches from the subject, and if it has pale flowers take two readings—one from the leaves and one from the flowers—and then use an average of the two for the exposure.

It will probably be said that it is not possible to get flowers and leaves to stand still outdoors for long exposures, owing to permanent air movement. For anything over 5 seconds this is probably true, but the picture of the Cyclamen (Fig. 4) accompanying this article had 3 seconds. Admittedly I had to wait some time for the wind to drop, but the result was worth it. The Alpine house is, of course, the ideal place for plant photography, unless one can take them indoors to a specially erected background and lighting arrangements. In the Alpine house the plant can be stood on a stool between the stagings, and it is easy with a few drawing pins to hang any background one needs. Flower Shows are also excellent places to take pictures. The plants themselves are first class, and there is always a well-lit window or corner where the camera can be used. I got some excellent colour photos on a window ledge at the 1955 Edinburgh Spring Show, and one of the illustrations to this article was taken at the same time (Fig. 8). Of course, the use of Flashlight will obviate any need for long exposures, but that is a fairly technical subject, and would need an article to itself.

A word or two on lighting the subject, and the use of filters is also appropriate, as an ill-lit picture can easily make a plant almost unrecognisable. Generally speaking, keep the lighting on the flat side ; that is to say, avoid any strong shadows. If these are there, and you must take a picture, try and get a piece of white card, and use it to reflect the light back into the shadows. A handkerchief hung between a couple of small sticks will do, but see that the reflector is placed so that it will not appear on the print, as you are photographing the plant, not the reflector.

A pale yellow and a pale green filter are all that are normally necessary. It sometimes happens that a darkish green plant has white flowers, and you find that either the green prints almost black if you want any detail in the flowers, or the flowers are solid chalk if the foliage is correct. To show both, use a green filter, which lets through green light at the expense of the white, and reduces the contrast, making it possible to show detail in both flower and foliage in the print. The same applies to blue and green. Gentians are always tricky to photograph, as the darker ones produce practically the same tone of grey on a print as their leaves, which makes it difficult to pick out the flowers. A yellow filter will darken the blue somewhat, and slightly lighten the green, which in printing will in this case increase the contrast between the two colours. Filters will of course need added exposure. The pale yellow usually needs 2 or 3 and the pale greens 3 times as much as shown on the exposure meter.

In illustrating this article I have tried to cover as much as I have written as possible, showing plants taken both with a 35 mm. and a 6 x 6 cm. camera, both indoors and out.

I should like to be able to recommend a book which covers the subject, but have been unable to find anything but an American volume, which concentrates on gardens, and larger flowers like tulips and roses, which need complicated studio lighting. The name is "Photographing your Flowers," by John P. and Mary Alice Roche, and published by Greenberg, New York. The quality of the illustrations, though, are excellent, and show what to aim at in a print for reproduction. There are some good notes on outdoor lighting, too, showing how to get the correct tones between flowers and foliage.

Fig. 4 CYCLAMEN x ATKINSII

PHOTOGRAPHED 26th February 1955 in Stuart Boothman's Nursery, Maidenhead, with frozen snow still on the ground. Camera, Rolleiflex with close-up attachment (Rolleinar 1). Adox 14 film at 3 secs. F.22. Developed in Neofyn Blue.

Fig. 7 SANGUINARIA CANADENSIS fl. pl.

PHOTOGRAPHED on 35 mm. Adox K.B. 14 film in a Rolleiflex. Electronic flash at F.22. Developed in Neofyn Blue.

Fig. 8 PRIMULA AUREATA

PHOTOGRAPHED at S.R.G.C. Show, Edinburgh, April 1955. Rolleiflex camera with 35 mm. film attachment. Rolleinar 1 close-up lens. Camera about 2 ft. from plant. Electronic flash, exposure 1/250 sec. at F.22. Fifty per cent. additional development in Neofyne Blue. Film, Adox K.B. 14.

Fig. 9 PRIMULA BHUTANICA

PHOTOGRAPHED at A.G.S. Show, London, April 1955. Note pistils extruded from buds on right of plant. Camera, Rolleiflex with 35 mm. film attachment. Rolleinar 1 close-up lens. Camera about 2 ft. from plant. Developed 50% extra time in Neofyne Blue.

Fig. 10 SAXIFRAGA x FALDONSIDE

PHOTOGRAPHED in the alpine house at the R.H.S. Gardens, Wisley. Camera, Rolleiflex with 35 mm. film attachment. Electronic flash, exposure 1/250 sec. at F.22. Film, Adox K.B.14, given 50% extra development, as electronic flash produces very soft negatives with normal development. Rolleinar 1 close-up attachment used and photograph taken from about 2 feet.

PRIMULA AFF. WIGRAMIANA P.S. AND W. 6025

REFERRING to my note on this Primula in *The Journal*, Vol. IV, page 275, in which I said I expected it to flower again in its cave bed there described—it did, and set seed for the second time, and the accompanying photograph (Fig. 12), shows it in early June 1955. It is the plant on the right, for the one more in the background on the left looks more like *eburnea*, though raised from the same seed number. It still looks healthy at the time of writing, so it may flower again, which would be for the third year. It probably flourishes so well in its cave bed on account of the sunless position of the site and the good soil drainage it has. A factor also contributing to the coolness of the position is the steep rise of the ground on the other, or south, side of the hedge which surmounts the retaining wall in which the cave and its bed have been made. This means that the ground behind cannot be very much warmed by the sun. Also in the same bed is *Primula bhutanica* and more under the roof of the cave *P. mollis*. Both of these have also done well and a clump of *Shortia uniflora grandiflora* has flowered especially freely.

N.E. England. R. B. COOKE

Ignorance, and Some Observations

By D. P. LAMBERT

MY SMALL garden clings to a ridge of the limestone Pennines 550 feet above sea level and is open to every wind that blows. It slopes gently and is naturally well drained ; part of it is shaded, part gets full sun. The soil is light and shallow, but good, with a pH of 7.1. The annual rainfall is between 40 and 50 inches. Frost is rarely severe or prolonged and there is more slush than snow. The worst weather usually comes in late spring, when things are beginning to move, and when sun, frost, and tearing winds make a brilliant but lethal combination. As elsewhere, most plants behave according to the book ; but I have been more interested in the exceptions, some of which are recorded here.

Anemone obtusiloba patula : I bought the blue form. It flowered a dull mauve. Next year it flowered white, rather a dirty white. The following year it flowered mauve, and later in the season white. I find it disturbing. On the whole Anemones do well, but not the native Pulsatilla. Garden forms flourish nobly, but the species plant will not grow or even live.

Antirrhinum asarina : planted in a sunny crevice, this southern Spaniard did reasonably well : seed planted in a narrower crevice did better still. But in the wet, sunless summer of 1954 self-sown seedlings appeared all over a shady patch devoted to Cyclamen species and flourished so outrageously that for the Cyclamen's sake they had to be dealt with. They were moved to the edge of a patch carpeted with native thyme and left to fight with that. The thyme died in the following winter, but the Antirrhinum came through unhurt. Another Spaniard, *Thymus membranaceus*, also came through, but suffered damage.

Bulbinella hookeri : In pure ignorance I planted this shade-loving, moisture-loving, lime-hating plant in the driest sunniest part of my limy garden. It has never looked back, and has outlived more than one Dianthus cultivar, which ought to have been ideally suited. On the whole 'Dianthuses' do not do well here, with the happy exceptions of *D. caesius* (*gratianopolitanus*) and *D. deltoides*, both of which multiply by self-sown seedlings, though the parent plant of *D. deltoides* died some time ago.

Daphne blagayana : The authorities differ, but the weight of opinion suggests that this plant is not a lime-lover and that it likes some shade. It flourishes here in full sun. The Daphne that refuses to flourish is the common *D. cneorum*. I have tried it more than once, and according to the Elwesian formula, "Where you thiink it will grow, where your friends think it will grow, and where nobody thinks it will grow" ; but all my plants have died except one, and that one will not flower. Instead, it throws fasciate branches, thin strips each crowned with a

coxcomb of leaves. In the hope of producing an amusing monstrosity, I have tried to layer these, but they will not be layered. Next year I think I shall try grafting it on to *D. blagayana.*

Draba mollissima : is the only Draba that does well here, and then only in a vertical nook in a retaining wall. Each winter it looks deader than any plant except *Phlox bryoides,* but in spring it revives in a remarkable manner. My present plant is five years old and seven inches across. Snails love to graze down the buds in March, but can be lured off with meta bait.

Eriogonum ovaliforme : contrary to accepted belief is hardy out of doors, and in a very exposed position at that ; though in wet weather the silvery leaves get tarnished and untidy. It flowers in summer, though why it should be encouraged to, except in the hope of seed, I cannot think. *Parochetus communis* is hardy, too, and usually flowers from September to December, or even January. The first really hard frost puts it down for the winter, but it comes again from the root in late spring. *Leucopogon fraseri* is another plant that stands the climate, but on the top of a peat wall, not in the limy soil : unusually severe frosts will damage it, but not ordinary ones.

Gentians : behave normally except the easiest Gentian of all, *G. septemfida,* which dies down in winter according to the book, but omits to reappear. Though *G. farreri* does well in the open garden, none of its hybrids is permanent. These flower well the first year, produce a few sad flowers the second year, and in the third or fourth year die without fuss.

Geum reptans : this reputed lime hater, though again the authorities differ, reputed also to prefer the stoniest of screes, grows neatly but unenthusiastically in a limestone scree, but in the ordinary soil grows well and sends out more viable offsets than I have room for. If it would spend its golden pennies all at once, instead of one at a time, what a superb plant it would be !

Omphalodes cappadocica : is all but impossible to please, but *O. Luciliae* does well when grown vertically and protected from snails. If there is a finer snail bait amongst plants I do not grow it.

Penstemon nitidus : is another plant that grows well when set vertically. On the flat, no matter how well drained a flat it is, it flowers and dies. Small plants in any position will flower themselves to death if they are allowed to, much as *Wahlenbergia serpyllifolia* will ; but if they are restrained from flowering till they are of reasonable size, much good comes of it. Even with small plants if the flower spike is cut off as soon as its perfection is passed the plant will often put out new leaves from the base and so survive. Otherwise it will behave like a monocarpic plant, except that it does not set reliable seed. *P. scouleri* does well in the garden, but resents root disturbance. Of other Penstemons I can only say that the plants I grow bear no resemblance to the plants described under their names in reputable books : furthermore, there are too many unacknowledged synonyms amongst Pen-

Photo.—D. M. Morison.

Fig. 15.—Primula pubescens "The General."

Photo.—Jas. C. Gilchrist.

Fig. 16.—Geranium subcaulescens.

stemons. I wish someone knowledgeable would publish a lucid account of the alpine Penstemons in the *Journal.**

Primulas : behave predictably except *P. auricula*, which refuses to flourish. Primulas of the X pubescens group and other natural *P. auricula* crosses do well, and even some florists auriculas ; but the true species either dies at once, which is the more satisfactory way of behaving, or refuses either to live or to die and goes on occupying valuable space to no purpose. *P. marginata* does well in a crevice, and so does P. "X Marven," in spite of its reputation for tenderness, though the species makes much the better plant.

Rhododendrons : grow on the peat wall except for *Rh. ferrugineum* and, oddly enough, *Rh. racemosum*, "Forrest's dwarf form," which are happy in the garden. *Rh. impeditum* survived contentedly in the garden, too, but has been freer flowering in the peat wall.

Saxifrages : behave with orthodoxy for the most part, but except for the tougher Kabschia hybrids the Englerias do much better than the Kabschias ; and one white mossy saxifrage seeds itself all over the driest and sunniest places. Apart from that strain no other mossy will grow anywhere. *Sax. oppositifolia*, which grows wild in sunny limestone crevices six miles away, does much better in the garden flat on the ground ; so does *Sax. retusa*, but in shade, not in sun.

Thlaspi rotundifolium : would not do well at all. Plants would come through winter wet and summer drought, but if once a bitter wind seared them they never recovered. So one plant was put in a specially well protected nook originally designed for *Thalictrum kiusianum*, and has flourished there better than the Thalictrum ever did. The latter was moved to a cranny on the shadiest part of the peat wall and has gone on there much better than the supposedly hardier *Th. koreanum*, which exists, but only just. *Corydalis cashmeriana* seems to dislike strong winds, too. Yet in nature it flourishes in places only less wind-swept than those endured by the Thlaspi.

Veronicas : will not do well. They either die, or are cut by frost before the flower spikes open. The one exception, a particularly delightful one, is *V. bombycina*, which is reputedly "suitable for alpine house only." It seems to be equally contented in a sunny scree or in a vertical cranny.

In fact the Authorities are useful guides ; but not everything is known about hardiness, or lime tolerance, or many another insistent need. In the beginning I blundered ignorantly, but sometimes with surprising success. Now, more experienced perhaps, but still very ignorant, I make deliberate experiments, believing that more is lost to our gardens by timidity than by wild weather. Often the experiments fail, but they succeed often enough to be greatly rewarding.

Giggleswick, Settle, Yorkshire.

*Dr. C. R. Worth has made a good beginning. We hope he may help us more.—*Ed.*

High Calcium or High pH?

A Study of the Effect of Soil Alkalinity on the Growth of Rhododendron

By HENRY TOD, Ph.D., F.R.S.E.,
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IT IS WELL-KNOWN that almost all Rhododendrons and many other members of the Ericaceae will not grow on soils which contain free lime. As far as can be found in the literature, however, it is not known whether this is due to the alkalinity of the soil, i.e. a pH effect, whether the toxic action is due to calcium *per se*, or to a deficiency of some other element induced by the excess of calcium in the soil.

It seemed of interest to show whether this effect of a lime-rich soil was due to a high pH by producing alkalinity by a means other than lime, and accordingly the experiment here described was started in June 1950.

Hogenson (1906) reported an experiment where azaleas and Rhododendrons were potted up in a soil to which had been added lime in a proportion of 1:160. These failed completely, but if an equal amount of "sulphate of magnesia" was added to the mixture, the plants grew on normally. More recently Hills (1950) has reported similar findings, and recommends magnesium sulphate for the treatment of calcifuge plants which are showing yellowing of foliage and failure in the presence of lime in the soil. Coville (1923) reported the use of magnesium sulphate and also of aluminium sulphate with the same effect.

These findings suggested that fairly large does of magnesium were not harmful to rhododendrons, and that it might be possible to raise the pH very considerably using magnesium carbonate.

The species used was Rhododendron davidsonianum, one of the Triflorum series, quoted by Hanger (1949) as producing an optimum growth at about pH 5.7. The seedlings were kindly supplied by Mr. E. E. Kemp, Curator of the Royal Botanic Garden, Edinburgh.

The compost used was a mixture of an acid soil from an old felled wood, which was known to be very low in calcium, and ordinary granulated peat. Both soil and peat were riddled to avoid the inclusion of any coarse mineral matter which might break down to release nutrients and upset the balance.

The compost so made was divided into three lots. One, (23 lb.) for the Control group, was used as made ; to the second batch of compost ($22\frac{1}{2}$ lb.) was added 85 gm. magnesium carbonate (pure, Ca-free) and to the third (of $24\frac{1}{2}$ lb.) was added 153 gm. magnesium carbonate. These quantities of magnesium carbonate were calculated on the "Lime Requirement" figure found for the compost by the I.S.S.S. Titration Curve Method (1933), converting the Ca values to $MgCO_3$, to produce pH values of approximately 7 and 8.

To each of these batches was added one gram of pure diammonium phosphate to give the seedlings a reasonable chance of establishing themselves.

The pots used were of fireclay, eight inches in diameter and eight inches deep, cylindrical, and coated on the inside with bitumen paint to render them completely inert (Nicholas 1948). One seedling was planted in each pot, and the pots were kept watered with either rain water or else softened water.

SOIL RESULTS

In October 1950, after a period of time allowed for the compost to stabilise and reach an equilibrium, soil samples were taken with a fine auger from the pots and analysed, giving the following results :—

TABLE I

Treatment	*pH*	*Potassium*	*Phosphate*	*Exch. Ca.*
Control "O"	4.7	Medium Low	Very Low	0.25 m.e. per 100 gm. soil
I	6.8	Medium	Very Low	0.38
II	8.4	Medium	Very Low	0.36

The above variation in exchangeable Calcium is within sampling error, considering the heterogeneous mixture of peat and soil, etc.

After three and five years, the soil analyses were as follows :—

TABLE II

Control "O"	1953	5.2	Very Low	Very Low	0.87
	1955	5.3	Very Low	Very Low	0.81
I	1953	6.8	Low	Very Low	1.19
	1955	7.1	Low	Very Low	1.27
II	1953	7.9	Low	Very Low	1.05
	1955	7.8	Low	Very Low	1.15

There are two possible explanations for the rise in exchangeable Calcium. The first is that the greenhouse in which the pots were kept for the first two years or so was made of concrete, and possibly the rainwater from the roof was contaminated by the fresh concrete surface (it will be noted that there is no comparable rise from 1953 to 1955 as against 1950 to 1953), and secondly the decrease in the organic matter content of the compost due to normal oxidative changes in the compost.

PLANT RESPONSE

In such a poor mixture, strong free growth could not be expected, but all the seedlings made slow, steady progress. In each group the colour of the foliage was the normal green with no signs of the characteristic yellowing which occurs in soils of high pH.

Little difference could be seen between the treatments though perhaps the branches were rather thinner in groups I and II. The approximate dimensions are given in Table III for the three groups. This year (1955) the plants flowered for the first time, the earliest being treatment "II," followed a week later by "I" and ten days after that the control group "O." In October the plants were cut off at ground level, dried and milled for analysis. The dry-matter weights are also given in Table III and they show that there was a certain depression of growth at the higher pH values which had been indicated by the rather thinner shoots mentioned above.

TABLE III

PLANT DIMENSIONS

Group	*Dry Weight*	*Height*	*Circumference*
"O"	8.2 gm.	11 in.	20 in.
	12.1	10	22
	14.7	11	21
	13.1	11	23
Mean	12.0	11	21½
"I"	9.5	11	23
	9.1	10	22
	9.5	11	18
	10.0	12	19
Mean	9.5	11	20½
"II"	7.5	13	14
	9.0	10	16
	6.7	9	16
	12.8	12	23
Mean	9.0	11	17

The analytical findings for the three groups will be found in Tables IV and V, where they are expressed as in the Dry Matter and in the Silica-Free ash respectively, and these variations are shown graphically in Figs. on page 55. Analyses are given as well for tissues from a plant of Thodo. davidsonianum grown under normal garden conditions for comparison, the soil pH being, however, somewhat higher.

TABLE IV

ANALYSES ON A DRY MATTER BASIS

	O	I	II	*Normal Garden Control*
Soil pH	5.3	7.1	7.8	5.9
% N	0.70	0.77	0.84	1.00
% CaO	1.27	0.83	0.70	1.24
% MgO	0.46	0.96	1.13	0.21
% K_2O	0.94	0.67	0.60	0.60
% P_2O_5	0.27	0.33	0.33	0.18
Mn (ppm)	1400	176	122	285

TABLE V

AS PERCENTAGES OF THE SILICA-FREE ASH

	O	I	II	*Normal Garden Control*
Soil pH	5.3	7.1	7.8	5.9
% Silicia-free ash	3.93	3.31	3.06	2.49
% CaO	32.3	25.1	22.9	49.8
% MgO	11.8	28.8	37.0	8.60
% K_2O	23.9	20.3	19.7	24.1
% P_2O_5	6.85	9.95	10.8	7.22
Mn (ppm)	35,000	5,320	3.990	11,450

As a comparison with other Rhododendrons growing in a more or less naturalised state, Tables VI and VII show the comparison of group O and the normal garden control with specimens from a variety of places over the East of Scotland, and one from the North of England. These are not strictly comparable, since they are from Rhododendron ponticum growing freely as almost completely naturalised "covert," but they may give an indication of the general mineral status of the experimental plants.

TABLE VI

	Rhododendron ponticum								*Rhododendron davidsonianum*
	In the Dry Matter								
	A	B	C	D	E	F	G	"O"	*Garden*
Soil pH	4.5	4.9	5.3	5.5	6.0	6.3	—	5.3	5.9
% CaO	2.03	2.00	1.82	1.58	1.75	2.24	1.28	1.27	1.24
% MgO	0.55	0.66	0.79	0.78	0.58	0.53	0.91	0.46	0.21
% K_2O	1.15	1.12	0.88	0.91	1.03	1.15	0.94	0.94	0.60
% P_2O_5	0.20	0.23	—	0.12	0.48	0.27	—	0.27	0.18
Mn ppm	588	533	760	624	874	312	205	1400	285

TABLE VII

In the Silica-Free Ash

Soil pH	4.5	4.9	5.3	5.5	6.0	6.3	—	5.3	5.9
% S.F.A.	4.41	4.38	4.20	3.46	4.99	4.51	3.49	3.93	2.49
% CaO	46.0	45.6	43.3	45.7	35.0	49.7	36.6	32.3	49.8
% MgO	12.2	15.3	18.8	22.6	11.6	11.8	26.1	11.8	8.60
% K_2O	26.1	25.4	21.0	26.3	20.7	25.5	26.9	23.9	24.1
% P_2O_5	4.53	5.15	—	3.36	9.53	6.07	—	6.85	7.22
Mn ppm	13350	12150	18100	18000	17500	6940	5860	35000	11450

Sources of material : A Bush House, Midlothian ; B Tynninghame, East Lothian ; C Danskine, East Lothian ; D Balbeggie, Fife ; E Royal

Botanic Garden, Edinburgh ; F Seafield, Midlothian ; G North of England.

It will be seen from the foregoing analyses that the general mineral status of the experimental plants was within what are probably normal limits. For example, the phosphate figures show that the level in the high pH pots was as high, in fact higher, than in the normally-growing plants. This is probably due to a decrease in fixation as the pH increased. The manganese values are low, but evidently had not reached deficiency levels, for if this had been the case, leaf symptoms would have been visible, which they were not.

While the exchangeable calcium is raised in groups I and II, this is a very small increase compared with that which would be shown by a soil containing sufficient calcium to reach the same pH, where the calcium level would be in the order of 15 to 40 milli-equivalents per 100 gm. soil.

It would seem, accordingly, fair to say that the results show that for the three groups, of four plants each, of Rhododendron davidsonianum, soil pH values raised to what would be toxic levels, *if the raised pH were due to calcium*, had no serious ill effect on the growth of the plants, and that alkalinity *per se* is not the cause of the harmful effects produced by alkaline soils on "calcifuge" plants—at any rate in Rhododendron.

The writer's thanks are due to Mr. Kenneth Simpson, B.Sc., A.R.I.C., and his Staff for the soil analyses quoted in the text, and for his interest and help ; also to Mr. Shearer McIntosh for the analyses of plant material.

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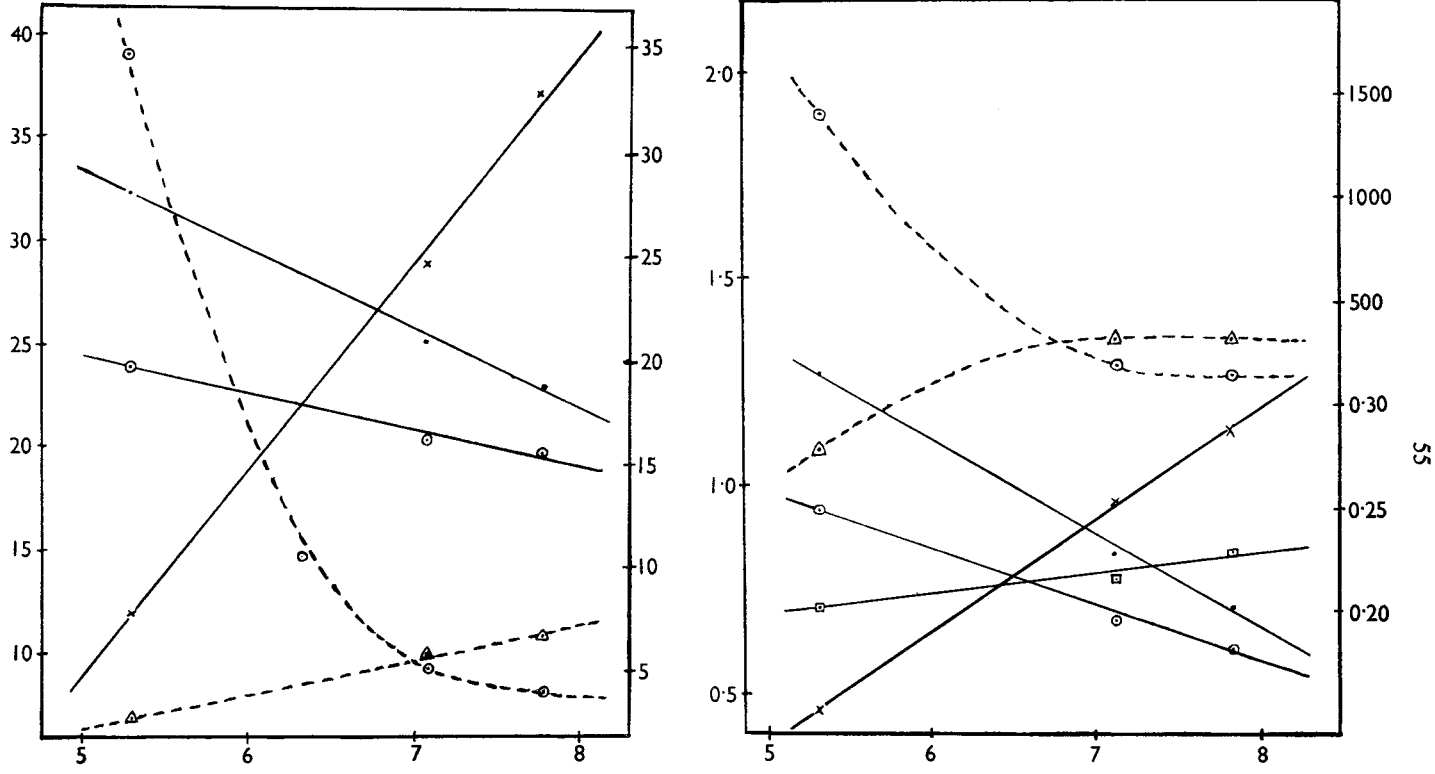
SCALES

FIG. 1

Left hand 0.5, 1.0, 1.5, 2.0 % CaO, MgO, K_2O, N.
Bottom 5, 6, 7, 8 pH.
Right hand 0.20, 0.25, 0.30 % P_2O_5
0, 500, 1000, 1500, ppm. Mn.

FIG. 2

Left hand 10, 15, 20, 25, 30, 35, 40, % CaO, MgO, K_2O, P_2O_5.
Bottom 5, 6, 7, 8 pH.
Right hand 5, 10, 15, 20, 25, 30, 35 × 1000 ppm. Mn.



KEY TO GRAPHS

FIGS. 1 & 2

Mn

P_2O_5

CaO

K_2O

MgO

FIG. 1 ONLY

N

I—The Alpine Botanic Garden at Lautaret

By JAMES DAVIDSON

THERE ARE few Alpine Botanic Gardens left in Europe now-a-days, many having disappeared in the course of time and as a result of both world wars. An example of this was the destruction during the last war of the famous Alpine Botanic Garden "La Chanousia," which was situated at an altitude of 7218 ft. at the Col of the Little St. Bernard in Italy.

The late Henry Correvon is well known as one of the pioneers in the establishment of such gardens for the cultivation of alpine plants in their natural surroundings. With the assistance of Lord Avebury, Professor Romanes and others, he inaugurated in July 1889 the first mountain botanic garden—"La Linnaea"—on the Great St. Bernard at a height of 5429 ft. It was unable to be maintained during the first world war and was turned over to the University of Geneva. After this, other similar gardens were formed in the European mountains, amongst them being "La Chanousia," established in 1897, and which eventually came under the care of the University of Turin.

At the present time the remaining important gardens are administered by the Botanical Departments of the various Universities or larger Botanic Gardens. In addition to the cultivation of the native alpine flora and alpine flora from various parts of the world, they are centres for research with attached laboratories which accommodate research students. There is exchange of material for research and they have also the duty to perform of educating and creating an interest for the general public.

The principal Alpine Botanic Gardens amongst the mountains of Western Europe which are still functioning are in the following localities :—

1. Shachen in the Bavarian Alps, at a height of about 6000 ft., and controlled by the Botanic Garden of Munich.
2. Patscherkofel, near Innsbruck in Austria, at a height of 6234 ft., and controlled by the Botanical Department of the Universiry of Innsbruck.
3. Pic de Midi de Bigorre in the Pyrenees, at a height of about 9188 ft., and controlled by the University of Toulouse.
4. Lautaret, administered by the Botanical Department of the University of Grenoble.
5. Schynige Platte, above Interlaken, Switzerland, at a height of 6562 ft., and under the direction of the University of Berne.

Of these, it is the garden at Lautaret which is the subject of this note.

This wonderful Alpine Botanic Garden of about 2½ acres is situated at the Col du Lautaret in the Hautes-Alpes, Dauphiny, at a height of over 6752 ft. A previous article in this *Journal*[1] has described the great

variety of the mountain flora which can be observed in the area, and in addition there is this Botanic Garden where the native plants can be closely studied growing side by side. Needless to say, for purposes of identification it is invaluable. It is situated in beautiful circumstances on a slope facing chiefly south and surrounded by the great mountains of the region. One looks straight across to the nearby massif of the Meije, with one of its glaciers—the Glacier de l'Homme —in full view, a wonderful sight !

As already mentioned, the primary functions of such a garden are the cultivation of alpine plants, research, and instruction, as well as giving great pleasure to alpine plant enthusiasts.

The garden has suffered many viscissitudes. In 1944 the former curator, M. Prevel, was killed along with the entire male population of the vicinity by the Germans. As a result of this catastrophe and other difficulties the garden fell upon evil days. It became completely neglected and large numbers of the plants disappeared through natural death, or as a result of the inroads of soldiers, mules, tourists and cows. Sad to relate, those who should have been the last to think of such disreputable doings—so-called rock gardening enthusiasts—dug up and purloined the rarest and most beautiful plants ! Interesting results, however, have been obtained with regard to the survival of a number of species through this period of neglect.

Within the last few years the garden has now entered upon a new and, let us hope, permanent period of prosperity under the administration of the Department of Botany of the Faculty of Sciences of the University of Grenoble. During these latter post-war years the collection of plants has been replaced and greatly augmented through the enthusiasm, energy and untiring care of the Curator, M. Robert Ruffier-Lanche, who is a great lover of and authority on Alpine Plants. Apart from the cultivation of alpine flora which is of a high standard, botanical research is being actively carried out under the supervision of Mme. Lucie Kofler, who is in charge of scientific research.

In the grounds is the chalet, which contains a spacious laboratory and which accommodates students from Grenoble University or other university centres in Europe who come to work during the summer. The garden also contains a monument erected in 1914 in memory of the late Captain Scott of Antarctic fame, who experimented at Lautaret with a motor sledge before his departure on his last expedition.

The garden is attractively laid out.* In front of the chalet is an area of natural turf amongst which grow a number of plants which are found in similar circumstances outside the garden—*Centaurea uniflora*, *Arnica montana*, *Campanula barbata*, etc., and a variety of natural grasses. It is to be emphasised that a large number of the species in the garden are those which grow locally in the vicinity of Lautaret and the neighbouring regions of Savoy, Piedmont and Western Switzerland. Other regions are also represented, including the Pyrenees,

*See Fig. 11.

Spain, Portugal, North Africa, Central and Eastern Europe, Caucases, Asia Minor, South East France, Corsica, Italy, Greece, Siberia, the Himalayas, China, Japan, and North America. According to M Ruffier-Lanche it has not yet been possible to obtain seed from the Southern Hemisphere.

Among the plants there is a good representation of European primulas such as *Pp. marginata, viscosa, hirsuta, integrifolia, longiflora, clusiana, allionii, pedemontana,* and *spectabilis.* There are also numerous Asiatic species, including *Pp. mollis, yargonensis, vittata, waltoni, alpicola,* and *rotundifolia.*

Saxifraga florulenta appears to be quite amenable, as well as *Eritrichium nanum,* which also grows in splendour on the nearby mountains. There are some plants of this species which have lived for three or four years in the garden and some seedlings which are in good health.

The gentians are represented by a complete collection of the French forms such as *G. kochiana, clusii, angustifolia, ligustica, costei, occidentalis* and *alpina.* A plant of *G. angustifolia,* which I saw in July 1955, was a beautiful specimen covered with masses of bloom. And of course there are the two common natives—*G. verna* and *G. bavarica.* There are also many Asiatic and American species.

The campanulas are of interest and include *cenisia, allionii, raineri* (true), *spicata, aucheri, saxifraga, moesiaca* and *thyrsoides,* which was growing as well as its brethren outside the fence ! This is a good and interesting species and one which is rarely seen in our own gardens.

Viola cenisia is growing well there and a drift of *V. bosniaca* in full bloom was worth going far to see. *V. calcarata* is represented in many colour forms.

Almost all the French species of dianthus are present, including *hyssopifolius* (wild forms), *neglectus, vaginatus, sylvaticus, sequieri, gallicus, benearnensis, balbisii* and others such as *microlepis, haematocalyx, glacialis,* and *alpinus.*

Amongst the daphnes are *striata* and *striata alba, blagayana, verloti* (from "locus classicus") and *cneorum.*

Lilies grow well, such as *L. concolor, carniolicum, pyrenaicum, pulchellum, callosum, jankae, rubrum, bulbiferum,* and the native *L. martagon,* including two forms with white flowers. However, the lilies, amongst them the martagons, are frequently caught by late frosts in July or August !

On the other hand some species are prominent for their unexpected hardiness, such as *Gladiolus illyricus* (from Portugal), *Erinacea pungens, Genista cinerea, Genista radiata* and some other plants. This may be due to the dryness of the climate at Lautaret, although the cold may be intense, as would be expected from its altitude. This dry climate does not suit many of the Himalayan species. For example, the

meconopses as a rule are not a success, apart from *Mm. prattii, rudis* and *horridula,* which all appear to do quite well.

In addition there are considerable collections of the Pedicularies from the Alps and Pyrenees, including some hybrids, also collections of Astragalus and Oxytropis. I have not mentioned the extensive collections of species of Salix Carex, Gramineae, Juncaceae, etc., nor the alpine ferns which include *Asplenium septentrionale* and *Cystopteris montana.*

The above is a synopsis of only some of the many species which are grown in this garden. M. Ruffier-Lanche wishes it to be clearly understood that nine out of ten of the species grown there are of recorded wild origin, this being a botanic garden. Altogether it is a garden which is full of interest to those who grow or are interested botanically in Alpine Plants and every endeavour should be made to pay it a visit by anyone who may be in the vicinity. A most hospitable welcome will be received from Mme. Kofler and the curator, M. Ruffier-Lanche.

Finally I wish to express my thanks and indebtedness to them for their valuable assistance in the compilation of this note, obtained from their publications[2] and personal communications, and to take the liberty of quoting a final sentence from one of their papers[3]: "A Botanical Garden or Arboretum remains one of the few places on earth where those engaged in the study and cultivation of humanistic and scientific values may meet and should be made to meet."

References :

1. Journ. S.R.G.C., No. 11, 1952, p. 117.
2. Rapport sur le jardin alpin du Lautaret. L. Kofler et R. Ruffier-Lanche. (U.I.S.B., Serie B, No. 13, Paris, 1953).
3. Les Jardins Botanique alpins. R. Ruffier-Lanche.

Longings

I have a secret longing, to see Japan again
When the wistaria blossom falls in showers of purple rain !
And avenues of trees are gay with tasselled flower of cherry ;
Or with the crimson pyramids of santen's winter berry,
I want to see the jonquils, and the red of easly plum—
Because with them the bushwarbler is always sure to come.
On leafless tree I'd like to see Magnolias unfold ;
And all the sunny hills aflame with maples red and gold :
A field of fluttering irises ; a bamboo's feathery plume :
And in amongst dark shining leaves camellias waxen bloom :
Then, in a wintry garden where pale grapefruit lanterns glow,
I'd gather daphne blossoms hiding underneath the snow.

R. M. H.

Spring blooming Midwestern American Wild Flowers in our Rock Gardens

By PETER P. KRIEGER

SPRING HAS come to our rock garden and the cliffs are coming alive again. One of the first harbingers of spring to greet us is *Sanguinaria canadensis*. Suddenly overnight the pale green shoots appear with two leaves tightly wrapped around them. The large flower bud stands above the leaves. In a day or so the grey-green leaves unfold and the snowy white poppies with yellow centers form big drifts among the limestone out-croppings in the woody section of our gardens. Like most flowers of the poppy family, the flowers last but a day. The fleshy horizontal root stock contains a blood-red juice from which the plant derives its latin as well as its common name "Bloodroot." The Indians formerly used the red juice in decorating themselves for war. As the season advances, other leaves appear, and by midsummer they have become so large as to give the plant an entirely different aspect.

Another of the shy inhabitants in the same part of our rock gardens is *Dicentra cucularia*. When the soil is still wet from the winter's snow the pale pink stems and the rolled up leaves are pushing up through the woodland floor. In a very short time the ferny leaves and the buds unfold and the dainty ivory white blossoms tinged with pink hang on curved stems, like small trousers from far off Holland, giving the plant its common name "Dutchman's Breeches."

Trillium nivale, *T. cernuum* and *T. erectum* are the three Trilliums that grow in our rock gardens. *T. nivale* is the earliest and smallest of them. The four- to six-inch plants push up through last fall's dry leaves or through moss before most of the other spring flowers appear. The gleaming white blossoms unfold against the dark green background of the leaves.

T. cernuum has small white to rose purple, nodding flowers growing on $1\frac{1}{2}$ ft. stems.

T. erectum grows to about one foot. It has brownish purple to greenish purple flowers.

All members of this genus observe carefully the rule of three ; that is they have three leaves, three petals and three sepals. All are easily grown from seeds in the shady parts of the rock garden. The best time to transplant Trilliums is in June. They can even be transplanted successfully when in full bloom.

Erythronium albidum is the only member of this genus we have in our garden. On an early spring day the bud opens to a six-petaled white lily flower with yellow stamens and a long pistil. It takes about seven years, from the time the seed is sown to blooming time. Each year appears a single richly silvery green and brown mottled leaf. In the seventh year two leaves instead of one come up with a flower

stalk between them. The foliage disappears soon after flowering. Erythroniums can be successfully grown in any shady or semi-shady part of the rock garden. They should have a winter mulch of coal ashes or decayed leaves.

The three-lobed bronzy leaves of *Hepatica acutiloba* make an excellent ground cover as the foliage is evergreen. The plant grows to about six inches. The pale pink, lavender or white flowers come on erect hairy stalks. The new furry and silky grey leaves unfold after the plant is through blooming. They are of easy culture in rich, well-drained neutral or slightly acid soil, and they like a half shady sheltered position.

Anemonella thalictroides gives us masses of bloom in April and May. It grows in our garden in light acid to neutral soil along the paths, interspersed with ferns. The white or pink-tinged flowers arise on a three-stalked six- to eight-inch stem. We propagate the Anemonellas by dividing the roots in the fall.

Mertensia virginica, or Virginia Bluebell, is a mass of pale blue flowers in April. At first the flower buds are pinkish, almost the color of apple blossom buds, and eventually they change to that splendid light blue of the full-grown bells. Confusion often arises from calling the Mertensias "Bluebells," the same as we call Campanulas. The Mertensias belong to the Borage family and not to the Campanulas. We increase the Mertensias by seed. They can also be divided, but this method of propagation is more difficult.

We collected all the before-mentioned plants from the wild and all are of very easy culture here on the Mississippi river cliffs. There are many, many more native wild flowers growing in the wild flower section of our rock garden, but to describe them all would fill a whole book by itself.

Propagation from Seed

By A. DUGUID

RAISING plants from seed is by far the most economical way of furnishing a garden. With strict attention to detail, there is no reason why anyone with time to spare cannot greatly add to the pleasure of gardening by raising some at least of their own plants.

There are various ways open to achieve this, all easily within the reach of anyone, whether town- or country-dweller. First there is the greenhouse, which for alpine seeds need not be heated. If, however, heat is available, this, for the raising of such seeds as primulas, polyanthus, meconopsis, rhododendrons and lilies early in the year, is a distinct advantage, provided that the temperature is never allowed to become excessive ; I find that a range between 45° F. and 60° F. is ideal with free ventilation except on very frosty days.

The cold frame is also useful, and a simple structure is easily made to house the seedlings that are to be raised.

If pots or pans are to be used, they are best to be plunged to conserve moisture. Sifted ashes, sand or peat are all suitable plunging material, allowing enough, so that the pots can be plunged to the rim.

Seeds can also be very successfully raised with small lantern cloches. These have an inside measurement of $4\frac{1}{2}$ inches : sufficient space to raise a nice batch of seedlings. I find it best to excavate the area where I am to raise seeds under cloches, making provision for draining away surplus water. Then line the bed with rough boarding to make an open frame. This again can be of any size, according to the number of seeds to be raised. Fill to within 3″ of the top with seed compost and the frame is ready for use.

To sow the seeds, have ready sufficient seed compost ; this, for small quantities, is best bought ready for use from firms who make and supply it, usually by weight, and is ideal for the purpose. Write out labels, with name of plant, date of sowing, and origin of seed (i.e., if from Scottish Rock Garden Club Seed Exchange, the letters S.R.G.C., or if from a firm, G. & D., or as the case may be). I also keep a ledger where again the name is entered, origin, method of sowing, and any other relevant matter : a note of germination, when pricked out, when planted, all add to the interest of plant raising.

Pots and pans should be washed clean—sizes between 3″ and 5″ are best for small quantities ; place crocks over drainage hole, using enough to ensure good drainage ; cover with a layer of rough material —broken turf, decayed leaves, or such-like—filling with compost to within 2″ of the top. Have at hand sifted compost—an old flour dredger makes a good sieve. Top off the pots to within half an inch of the top with this, making all moderately firm : soak in water until the top is just moist. Leave for a few hours to drain, and then sow. Sow seed *very* thinly and evenly on the top of the soil : larger seeds

can be spaced out with a match stick and lightly pressed into the soil ; fine seed is evenly spaced if a small brush or feather is lightly switched through the newly sown seed ; finely dust with compost to cover seed. Label each pan as sown. After sowing, if at all possible, I like to get the pans of alpine and primula seeds well frozen, and if covered with snow all the better, leaving them in an open frame out of doors for this purpose. A few fronds of bracken laid on the top of the pots saves the soil from being battered by heavy rain. Frozen seeds germinate freely as a rule, especially if the pots are put in a heated greenhouse afterwards. All that is necessary is to get the seed frozen solid, the length of time varying with conditions.

Those who have "fridges" can freeze their seeds artificially, the method being slightly different, the seed being frozen before sowing. Open the packet and add a few drops of water to each packet that is to be frozen. Place in "fridge" and freeze for 24 hours ; remove and thaw 12 hours in a warm room ; damp and freeze again for 24 hours : at the end of this time sow immediately and place the pan in a heated greenhouse. Germination is usually very rapid. This process is very good, especially for the rare primulas and meconopsis.

Watering has to be carefully done. At no time during the germinating period must pans be allowed to dry out. Frequently one finds it advised in gardening books never to water seed pans until they are dry. This is quite wrong so far as alpine seed is concerned. Keep a pan for holding water handy, and dip each pan when necessary, that is, when just a trace of dryness shows on the top.

Pans in a heated structure will need to be carefully gone through each day ; cold houses will naturally need less watering. Spraying with a fine mist spray is of great benefit and keeps seedlings growing freely.

Treatment in cold frames is different ; there the pans are plunged and need less watering. Such watering is done with a very fine spray or rose on watering-can.

Alpine seed frames should at all times have free ventilation. A small piece of wood laid under the sash at the back gives the necessary ventilation and as the seedlings grow this space should be increased with the use of larger blocks.

Going back to seed raising under lantern cloches—you proceed thus. The frame is filled with compost and all made level. Press a cloche onto the bed, which will leave a square mark. Sow the seed inside the lines of the square, label, and cover the seed as before, then place cloches on top. Those seeds rarely dry out, and need very little attention, and this method is ideal for anyone with the minimum of time to deal with seedlings.

I usually sow them in January and February and leave them alone till the seed germinates, usually during April.

Should a dry spell come, however, it is a very simple matter to lift the cloche, water through a fine rose, and return the cloche. Seeds sown by this method take longer to germinate than in a heated greenhouse, but once through their progress is rapid.

All seeds should be pricked out as soon as ready. Again this varies with different species. Such species as Dianthus and Aubrietia quickly need moving on, while, generally speaking, such as primula and meconopsis are best left longer. For small garden purposes pricking into pots is the best. Again, the compost for this can be bought ready to use. After potting, plunge pots into a cold frame, which must be kept closed and shaded until growth recommences, admitting air gradually as required.

Boxes are also excellent for raising seeds ; preparation is the same as for pots, with special attention to drainage, making sure that sufficient holes are bored in the bottom to let away surplus water, and also crock as for pots. When filling boxes with compost, firm the soil well into corners and finish off with fine soil as before. One fault with boxes ; they need more room than pans. On the credit side, they do not dry out so readily.

Over the years I have tried out raising different alpine and allied seeds on sphagnum, with gratifying success. Such as rhododendron, heaths, andromeda, phyllodoce, cassiope and lilies, germinate and thrive on sphagnum better than on any other medium I have tried. Primula, bryocarpum, cyananthus and haberlea also gave good results.

Sphagnum is the moss common on peaty moorlands anywhere in Britain, as it is also to be found all over the northern temperate zones of the world. I have found that the sphagnum of the open moors, preferably that of a reddish growth, is the most suitable. Sphagnum of ditches, usually a vivid green in colour, also germinates seeds freely but impregnating it is a green algae which grows and smothers the seedlings.

Gather the moss and spread it to dry—in summer easily done out of doors—at other seasons, in a warm place, such as the hot pipes of a greenhouse. When dry, rub through a sieve until it is of the texture of fine peat, when it is ready for use. Crock pots in the usual way and fill with sphagnum which has been damped slightly, making it firm in the pot ; label as before, and sow the seed on the surface of the pot, leaving seed uncovered.

If sowing lily or nomocharis seeds, however, bury them under a two-inch layer of sphagnum. After sowing, give the pots a thorough soaking—this drives the seed in amongst the sphagnum and gives sufficient covering. Place the pots in a warm greenhouse, and give frequent watering, never allowing the pots to dry out. Don't be afraid of over-watering ; I don't think this to be possible, as the sphagnum will only hold a certain amount, and the surplus quickly drains away.

If the seed is sown thinly there is no difficulty with pricking out. Turn the whole pot out and gently wash the bottom part off ; then, by carefully pulling, each seedling will come away with well-developed roots.

I use sandy peat and loam to prick out all ericaceae seedlings, and shade until re-established.

Primulas will be ready for pricking out by late spring ; rhododendrons are best left till the spring of the year following sowing, being ready when just starting into growth, usually in early March.

For lilies and nomocharis the procedure is different. I used to prick them individually into 3″ pots, but did not get satisfactory results. Lily seedlings have very long roots which they hate to have restricted. Again lilies in nature grow closely together in clumps, so I hit on the idea of pricking them into 10″ chrysanthemum pots.

The mixture used was two parts loam, two parts leaf soil, one part sand and one part rubbed sphagnum, all mixed thoroughly together. With this I fill the pots loosely (after crocking) ; next, turn the whole pot of seedling lilies out, scrape a hole in the centre of the compost, and insert the whole ball, firming the compost around until the pot is full, with the seedlings just level with the top of pot. Leave in the cold greenhouse till the end of second year, then plant into flowering quarters.

It may be of interest to say that several lily species and nomocharis have flowered in two years from seed, and notholirion in five years. There is no check and little root disturbance ; the use of the large pot is quite feasible even in a small garden.

Provided only a few species were grown each year, in a short time quite a good collection could be built up at but a fraction of the cost of buying bulbs.

Raising plants from seed is absorbing work, and when at the end some difficult and rare plant comes into bloom—very satisfying work as well.

Hardy Heathers—Part 5

By NORMAN WEBSTER

ONE OF OUR leading nursery specialists lists over fifty varieties of the Common Heather of Scotland, *Calluna vulgaris*. The ordinary gardener cannot but be confused by such a selection and urgently needs help to sort them out.

From this large group I choose first *Calluna vulgaris* "August Beauty" as the best of the charmed group of White Heathers, especially beloved by Commonwealth and U.S.A. visitors to the Highlands. There is very little difference between "August Beauty" and the older form known as "Mair's Variety" or as *alba elongata*. They form bushy plants two feet high, and have flower spikes as long as nine inches. The best form of "August Beauty" has a particularly graceful habit, the flower spikes curving outwards from the centre of the plant so that their tips almost touch the ground : this habit seems less pronounced in older plants. Like all the early white Callunas, "August Beauty" does not remain long at its best, and in hot weather the flower tarnishes within ten days. Fresh green growth will appear beyond the withered flower spray almost at once, so the plants should be pruned over very soon after the flower begins to fade.

Calluna vulgaris alba flore pleno is the formidable botanical name of the double white heather. It is said to have been found in the Schwartzwald district of Germany by an English climber about 1935, and it gained the coveted Award of Merit in 1938. The first flowers to open are often single, but the plant soon mends its ways, and the later flowers are fully double. With me the colour is not always pure white, and "creamy" seems a more accurate description. The flower shoots are much branched and inclined to face downwards, so that one sees the full beauty of the flowers better in a picked spray. I have always hoped that a more upright form of this double white would appear, but I have not yet heard of it.

Calluna vulgaris alportii must be about the oldest cultivated heather, and it remains one of the best. The foliage is sage green and almost sombre, a wonderful foil to the deep crimson flowers very freely produced. 'Alportii' is now a variable plant and it is well worth while to seek out a really good form. At its best it is a robust grower, reaching about three feet. This is one that does not require cutting over every year. If you leave it to grow through the faded flowers it will remain close and well furnished : if the situation calls for it, it does not resent being kept down to a foot. It is one of the most adaptable of heathers and very long lived : I have seen veterans known to be thirty years old and showing no sign of retiring from active flowering.

Calluna vulgaris "County Wicklow" is a fine double heather with flowers of lovely shell pink. Most of the double callunas are semi-prostrate in habit, but "County Wicklow" is more upright, and this

adds greatly to its effectiveness. I have never quite made up my mind whether *Calluna vulgaris* "Camla Variety" is really distinct, or if it is a very fine form of "County Wicklow." In 1953 a single plant of "Camla Variety" was the high spot of my heather border for several weeks, a dense, compact plant that could not have been more closely covered in bloom.

Now that at last we come to *Calluna vulgaris* "H. E. Beale," I feel I have already worn out all my superlatives ; so I shall just say that I consider this the finest heather in cultivation. From the low, close-growing plant appear gracefully tapered flower sprays which often exceed twelve inches in length, and are covered with double, silver-pink rosettes, which have been compared to tiny Queen Alexandra roses. The flowering period is from mid-September to early November. Flowers are produced not only on the leading shoots, but also on the lateral spurs at their bases, giving an impression of great richness. If picked when at their best, the flowers keep fresh in water for many months, only very slowly losing a little of their bright colour, but remaining decorative until the following spring. They seem to me to keep better in water than when stuck into a potato, as is sometimes advised.

Most plants have some drawback, and "H. E. Beale's" is that the foliage turns a dingy brownish colour in spring and early summer. When you first see your plants at this stage, you think you have lost the lot. This heather flourishes in heavy clay. Mr. Richard Trotter, now of Brin, Strathnairn, told me that from his former garden at Leith Vale, Surrey, he took sprays of "H. E. Beale" to an R.H.S. Show. They were soon the centre of an admiring crowd, who thought he had brought a new heather to put up for an Award of Merit. The plants were ordinary "H. E. Beale" ; but his heavy Surrey clay had grown about twice as large as life. Verb. sap.

If you are planning a heather garden on a scale that calls for single plants of most varieties, then plant a dozen "H. E. Beale." If you normally plant in dozens, then plant a hundred of this one. If your garden is of postage stamp size, then plant at least one "H. E. Beale." This I consider the best bit of advice I am giving.

After that, it seems strange to write that the leading nurserymen growers of heathers consider *Calluna vulgaris* "J. H. Hamilton" the finest heather yet introduced. In gardening one never ceases to wonder at the diversity of human experience. "J. H. Hamilton" has very double flowers of bright pink, which appear almost tangerine in a low sun. Because of its prostrate, almost trailing habit, which hides much of the beauty of its flowers, I rank it inferior both to "H. E. Beale" and to "County Wicklow" ; but as "J. H. Hamilton" flowers earlier than the other two, there is good reason for growing all three wherever space allows.

Calluna vulgaris serlei aurea is a late flowering white of distinctive habit, reminding one of a dwarf conifer. Its great merit is its golden

foliage, which retains its colour throughout the year. Unfortunately as the plants age the brilliance of the golden colouring diminishes, and this is definitely a variety that is best replaced every five or six years. Relative starvation suits this one best, so do not give peat or leaf mould unless you garden on pure sand.

My last selection is *Calluna vulgaris serlei grandiflora* or *rubra* which, appropriately enough, is one of the late flowerers and rounds off the autumn season. Nobody has a good word to say for this one, and catalogues print its name and description apologetically in the smallest possible type. It is a robust grower, two to three feet. Flower sprays are reddish purple and of great substance, which is just as well. Blooming as it does in October and November, it often faces wintry conditions. To my mind it is the best of the late flowering single callunas.

SELECTION OF VARIETIES—CURIOS

The two dozen hardy heathers just described should form a worthy backbone for any collection ; but so many gardeners love curio plants that I shall list a few that come in this category ; some of them have, in addition, considerable garden merit.

Erica tetralix mackaiana flore pleno has double, rose-pink, bell-like flowers in July and August.

Erica scoparia nana, a dwarf form of the Besom Heath, is worth growing for its fine green foliage and close bushy habit.

Calluna vulgaris alba "White Mite" is a tiny white heather with a long flowering period.

Calluna vulgaris foxii floribunda is probably the best of the dwarf carpeting callunas, and certainly the most free flowering. This and the preceding are excellent trough garden plants.

Calluna vulgaris hirsuta compacta or "Sister Anne" is of tortuous and completely prostrate habit, with silvery foliage and curiously curled pink flowers.

Calluna vulgaris "Silver Queen" or *tomentosa* is mainly a foliage plant with woolly, silvery-grey foliage : flowers lavender pink, looking as if dusted with powder.

Calluna vulgaris "Tom Thumb" is minute but erect growing. resembling a tiny dwarf conifer. In the trough garden it is a good contrast to *C. v. foxii floribunda.*

ASSOCIATE PLANTS FOR HEATHERS

It is difficult to generalize on what other plants go best with heathers ; so much depends on the scale of the garden. If it is extensive, small trees like our native silver birch are excellent for background effect ; so are many evergreens like fir, juniper and yew. This idea can be adapted to quite small gardens by using the wide range of dwarf conifers now available under an amazing jumble of contradictory names which

I defy anyone to unravel. However, the plants are none the worse for that, and they range from completely prostrate forms such as *Juniperus sabiniana tamariscifolia* to slender upright pyramids like *Juniperus communis compressa.* It is important to get these dwarfs on their own roots, as grafted plants have a stronger tendency to revert to the habit of forest trees. All these conifers want careful watching, and any growing out of scale should be moved at once to another part of the garden.

It is outside the scope of these articles to dwell extensively on good associates for heathers ; so I shall just mention dwarf rhododendrons, of which there is a vast selection : the ledums, which thrive in moist, acid soil ; the kalmias, which appreciate a cool position ; the dwarf gorses like *Ulex nanus*, whose flowers give that golden colour not yet available in heathers ; the pernettyas, which are sometimes inclined to be invasive ; and the St. Daboec's Heaths (*Daboecia*), of which the recently introduced *Daboecia praegerae* with rose-pink flowers is outstanding. There is almost endless scope for planning attractive associations, and I have seen improbable things like species roses and ivies trailing through a heather border with charming effect.

NURSERIES SPECIALIZING IN HEATHERS

Finally I give a list of nurseries, in alphabetical order, which specialize in heaths and heathers. All publish lists or catalogues, giving varying amounts of descriptive material.

Ascot Wood Nursery, Ascot, Berks.
J. H. Brummage, Heathwoods, Taverham, Norfolk.
Dingle Hollow Nursery, Romiley, East Cheshire.
Jack Drake, Inshriach, Aviemore, Inverness-shire.
W. E. Th. Ingwersen, Ltd., Birch Farm Nursery, Gravetye, East Grinstead, Sussex.
James Laurie & Son, Dundee.
H. G. & P. M. Lyall, Mount Pleasant Lane, Bricket Wood, Watford, Herts.
Neil Lyle, Maryfield Nursery, Leslie, Fife.
Maxwell & Beale, Broadstone, Dorset.
Stewarts Nurseries, Ferndown, Dorset.
Colonel J. H. Stitt, Drumcairn, Blairgowrie, Perthshire.
Frederick Street, West End, Woking, Surrey.
Underwood Bros., Hookstone Green Nursery, West End, Woking, Surrey.
Robert Veitch & Son, Ltd., Alphington, Exeter.

Colour in January

By K. SIMSON HALL

EARLY COLOUR in the garden is usually associated with the winter Aconite and the various forms of Snowdrop, which may bloom before the turn of the year. Although these may both be grown in the rock garden, and snowdrops can look very lovely pushing through a carpet of thyme, they are inclined to spread too freely and are seen to best advantage growing in grass under trees.

There are, however, some less prolific bulbs of great charm which will flower, even in our harsh climate, in January.

One of the earliest of these is *Crocus laevigatus*. This tiny species, barely three inches high, has pale mauve flowers streaked with a deeper shade which open in mid-January and continue blooming well into the next month. Snow may come and go, nights of 23 F. may be succeeded by days of bright sunshine, and still the little flowers stand bravely erect.

Under favourable conditions the next crocus to bloom, *C. Tomasinianus*, will also be out in January, though it is more properly a February flower. The form "Whitewell Purple" with its flowers of rich reddish purple forms a handsome contrast to the pale lavender of the type. Of the yellows *Crocus chrysanthus* "Zwanenberg," its gold petals backed with mahogany colour, is one of the earliest and when open wide in the sunshine is a very cheering sight.

Though the majority of scillas do not show colour until March, there is one form *S. Tubergeniana*, which opens its heads of pale pastel blue flowers towards the end of January. Birds are inclined to peck the petals in hard weather, but the flowers are so unexpectedly lovely at this time of year that they deserve a place in any rock garden.

Probably the most exquisite of the early flowering bulbs is *Iris histrioides major* (Fig. 13). On a sunny day in January the plump buds on 3-inch stems will suddenly burst open, and from then onwards the fragile blue flowers, with crests of warm gold, will bloom undaunted in all weathers, overlapping in their flowering period with the yellow *Iris Danfordiae* and the various forms of *I. reticulata* (Fig. 14).

As a background and contrast to these early bulbs there are several beautiful forms of *Erica carnea* which make a carpet of rich colour even in January. *E. praecox rubra* is a low-growing plant with flowers of a warm deep red, *Erica carnea* "Winter Beauty" and *E. c.* "Eileen Porter" are two pink forms which will often bloom in December and *E. c.* "Cecilia M. Beale" is probably the best of the very early whites. Their flowering period continues for two months or more, so that a group of these ericas with a foreground planting of early bulbs will ensure a patch of bright colour lasting until the main Spring flourish begins.

Edinburgh.

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Plants and Problems

LEAFLESS LEAF-CUTTINGS

THOSE WRITERS who describe the propagation of Petiolarid Primulas from leaf-cuttings emphasize the importance of pulling off the leaf with the nearly invisible bud in its axil intact. I would go so far as to say that the bud is the only part of the cutting which matters. I am satisfied that a leaf cutting is all the better if nearly all the leaf is removed except about half an inch to one inch of petiole, which may be regarded as no more than a handle by which to move the microscopic bud from the parent plant to the cutting sand. It has sometimes been stated that the leaf when left on continues to build up food material for the new young plant, but my experience has been that most of them soon turn yellow, and having no chlorophyll are not useful for food synthesis. Even worse, they may turn mouldy and rotten, infecting not only their buds, but also other cuttings round about. Those leaf-cuttings which do retain green colouring matter and do root successfully, are much slower than those which have only a minimum of petiole. The children which break away from apron-strings make faster progress than those spoon-fed too long.

Another practical advantage is that the petiole-bud cuttings take up less room than leaf-cuttings. Sixteen to twenty short lengths of pertiole put in upright to a depth of one-sixth of an inch and one inch apart will go easily into a four-inch pan, with room to spare. Leaf cuttings need to be put nearly three inches apart, to ensure that any which go mouldy do not infect the others.

Hundred per cent rooting may be expected from petiole-bud cuttings, provided that the petiole-bud is there, of course.

Surely "leaf"-cutting is a misnomer. It is the bud which makes the new plant, not the leaf as in Begonia rex and Cardamine pratensis fl. pl.

East Lothian. L. C. B-H.

A HUMAN PROBLEM

FEW THINGS are more enjoyable than showing the garden to visitors, but I wish I knew how to discourage some of them from :—

1. Prodding Kabschia saxifrages with finger tips or the end of an umbrella to find out whether they are solid or hollow.
2. Nipping, crushing, and bruising everything which they think might possibly be aromatic.
3. Slapping and rumpling Helichrysum marginatum as if it were a dog, to find out whether it feels as velvety as it looks.
4. Using sink and trough gardens for parking handbags and hats.

Is there any way of protecting favourite plants from this disrespectful treatment ? The perpetrators are in all other ways quite delightful

people and I do not want to do anything to hurt their feelings. "Don't touch" notices, black cotton entanglements, and wire pea-guards are all inconvenient and ugly. Is there a pulvinate stinging-nettle, attractive in appearance but violent in action, which could be planted at strategic points ?

L. C. B-H.

A MECONOPSIS HYBRID

THOSE WHO visited the garden of the late Dr. A. O. Curle in May or June will not easily forget the magnificent display of meconopses.

Of these the most interesting was the hybrid which Dr. Curle raised himself. At first this was a chance cross, but he later reared plants from articially fertilised seed. The cross was similar to that of *M. Sheldonii* (*M. betonicifolia x M. grandis*), but Dr. Curle was convinced that the type of *M. grandis* was important. The one he used was a small plant with rather insignificant purplish flowers which, as he said, most people would throw away as being of little garden value, and which was shy of setting seed.

The resultant cross has rather long narrow leaves with brownish hairs. The slightly hairy stem may grow to over 4 ft. and bears flowers of an intense, pure blue, which may have 4 or 6 petals and be up to 7 inches across. The flowers open earlier than those of either parent, my first one in 1955 being out on 15th May. They do not set seed but fortunately the plant increases readily from off-sets.

K. S. H.

BLUE AND GREY

THE COMBINATION of grey leaves and pale blue flowers is to me a very pleasing one, and this note tries to describe two plants which have this combination. They both belong to the Borage family and, if their simple wants are attended to, are quite easy to grow. The first is *Mertensia rivularis japonica* (also known as *M. pterocarpa*), a native of Japan which got the Award of Merit in 1948. It has upright stems of six or seven inches with broadish pointed heart-shaped leaves of grey-green.

The flowers are carried in loose cymes at the tops of the stems. They are bell-shaped and drooping, and a very pleasing shade of pale blue —delphinium blue, I think it is called—altogether a very attractive plant. It is herbaceous and quite hardy growing in scree, where it has produced self-sown seedlings for me for the last two years. Propagate by seed sown in spring.

The second plant is *Lithospermum oleaefolium*, a native of the Spanish side of the Pyrenees. It has the reputation of not being hardy and of being difficult. That is probably correct if you try to grow it in a heavy sticky soil.

I have grown it successfully, however, both in Perthshire and here in Edinburgh, for the last seven or eight years, in sharp scree without any protection. Treated like that it is becoming invasive, spreading by underground runners and threatening to smother some plants of *Gentiana verna*. It is even invading the path now. It is shrubby and more or less evergreen, and as its name implies has olive-like grey leaves about three-quarters of an inch long.

The trumpet-shaped flowers are sky-blue with a suggestion of pink, and are held upright at the ends of four or five-inch stems, three or four to a stem.

It received the Award of Merit in 1938, and is a most desirable plant. It is said to like lime, but it does perfectly well without it.

Propagate by cuttings in July/August and give them some shade is what "the book" says. Personally I just divide, taking lengths of underground runners three to six inches long, put them into very sandy, gritty soil, and keep in a closed frame, or under a jam pot, for about a month. Both these plants will be found in catalogues of firms advertising in this *Journal*.

Edinburgh. M-L.

POLYTHENE BAGS

IN THE R.H.S. *Journal* of April 1952 there was an article by Dr. Wyman of the Arnold Arboretum about experiments with polythene film for air-layering trees and shrubs. This year I have been using polythene sandwich bags to make miniature frames for rooting miniature cuttings—those of one inch or less. Four-inch half-pots are used and sandwich bags measuring 12 ins. by 8 ins. Shallow pans could be used for rosette cuttings of saxifrages, Draba species, etc., but they do not hold enough depth of rooting medium for most other things. Pots are too tall to go convieniently into the bag.

The half-pot is crocked and partly filled with the rooting material, leaving an inch of space at the top, so that the cuttings come only up to the rim. I usually use fine builder's sand, topped with coarse Tay river sand or small gravel. The cuttings are inserted in the usual way, and the half-pot watered from below. After draining it is put into the bag, the opening of which comes to one side. This is closed firmly with a rubber band, and another band is stretched over the rim so that the polythene is taut and the cuttings may be easily inspected. It is put into a shady place and forgotten for a few weeks. It requures no watering nor any other attention. When new pale green growth indicates that the cuttings have rooted, they are taken out of the bag and potted-on in the usual way.

The one and only inconvenience of this method is the ease with which the bags tear and puncture if carelessly handled. They are, however, easily replaced for a few pence and although damaged may still be used for wrapping plants to send by post.

East Lothian. L. C. B-H.

AMERICAN PLANTS—A SUGGESTION

IT OCCURS to me that many of our members in Canada and the U.S.A. may not realize that what to them may be comparatively common plants, over here may be practically unknown. I suggest, therefore, that they might see if they can send over seed of some of the following plants for next year's Seed Distribution : *Aquilegia Jonesii, Campanula Piperi, Campanula divaricata, Phlox bryoides, P. rigida, P. muscoides, Potentilla Breweri, Pentstemon laricifolius albus, Leucocrinum montanum, Hesperochiron californicus, H. pumilus, Romanzoffia sitchensis, Trillium rivale.* I know that some of these even "over there" are definitely NOT common or easy. Personally, I have been lucky in getting a few of the above through the kindness of pen-friends among our members and I am sure many of our members would like to have a try at them too.

In the last Seed List we have had quite a number of interesting seeds from overseas, and we are very grateful, but would like more.

Edinburgh. M-L.

GENISTA PILOSA

THIS British native, we have growing in our Terrace Planting, and truly love it very much. It has a south exposure, full sun, is planted in loose, well-drained soil, is spreading in good form and beginning to drape itself over a low stone wall. The plant forms a thick mass of branches and during its flowering season the pretty, bright, yellow pea blossoms completely cover this almost prostrate shrublet. If necessary it is easily kept checked by light pruning ; however, I prefer to give it ample room and allow it to spread as it wishes. Truly, these small Genistae are wonderful plants for our Rock Gardens.

Kent, Washington, U.S.A. L. M. LeB.

JUNIPERUS COMMUNIS VAR. MONTANA (J. SIBIRICA) MOUNTAIN JUNIPER

THIS FORM of our alpine Juniper we discovered in the fall of 1954, growing at an elevation of 5600 feet, in the rough country of the Olympic Mountains. I first noticed a bright yellow patch amongst a drift of "Mountain Heather" some distance below my position upon a projecting cliff edge. After working my way down from the rocky promontory I could now see that the new-found plant treasure was a pure golden form of the Mountain Juniper that is quite common on dry rocky cliffs in mountain meadow and lower alpine regions. The colour was good and not that off shade so often seen in variegations of foliage. A good quantity of "wood" was brought home and cuttings were made ; we now have small plants that are rooted and growing on in pots in the large greenhouse. It is now our hope that

our plants will have that same delightful colour that we were privileged seeing upon the parent shrub high in the Olympic Mountains several months ago.

Kent, Washington, U.S.A. L. M. LeB.

LUPINUS LYALLII

NONE OF US can begin to duplicate on our gardens the Alpine Meadows we so thoroughly enjoy visiting, especially when they are arrayed in their glorious best.

One of the many, many plants we derive great pleasure from in our Gardens is this beautiful alpine Lupine, with its silky appearance, and without the coarseness seen in some of its relatives. We have planted it in our Terrace beds, close to the Residence, where we may see it often along with our other alpine treasures. I believe others have written of this plant in the *Journal*, but for those who do not possess it, this is a brief description : it has a silky, greyish leaf, grows to a height of 3-4 inches, having a spread of 6-10 inches. Flowers are of a light blue, though I have seen pure white forms. It grows in great abundance on the flanks of Mt. St. Helens, Mt. Adams, is seen on Mt. Rainier, and in the Olympic Mountains. To see this plant growing, as I have seen it, on Mt. St. Helens, nearly to glacier edge, and in such quantities, is a real treat.

Kent, Washington, U.S.A. L. M. LeB.

STRANVAESIA UNDULATA

(A dwarfish form)

SEMI-PROSTRATE form, growing to about 12 inches high and then drooping and spreading about. Our original plant was grown from imported seed of the type ; this plant we saved because of its low-growing habit, the rest we sold. It is an easy plant to keep within bounds, and looks especially well if given a large boulder where it can sort of spread itself about, and in such a position the ripe red berries will show off in good fashion. We are growing this plant in one of our raised plant beds upon the Terrace ; another nicely formed specimen we have planted with a grouping of dwarf *Picea Abies*.

The leaves are a bit smaller than the type, a good share of them assuming a reddish colour for winter. To assure that this variety will not be lost, we have distributed it to Botanic Gardens.

Kent, Washington, U.S.A. L. M. LeB.

RHODODENDRON CAMTSCHATICUM

FOR SOME time this little friend of ours did not take kindly to us ; in order to have it like us more appropriately, we moved it into the Shelter Garden and planted it in close association with a grouping of *Rhododendron radicans*. Now it flowers for us each year.

Four years ago some seed ripened and this was planted. Surely though, this is a little type that grows, OH so very slowly ! Its tiny stems are certainly stout looking. I cannot help but wonder how long it will be until flowers will be forthcoming on these wee plants that delight in being just "plant children."

Our plant never blooms heavily, but its pretty rosy-crimson flowers are delightful. It has grown to the great height of four inches, spreads by underground stems, and generally flowers during the last of May.

Kent, Washington, U.S.A. L. M. LeB.

Book Reviews

"FLOWERS IN COLOUR," by A. G. L. Hellyer. (Collingridge, 21/-).

Publishers do not usually underestimate the status of their offspring ; but in describing " Flowers in Colour " as " popular " I think Collingridge do it less than justice. Among the many hundreds of line and coloured illustrations are many which seem to me very choice indeed. I do agree with the publishers that the book is " inexpensive " : at 21/- in these inflationary days it seems to me very remarkable value.

The water colour drawings are by Miss Cynthia Newsome-Taylor and depict mainly the commoner garden plants, but on nearly every page she includes one little gem—*Ramonda myconi*, *Saxifraga burseriana*, *Sisyrichium angustifolium*, a tiny twig of *Hamamelis mollis*—making a cool, refreshing contrast to the greenhouse " lovelies " like hippeastrums, gerberas and gloxinias.

The line drawings come from Loudon's " Encyclopaedia of Plants " (first published in 1829) and were done by James de Carle Sowerby, eldest son of the James Sowerby of " Botany of British Plants " fame. Upwards of five hundred of these are reproduced, enlarged to one and a half times the original size. Even then some of them would fit neatly under four postage stamps ; but they somehow succeed in extracting and presenting the very essence of a plant. Note, for instance, on page 60, how sharply *Galanthus plicatus* and *nivalis* are differentiated ; and not even the late Mr. E. A. Bowles could have crystallized more perfectly his beloved crocus species or dwarf daffodils.

Mr. A. G. L. Hellyer is the editor, and also contributes brief, simple, but excellent descriptive and cultural notes.

All gardeners, from beginners to experts, should in their various ways find much of value in this book. And what an answer to those imminent Christmas present problems !

NORMAN WEBSTER

"BULBS ALL THE YEAR ROUND," by Roy Genders. pp. 304. 25/- (Faber & Faber, London).

The author's object in this book is to demonstrate how bulbs and corms can provide flowers all the year round, and the book is a valuable aid in this search for bloom. The book does not set out to be an encyclopaedia of bulbs and some of us might have liked more to be included—for instance rhodohypoxis is mentioned only in the appendix and not in the text. But in fact a wide variety of bulbs is dealt with and the author's selection is very comprehensive.

Apart from a chapter on bulbs for the greenhouse, Mr. Genders' main concern is with hardy bulbs. Hardiness is always a relative matter and

the notes on each subject generally indicate (where hardiness is doubtful) the sort of conditions the bulb must have, and so provide a fair pointer. There are suggestions on bulbs for home decoration and notes on the author's views as to the forcing and commercial propensities of certain varieties. Frequently, there are ideas on what other plants the bulbs may be grouped or carpeted with.

Many bulbs suitable for the rock garden are dealt with and much attention is given to the smaller bulbs. The smaller varieties of narcissi have a good innings. The tulip species are mentioned, but this section could, we think, have been with profit enlarged at the expense of the Dutch hybrids. However, the autumn and spring crocus species get a lot more space than the " fat boys." It is all a question of selection and on the whole we think the selection is pretty good.

There are appendices on bulbs under glass, bulbs outdoors, bulbs for shady places and for damp positions. The first two of these appendices are in monthly sections, providing suggested succession of bloom at a glance. The index is good.

This is not a book for the expert or the customer for an encyclopaedia, but for the person who wants to know more of what he can do with bulbs in the battle for flowers all the year round there is plenty of ammunition.

J. AITKEN.

FOYLES HANDBOOKS

" ROCK GARDENING," by Roy Genders (pp. 114); " BULB GROWING," by A. J. Simons (pp. 101); " SHRUBS AND TREES FOR YOUR GARDEN," by Douglas Bartrum (pp. 81); " LILIES AND THEIR CULTIVATION," by M. E. Leeburn (pp. 96); all 3/-. W. & G. Foyle, London.

Foyles have now issued in their Handbook series four short books on subjects of interest to members. They are attractively produced, with stiff covers and four pages of photographs. They are not, and do not pretend to be, authoritative monographs, but they perform their function of introductory general works well. They are all extremely good value for 3/-.

Rock Gardening by Genders is a bit more elementary than most of our members are after, but it is of value to someone who is going to start a rock garden from scratch and who has no—or little—previous knowledge of the subject. Mr. Genders hammers home many sound points and he assumes that his reader is a novice. That is very important in a primer. If the new rock gardener digests this little book he will avoid many pitfalls and will have a respectable rock garden and not what Farrer calls an " almond pudding."

There are some weaknesses. A scree is more than an inch or so of chips on top of the rock garden and we do not think gentians are good examples of plants for screes. Indeed, later, when he describes more fully the conditions necessary for gentians, the author makes this clear. Generally, too, we would prefer early spring planting of new plants, whereas July to October is mentioned as the optimum period. And where, oh where, can a good selection of plants be obtained at sixpence each ! The index could be better.

But the weaknesses are small in an otherwise good little introductory book. If you see your neighbour starting an " almond pudding," burst half a dollar by presenting him with this little book and you will make a rock gardener of him.

Shrubs and Trees by Bartrum deals in the main with subjects which are larger than most of us can accommodate unless we have fairly large gardens. The author takes each month in turn and mentions those shrubs and small trees which are then in display. Some of those mentioned are

suitable for the rock garden. The month by month arrangement of the chapters is useful when we are seeking ideas for colour at a time when the garden is lean.

Bulb Growing by Arthur J. Simons is a first class, readable little book well worth the money for the historical notes alone. For instance, how many know that *Narcissus triandrus albus* has the popular name of Angels' Tears because Angel was the discoverer's guide who was " always blubbering about something." The narcissi suitable for the rock garden are well dealt with and although some of us might have desired more about species tulips, there is a section on these and in a short book you can't get everything. The small bulbs are well described. The index is good. Altogether, this is a very fine small book.

Lilies by Mrs. Leeburn is a good introductory work on the subject and it is an asset in such a book that there is at the end a short bibliography. The earlier chapters are upon general cultivation and thereafter many species and varieties of lilies are dealt with individually. The fine index makes this an easy book to refer to. The notes on the various lilies show the cultural requirements and characteristics of each type.

J. AITKEN.

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