The Journal
OF
The Scottish Rock Garden Club

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

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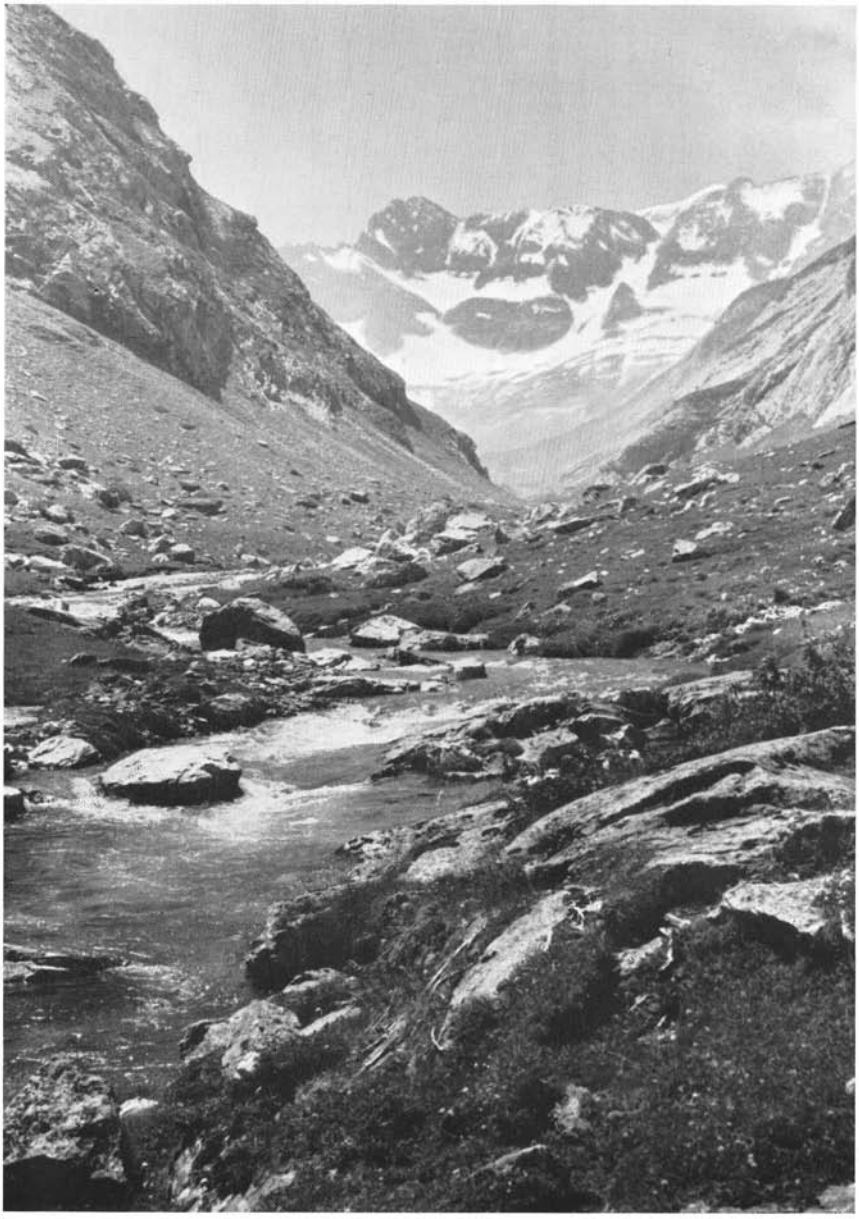

Photo—D. Holford

Frontispiece—Val D' Estoute, Gedre District
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VOL. X. PART 3 No. 40—April 1967

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Editor's Notes

NOT WITHIN our memory do we remember having seen the Winter Jasmine carrying such a wealth of bloom and it lasting undamaged over so long a period. Its massed display went on without a break from November until the beginning of March, when by that time the most unusual sight of deep golden carpets of fallen flowers could be seen on the ground beneath the bushes in garden after garden. Witch Hazels and *Viburnum fragrans* were equally floriferous, and now the Forsythia is at its glorious best in many gardens and *Cornus mas* is similarly full of flower.

Coming to plants nearer rock-garden proportions the earliest of the season's flowerers, *Iris histrioides* and *Iris danfordiae*, *Hepatica triloba*, the species *Crocus*, and even the early species of Saxifrage are already past their best and many other saxifrages and the later *Iris reticulata* hybrids are in full bloom in the open ground. *Erica carnea* in all its many shades ranging from deep carmine to pale pink and white is ablaze with colour in one garden after another. Writing in the earlier half of March it is hard to realise, when looking at all the colour in the garden, that the season is not considerably further advanced.

By the time this issue of the *Journal* reaches its members it will be known to us what effect the 'summery' winter has had on the earlier of our Shows. Will the first of the year's Shows at Penicuik have gained by the earliness of the season or will such earliness have upset the timing of plants in relation to the schedule ? If things continue as they are now without any check the effects may be more evident in our later Shows. One would imagine, however, that the quality of the plants on show might be higher than usual ; and it is just possible that we may see good specimens of plants which do not usually fit in with any of our normal Show dates.

Two rather unusual contributions which should prove interesting appear in later pages of this *Journal*. One concerns a plant which is known in only one habitat and that one not at all extensive. The sole known colony of *Ranunculus paucifolius* is limited to an area of 300 yards by 60 yards in a mountain region West of Christchurch, New Zealand, and is now under strict protection by the New Zealand Government.

The other article concerns some plants of Alaska, a part of the world which we cannot remember having been mentioned previously in any of our *Journals*. If seeds of these plants appear in a future seed

list it is just possible that they will present a challenge to grower members. Even though they prove not difficult to grow it is possible that the flowering of them may be a different matter. The Arctic Circle cuts across Alaska so that at best these plants must be used to very long light in summer and extremely short days in winter and may find it difficult to adapt themselves to our latitudes.

Another article of great interest, to our thinking, is that by Mr. Reginald Kaye on " Ferns for the Rock Garden ". Their great beauty of form, colour, and texture makes them charming subjects for rock gardens. We look forward with keen anticipation to the forthcoming publication of Mr. Kayes' book on hardy ferns.

One of the Club's most popular features is its Seed Distribution Scheme. Since it was first started in 1950 under R. S. Masterton, when over 5000 packets were distributed, it has grown rapidly and extensively under successive enthusiastic managers and their helpers till now it is a most highly organised scheme handling many thousands of seed packets each year. Letters of appreciation regularly received in correspondence between members continually show how highly this service is regarded. One such letter contained the sentence : "Surely the seed exchanges of such clubs of yours, and those I belong to, are among the highest boons of mankind". Another reads : "What a tremendous job ! How utterly exhausting it must be to receive, record, alphabetize, check, package, list, proof-read, mail lists, file and check orders, make decisions. How little we, who merely gather seeds and send them in, then pore over the list with infinite indecision, realise how long you have been struggling to put the list in our hands." This sounds very like 'the voice of experience' !

The Photographic Competition, initiated last year, could be claimed as quite a satisfactory first effort. Last year's judges have very kindly agreed to act again and have expressed the hope that they will be given a lot more work to do this year.

This, of course, lies with Club members, and when one realises how many excellent photographers there are in our membership, surely one could reasonably expect a considerable increase in the number of competitors and entries. The fact that one of the prize-winners was a black and white reproduction from a Kodachrome colour film should be an encouragement to those who photograph in colour rather than in black and white.

We are very happy to have the pleasure of offering our congratulations to one of our French members, Mons. J. M. Spas of Arras. He

has been appointed President of our sister Club in France—The Societé des Amateurs de Jardins Alpins. We are sure that Club members are all united in wishing M. Spas well during his term of Presidency.

St. Andrews, *March* 1967.

NOTICE

IN ACCORDANCE with Rule 5, para. 2, members are hereby notified that nominations for the President and other Office-bearers, and for Members of Council, are required, and must be received *in writing* by the Secretary on or before 20th August 1967. Such nominations shall be signed by two members of the Club, and each nomination shall be accompanied by the nominee's consent *in writing* to accept office if elected. These nominations will be published in the notice calling the Annual General Meeting which will be sent out with the September *Journal.*

The Honorary Secretary,
Mrs. L. C. BOYD-HARVEY,
Boonslie, Dirleton, East Lothian.

Note :

According to Rule 4 (*a*) all Executive Office-bearers retire annually, but are eligible for re-election, except that Dr. James Davidson, F.R.C.P., having held the office of President for three years, is not eligible for re-election as President.

According to Rule 5, para. 1, the following Ordinary Members of Council retire and are not eligible for re-election for one year : Mr. F. C. Barnes, Mrs. B. B. Cormack, Mr. J. D. Crosland, Mrs. I. Simson Hall and Mrs. E. Taggart. In accordance with Rule 5, para. 3, Captain W. J. Dean retires and is not eligible for re-election for one year.

Subscriptions

SUBSCRIPTIONS were due on 15th January. If you have not already paid yours, the Subscription Secretary would be glad if you would do it now. The address is : Mr. R. H. D. Orr, C.A., 30 Alva Street, Edinburgh, 2.

PHOTOGRAPHIC COMPETITION — 1967

An invitation to enter black and white prints for this Competition is extended to all the amateur photographers among our members throughout the world.

Prints, not more than three per member, should be unmounted and approximately 6 ins. × 4 ins. in size.

They should be good illustrations of new, rare, unusual or otherwise interesting plants, wild or in the garden, suitable for the rock garden in its widest sense, i.e., including scree, wall, peat, water, etc., gardening, as well as Alpine House.

Mr. JOHN CAMERON, Former Editor of the *Dundee Courier*, and Mr. R. A. DAW, Editor of the *Scots Magazine*, have very kindly agreed to act as judges again.

Prize Vouchers for £3, £2 and £1 will be awarded as 1st, 2nd and 3rd Prizes respectively.

ENTRIES should be sent in a strong envelope, kept rigid with stiff cardboard, addressed to the Editor : Mr. JOHN L. MOWAT, University Botanic Gardens, St. Andrews, Fife, **not later than 30th JUNE 1967.** A stamped and addressed envelope should be provided if return of the photograph is desired.

Awards will be announced in the September *Journal*, when the winning photographs will be published. The Editor, in his discretion, may publish other photographs submitted.

Members should attach to the back of each print the following: Name and Address (in block letters), Camera and film used, Exposure and lighting data, and Camera/Subject distance.

Subject : The correct botanical name should be given, and a short description of the plant, with details of its colour, habit, situation and type of cultivation most suitable.

The following signed declaration should then follow :—
"This photograph is my property, taken by me as an amateur photographer in pursuit of my hobby."

(Signed).....

Seed Distribution, 1967

THIS YEAR the list was a little later than usual but I think the orders went out up to time, thanks to prodigious labours by some of our members. I am very grateful to those who made it possible for me to do this work and on your behalf thank them most sincerely. There were about the same number of donors this year but, as you can see from the list, they were very generous and I would also like to thank them very much.

During my three years at seed distribution I have made many friends, both at home and abroad, and only need a good win on the pools and about a year to avail myself of all the invitations to explore for alpines in their native habitats. Thank you all very much, and to those of you who intend to come to Scotland sometime, I will be delighted to help you in any way, should you require assistance.

Miss Robertson, who takes over in April, wishes me to let you know that arrangements will be the same as in previous years, and seed, or lists of seed to follow, should reach her **not later than 1st November 1967.**

Miss M. ROBERTSON,
Portkil Cottage,
Kilcreggan,
Dunbartonshire,
Scotland.

Delay in doing so holds up the printing of the list.

JOYCE HALLEY

Club Christmas Cards

We regret that owing to the extremely high price quoted for the making of colour blocks it has been found necessary to withhold colour plates from this issue of the Journal. Enquiries, however, are being made, and we are hopeful that it will be possible to produce them in the Autumn issue.

The Discussion Weekend, 1967

HOTEL DUNBLANE (THE HYDRO), DUNBLANE
14th and 15th OCTOBER 1967

PROGRAMME

Saturday :

1.00 p.m.	Lunch
2.30 p.m.	Opening Address
2.40 p.m.	The W. C. Buchanan Memorial Lecture Lecture and Demonstration on the uses of Tufa in the Cultivation of Alpines : Will Ingwersen, Esq., V.M.H.
4.00 p.m.	Afternoon Tea
5.00 p.m.	"Down to Earth" : J. D. Crosland, Esq.
7.00 p.m.	Dinner
9.00 p.m.	Ciné Film : "Nepal 1954 Expedition" by Stainton & Williams. This colour film will be shown and described by Mr. and Mrs. W. R. Cairns

Sunday :

10.00 a.m.	"Simple Propagation of Alpine Plants" : A. B. Duguid, Esq.
11.30 a.m.	Break and Visit to Flower Show
1.00 p.m.	Lunch
2.30 p.m.	"Alpines—Wild and in the Garden" : Stewart Mitchell, Esq.
4.00 p.m.	Afternoon Tea
5.00 p.m.	Close down

HOTEL RESERVATIONS AND ARRANGEMENTS FOR WEEKEND RESIDENTS :

All bookings for the Weekend must be made *direct* to the Hotel Dunblane (The Hydro), Dunblane, Perthshire, mentioning membership of the S.R.G.C. The special Conference rate for the hotel is £4 10/- per person. This quotation is for accommodation and all meals from lunch on Saturday to Sunday afternoon tea inclusive. A service charge is also included.

NON-RESIDENTS :

Non-residents who require meals will be charged 12/6 for lunch, 17/6 for dinner, 1/6 for morning coffee, and 1/6 for afternoon tea and biscuits.

CONFERENCE CHARGE AND IDENTITY BADGES :

In order to cover the overhead expenses of the Weekend, there will be a Conference Charge of 10/- each person. Non-residents will be asked to contribute 5/- each for one day or 10/- each for both days. Members are asked to pay the above Conference Charge at the Conference office on arrival at the hotel, when they will be given Identity Badges.

Dunblane Discussion Weekend Show

THE SHOW will be held in the Hotel Dunblane on 14th and 15th October, and it is hoped that this Show will be well supported, particularly by members attending the Discussion Weekend.

The WILLIAM BUCHANAN MEDAL will be awarded to the exhibitor gaining the highest number of points in the Show.

Exhibitors are asked to have their plants at the Hotel Dunblane as near as possible by mid-day on Saturday 14th October.

SHOW SCHEDULE

Class 1. 3 pans Gentiana, species or hybrids, distinct
2. 2 pans Gentiana, species or hybrids, distinct
3. 1 pan Gentiana, species or hybrid
4. 2 pans Rock Plants with silver-grey foliage, distinct
5. 1 pan Rock Plant with silver-grey foliage
6. 3 pans Rock Plants with autumn-tinted foliage, distinct
7. 2 pans Rock Plants with autumn-tinted foliage, distinct
8. 1 pan Rock Plant with autumn-tinted foliage
9. 2 pans Rock Plants in fruit, distinct
10. 1 Pan Rock Plant in fruit
11. 2 Pans Cyclamen, distinct
12. 1 pan Cyclamen

13. 2 pans Bulbs (excluding Cyclamen) suitable for the Rock Garden, distinct
14. 1 pan Bulbs (excluding Cyclamen) suitable for the Rock Garden, distinct
15. 1 pan Calluna or Erica
16. 2 pans dwarf Conifers, distinct
17. 1 pan dwarf Conifer
18. 2 pans Rock Plants, new, rare, or difficult in cultivation, distinct
19. 1 pan Rock Plant, new, rare, or difficult in cultivation
20. 2 pans Hardy Ferns suitable for the Rock Garden, distinct
21. 1 pan Hardy Fern suitable for the Rock Garden
22. 3 pans any other Rock Plants, distinct
23. 1 pan any other Rock Plant

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 Lawrence Hochheimer, Ridge Farms Road, Norwalk, Connecticut 06850, U.S.A.

In addition to its *Quarterly Bulletin*, the American Society has a Seed Exchange in operation.

The Clark Memorial Lecture

(Given at Edinburgh on 8th November, 1966)

High Alpines and their Cultivation

By HAROLD ESSLEMONT

THE SUMMIT of Piz Palu is 13,000 feet high and is under perpetual snow. A little lower, however, on the Diavolezza at 10,000 feet, by July the snow has melted and in the screes and among the rocks one finds fine plants of *Ranunculus glacialis, Geum reptans* and *Eritrichium nanum.* Below in the high alpine meadows, *Anemone vernalis* "Our Lady of the Snows" is opening its white chalices to the sun. By November, once again, all will be covered by a winter blanket of snow.

These alpines are obviously hardy. Why then do we see so few of the lovely flowers of *Anemone vernalis* or the brilliant blue Forget-me-nots of *Eritrichium nanum* in our Scottish Gardens ? Our wet and changeable Scottish winters must take the blame. In my garden, the shaggy buds of *Anemone vernalis* rot off in winter and a wet July can damp off *Eritrichium nanum* left unprotected out of doors. We are advised to grow our alpines in the open and most of us would agree that where possible this is the trouble free way. What is the answer ?

I suggest that to grow a comprehensive range of alpines, some additional aids to cultivation are required. Frames, with a wire mesh protection against birds, which can be left open for a great part of the year, give a considerable measure of control, and a well ventilated and shaded alpine house meets the needs of the more difficult alpines. By plunging the pots in sand, time can be saved in watering and the plants will benefit greatly from the cool root run.

The next question is, should the alpine house be heated in winter ? The ideal is, of course, to have both a frost-free or Mediterranean house and an unheated one.

Few of us can achieve this, however, and where only one house is possible I strongly recommend that it be unheated. Experience has shown that a plant which will tolerate one's winter temperature will keep in better character than its frost-free wintered companion. Remember, too, that good outside lath blinds will keep out up to 6° of frost and that pots plunged in dry sand afford considerable frost protection to the roots.

Let us consider for a moment a typical high alpine, *Androsace helvetica*, growing in a crevice near the summit of the Weishorn. Note its tight compact cushion almost covered with flowers, its position on the rock face, ensuring quick drainage and its extreme root restriction. At 9000 feet the rarified atmosphere does not hold as much moisture as at lower altitudes and the sun and the wind ensure quick drying after rain. In winter, the cushion is protected by a covering of snow. Our problem is to provide similar conditions for its cultivation at low levels is not an easy one. I suggest two methods for the cultivation of these saxatile plants. A sectioned pot of a plant of the Pyrenean *Androsace cylindrica* illustrates one of them. Note the gravel over crocks to ensure good drainage, the gritty compost full of roots, and the deep tufa "collar" built closely round the vulnerable neck of the plant.

Opinions vary as to the amount of grit or gravel to add to the compost. I use about one-third, some successful cultivators increase it to two-thirds. The answer depends to some extent on the time available for watering and repotting. For lime loving plants like *Androsace helvetica* substitute lime-stone for sandstone chippings. Never overpot, pot on one size only at a time and unless seed is required remove all dead heads after flowering. Androsaces and other cushion plants such as drabas grown hard in this manner can be kept going for a number of years and a ten-year-old specimen can carry up to two thousand flowers.

Most alpines are deep rooting. This is apparent in any pan of seedlings. Their long roots are necessary to penetrate the screes and reach the nourishment and moisture below. Long pots meet this requirement and in addition facilitate bottom watering, an important aid in the cultivation of the more difficult cushion plants. A second method which I have found successful with saxatile plants is to bore a hole or holes *through* a lump of tufa and to insert a plant or plants in them. A nine-year-old plant of *Daphne petraea*, on its own roots in tufa, has flowered regularly for some years and a seven-year-old plant of the shy flowering *Kelseya uniflora* once produced over four hundred flowers. *Diosphaera asperuloides*, from the Styx valley, responds well to this treatment, if one does not forget its annual haircut after flowering.

Some fine pictures of Rock Campanulas (M & T 4564) growing in vertical rock crevices in Iran were shown recently by M. Brian Mathew. These pictures have obvious suggestions for their cultivation and

several new species collected by Mr. Mathew and Mr. Archibald are establishing happily in holes bored through lumps of tufa. *Campanula morettiana* and its variety alba, which were discussed in a recent article in the *Journal*, fall into this category and *Primula allionii*, another lime lover, responds to tufa treatment. The number of interesting alpines one might discuss is endless and I must confine myself to a few favourites, adding some suggestions for their cultivation.

Anchusa caespitosa from the White Mountains of Crete is highly commended by its introducer, Mr. Peter Davis. Give it a crazy paving of tufa lumps for its woody stems to spread over and it will delight you with its gentian-blue flowers. It is a gross feeder and requires annual repotting with an ample supply of water during the summer months.

Phlox triovulata may well lay claim to the title of "Queen of the Phloxes". It hails from the sun-baked slopes of New Mexico. It enjoys a gritty mixture with some leaf mould and should be cut back and repotted after flowering. Propagation is by root cuttings, although side shoots can be struck. If you fear to lose your plant by taking root cuttings, try growing a plant in an orchid pot, plunged in a larger pot filled with a mixture of peat and sand. In time offsets will appear between the two pots. These can be removed and grown on. My F.C.C. forms of *Paraquilegia grandiflora* is a Branklyn seedling. Mr. Renton informs me that his plants all originated from Major Sherriff's collected seed. Photographs taken in the wild indicate that this Paraquilegia is a woodland crevice plant. Try it in a gritty ericaceous mixture with some small tufa lumps on the surface. These will ensure it the cool root run it appreciates. Repot every second year and dust the surface with hoof and horn when growth commences in spring. There is an attractive white form of paraquilegia. *Aquilegia jonesii* in a good form is another of my favourites. I wish I could tell you how to flower it well, but this picture of it in nature with nine flowers, growing in a crevice, may give you some idea.

The well flowered *Verbascum dumulosum* shown is a ten-year-old plant. You may be a little surprised at my second picture of it, cut back to stumps. I prune it hard back after flowering and subsequently rub off about half of the new shoots. Repot it annually in spring, before flowering in a mixture containing 50% soft tufa lumps. *Asphodelus acaulis*, from the Atlas Mountains, is not often seen well flowered in Scotland. Its fleshy roots require a long pot and a lean diet. A 50% gravel mixture suits it. Repot every second year. *Calanthe alpina* resembles an exotic stove plant more than an alpine. I understand my

plant was collected at 12,000 feet in Sikkim and it has proved quite hardy. It is only brought into the alpine house when in flower.

The first problem with Jankaeas is to acquire one. Kind friends who have visited Mt. Olympus have solved this for me. Collected plants often arrive in rather poor condition and consequently are tricky to establish. Once this is accomplished they should go ahead slowly but surely. Try them in gritty ericaceous mixture with the crowns built up in tufa above the level of the pot. During the summer months mine are plunged in a box underneath the staging along with my ramondas and transferred to the staging only during the winter. This will help to prevent leaf scorch in summer. *Dicentra pusilla* is reckoned one of Japan's choicest alpines and my illustration of Mr. Drake's A.M. plant makes this readily understandable. One of the reasons for its scarcity is due to the fact that the seed is almost viviparous and unless it is sown immediately it will not germinate. A fellow member who recognises this fact has a welcome pan of seedlings to distribute each spring.

I have only included two from a wide range of interesting dwarf shrubs. *Linum elegans* from the sunny hillsides of Greece, like *Daphne petraea* increases slowly. Plant it in a gritty mixture with some tufa lumps for its twiggy branches to grow over and in five or six years an expanse of golden flowers will reward your patience. *Rhodothamnus chamaecistus* with its rather fleeting blossoms has to be very well timed to do itself justice on the Show bench. Lime or no lime ? I find it is indifferent, but add a few lumps of soft tufa to the mixture for good measure.

Overseas mail from gardening friends always helps to brighten a dull morning, and when it contains seeds or plants it is doubly welcome. Some of us have had the good fortune recently to share in the plant material brought back from Iran and Turkey and are experiencing the thrill of trying to introduce new and unknown plants into cultivation. Some of them, like the Dionysias and the Juno and Oncocyclus Irises will present a challenge to the keenest cultivator. Pictures of these plants taken in the wild by Mr. Mathew and Mr. Archibald are quite breathtaking. I agreed entirely with Mr. Archibald's description of a well flowered yellow cushion of *Dionysia michauxii* growing on pure tufa rock as 'fabulous'.

The Persian Dionysias have always held a fascination for me, partly on account of their rarity and partly on account of their challenge to the cultivator. Seed from the various expeditions is now be-

coming available. Germination from the "seed" or brushings from Dionysia cushions to date has been poor, with the exception of *Dionysia aretiodes* (*demavendica*). Some twenty pans between them produced only some dozen seedlings, of which about half were established. The latter were pricked out into thumb pots at an early stage to avoid damage to their fine root system and the seedlings wedged between two small pieces of tufa. As soon as the thumb pot was full of roots they were potted on one size in a long pot containing a mixture of half gritty soil, half soft tufa lumps. The object is to keep the cushions tight and firm like a well grown androsace. There are on the other hand some shrubby dionysias such as *D. paradoxa* and *D. lacei* from Afghanistan. It is too early to say much about these at the moment except that they seem to require a certain amount of shade in summer. It should be possible to propagate the cushion dionysias by cuttings as with *D. curviflora*. Some interesting experiments have been tried with "live" material which was flown over from Iran and I understand cuttings of *D. diapensifolia* have been rooted in mist spray. All the dionysias I have shown have been grown in an unheated alpine house and appear completely hardy.

Interest in the plants of New Zealand's mountains has been stimulated by the book "Plants of the Southern Alps" by Philipson and Hearn, and by the outstanding talk with magnificent illustrations given recently by Professor Philipson at Edinburgh. One of the immediate difficulties that confronts the cultivator of New Zealand plants is the reversal of the growing season entailing two summers or two winters in succession. Once the plants become established, however, they do not appear to be as impossible as some earlier reports suggest, and healthy and growing cushions of *Raoulia eximia, R. buchanani* and *Haastia pulvinaris* are now to be found in several Scottish alpine houses. The chief mistake the beginner is likely to make with his first attempt at growing these plants is with the mixture and the watering.

New Zealand alpines in general should be kept moist and a gritty ericaceous mixture with additional peat seems to suit most of them. During the summer months the Raoulias require daily watering and they will appreciate being put out to a light summer shower in summer. Remember, in their mountain home they are often drenched with dew at night. Small offsets of *Rr. eximia* and *mammillaris* can be rooted with care in a mixture of peat and sand. Some of the New Zealand buttercups have great charm and *R. sericophyllus* with its finely

dissected foliage is a particular favourite of mine. *R. chordorhizus*, too, with its grey leathery leaves always arouses interest. *R. pachyrhizus*, as yet unflowered with me, is well spoken of by one of my New Zealand correspondents !

There are many other interesting plants one might discuss, but time is limited. I shall conclude with two alpines photographed in the wild by a correspondent from far off Alaska : *Eritrichium splendens* and *Papaver walpolei*, both of which I should like to see in cultivation. That fine plantsman Mr. E. B. Anderson once remarked that it required two lifetimes to grow alpines—the first to gain experience and the second to cultivate them. I can only hope that some of the experience which I have shared with you this afternoon will help you to get on with their cultivation.

CYATHODES

NATIVES of New Zealand, Cyathodes are not as well known in gardens as they ought to be. They have a reputation of being only half hardy, but the two that I grow here, *Cc. colensoi* and *robusta*, have come through two winters of periods of sharp frost, and also the searing easterly winds of the spring of 1966 quite safely. They are plants for an acid soil, so are eminently suitable for the peat garden, in a mixture of peat, loam and sand of almost equal proportions, in a sunny sheltered corner. Here I grow them in a trough as contrast plants among a collection of Gentians, which are growing amongst peat blocks built up above the level of the trough. Here they have settled down and make a pleasant picture with their quiet beauty, especially in the winter months. *C. colensoi* is a procumbent plant, with small bronze-green leaves set in whorls round the stem, while *C. robusta* is upright-growing, with whorls of dark green prickly leaves exactly like miniature pine needles. Both produce white pitcher-shaped flowers in early summer, which in due course are followed by small white berries. These plants are a welcome addition to the list of shrubs suitable for alpine work, both being neat and compact in habit.

A. D.

Berwickshire

North Berwick Discussion Weekend

OCTOBER 1967

A HUNDRED and twenty resident and non-resident members assembled at the Marine Hotel, North Berwick, on 1st and 2nd October. This was the first occasion for the East Lothian members to have the privilege of acting as hosts to members from all over the country. Because of its proximity to the Great North Road a higher proportion than usual of members from south of the border were able to attend this most sociable annual event in the Club's calendar.

Lectures were held in the hotel's big sun-lounge overlooking the Firth of Forth. One lecturer did in fact express his regret that the beautiful view over the sunlit water had to be shut out while he showed his slides.

In the Flower Show along in the Neptune suite, the common problem of gentians refusing to open did not arise ; they all responded to the warmth and looked their best in the bright sunlight.

WILLIAM BUCHANAN MEMORIAL LECTURE

CHELSEA PHYSIC GARDEN—PAST AND PRESENT

By W. G. MACKENZIE, V.M.H.

CONSIDERING CHELSEA was simply a village outwith the City in those early days it is surprising that, despite the spread and major developments that have taken place, this valuable and open site, within two miles of Westminster, can still fulfil the purpose of furthering science as was intended when first developed almost 300 years ago. The year 1673 dates it as the second oldest of the existing botanic gardens today, still occupying the original site, as most of the boundary walls built the year after the garden was taken over are still in existence. So much has taken place over this long period that one can but briefly summarise its many worthy contributions to science, as it has been so closely linked with the whole history of medicine and botany since its beginning. Tribute must be paid to the Society of Apothecaries who, despite their many difficulties, were ever ready to make personal sacrifices to further their knowledge for the benefit of mankind. As most, if not all, medicines were derived in those early days from plant materials, the study of medical botany was vitally important, as not only had they to learn of the plant properties, but also be able to

identify correctly the plant itself. The herborising walks formed part of this early training, some extending as far afield as Bath and Anglesey taking up to twelve days to complete the return journey. As not all students were able to take part in the botanical excursions it was most essential that such plants be brought together for teaching and identification purposes in the garden now acquired at Chelsea. A further reason the Society considered Chelsea suitable was the fact that it bordered the river, enabling a barge house to be erected for their ceremonial barge which they also used for the transporting of plant material, grown in the garden, down river to their laboratories at Blackfriars. The existing site was first leased from Charles Cheyne for a term of sixty-one years at an annual rent of £5 ; this lease was extended by a further sixty years when a few years only of the first lease had expired. The early establishment of the garden was greatly assisted by the transfer of a large collection of herbs, then grown at Westminster, in which the Apothecaries had an interest. This resulted in the garden being sufficiently well established, ten years after it was taken over, to attract a number of visitors from the Continent, including Dr. Herman, Professor of Botany at the well known University of Leyden, who proposed a plant and seed exchange—thus inaugurating a system common throughout most botanical institutions today. This visit brought to Chelsea four of the earliest recorded Cedars to come into this country, which later formed a landmark on the riverside for well over two hundred years.

At this early date—1681—the first of a number of greenhouses and stoves were erected which brought the following comment from John Evelyn, the Diarist : '*I went to the Apothecaries at Chelsea where their is innumerable rarities and what was very ingenious was the subterranean heate, conveyed by a stove under the conservatory, which was all vaulted with brick, so as the doores and windowes open in the hardest frosts, secluding only the snow*'.

As the area occupied formed part of the Chelsea Manor Estate, the purchase by Sir Hans Sloane of the Manor in 1712 was not only of great importance to further developments then, but its safeguarding today. Amongst the conditions laid down in the deed of conveyance was '*the said garden might at all times thereafter be continued as a physick garden so that their apprentices and others might better distinguish good and useful plants from those that bore resemblance to them, and yet are hurtful*' — '*that fifty specimens of distinct plants, with their names or reputed names were to be delivered yearly to the*

Royal Society, until the number of 2,000 *had been attained and those presented in each year were to be specifically different from those of former years*'. It is pleasing to report that this condition was more than fulfilled, as 2,550 *specimens* in all were delivered to the Royal Society by the year 1794. The full significance of this latter condition can be more fully appreciated when one reads of the great effort being made, both by Sir Hans and the Society, to introduce into cultivation many new plants in which Chelsea played a leading role throughout the eighteenth and nineteenth centuries.

Now the garden was in the Apothecaries own hands they directed their energies to its reorganisation by enlarging the plant collection, building new greenhouses and laboratories, appointing their first Praefectus Horti and allocating a sum of money for plant collecting overseas. It was following this generous gift that the Society had the statue erected to Sir Hans Sloane by the sculptor Michael Rysbrach, following his completion of his statue to Sir Isaac Newton in Westminster Abbey. Around this time another important name appears in the life of the garden, that of Philip Miller, who gave forty-eight years valuable service as Curator. His many contributions to both science and horticulture have already been fully recorded, but it was he who brought to Chelsea the great international standing the garden then enjoyed. Amongst his many visitors from overseas was the great Linnaeus himself, who wrote at length of the many new plants he saw and the many treasures he took home. Soon after his visit, two of his students, Kalm and Fabricius, stated that 'the plants they saw at Chelsea had brought together the treasures from both Indies'. Another famous name which regularly appears in the early records is that of Sir Joseph Banks for, as a Chelsea boy, he was no doubt greatly influenced in his early life by his close association with the garden and those connected with it. Amongst his many contributions to the garden, following his visit to Mount Hecla in Iceland, was a gift of basaltic lava which resulted in what must be one of the earliest rock gardens to be built from this and forty tons of stone from the old Tower of London—the purpose being to create better conditions for the growing of alpine plants.

The garden had now greatly added to its range of plants from abroad and special mention is made of the seeds and plants then being received from St. Lucia, Sierra Leone, Port Jackson, Norfolk Island, Cape of Good Hope, Madrid and Germany. Mention is also made of the two black periods throughout the life of the garden, fortunately short lived, resulting in the whole of the herbarium specimens, then

housed at the garden, being presented to the Trustees of the British Museum, including those of John Ray, Samuel Dale, Isaac Rand, in addition to those of Sloane, Petiver and Sherard. Likewise the early garden library, first begun in 1681 and now forming a valuable collection, was removed to the Apothecaries Hall in the City ; now after more than one hundred years it was recently returned and made good for the benefit of the students so that it is not only back in its old home, but safely housed in the original black oak cabinets specially made for it in 1739. This library contains many of the works published by those connected with the garden—Joseph Miller's Botanicum Officinale, William Curtis's Flora Londonensis, Philip Miller's Gardeners Dictionary, William Hudson's Flora Anglica and Elizabeth Blackwell's Curious Herbal to mention a few.

Early in the nineteenth century the garden was opened to all students to meet the increased demand which the high standard of botanical science had now reached. Some 500 students applied for admission but, from the old attendance books, this number had to be reduced to 200 to suit the laboratory accommodation available. Later in the century the making of the Chelsea Embankment was being considered and an offer was made to put aside a part of Kew for the transfer of the plant collection, but this offer was declined as it was considered too far away for the students to make full use of the garden facilities. Other than the loss of the aquatic garden through the severing of the tidal waters in the making of the Embankment, the garden actually was enlarged through reclaiming much of the foreshore for the carrying of the new roadway.

With the ever increasing costs and the change in medical teaching the Society of Apothecaries finally and sorrowfully relinquished that which they had borne for so long. On contemplating those fine efforts one cannot but feel regret that the burden, so willingly carried, was finally laid down, but not before they had firmly laid the foundations of much we enjoy today. Before closing on this era some mention must be made of some of the men who contributed so much throughout the long life of the garden. The post of Praefectus Horti, like that of the Curator, was held for considerable periods and included such names as Isaac Rand, Joseph Miller, John Wilmer, William Curtis, Thomas Wheeler and his son James Lowe Wheeler, and John Lindley. Of the Curators the outstanding names were Philip Miller, William Forsyth, John Fairbairn, William Anderson, Robert Fortune and Thomas Moore.

The Society of Apothecaries accordingly surrendered the garden in January 1899, resulting in the Treasury setting up a Committee to report on its suitability as a centre for the teaching of botany. The Trustees of the City Parochical Foundation were invited to accept Trusteeship and appointed a Committee of Management representing the various interested bodies—Treasury, Lord President of the Council, Education Board of the Greater London Council, Royal Society, Pharmaceutical and Apothecaries Societies, Royal College of Physicians, Senate of the University of London, together with nine members appointed by the Trustees. To those members the representative of Sir Hans Sloane was added, who today is the Earl of Cadogan.

This change brought about a complete overhaul and new lay-out of the garden on strictly botanical lines by William Hales under the direction of Professor Farmer. The widening of the Royal Hospital Road resulted in the pulling down of the old laboratory building and lecture hall together with all other buildings, including all glasshouses. With the exception of the cool fernhouse, in which Thomas Moore grew his unique fern collection, all other buildings date from the beginning of this century. The one unfortunate loss, brought about by those sweeping changes, was the removal of one of the early plantings of Ginko, which found itself in the middle of the thoroughfare and had to be taken down. A large part of the garden, as one would expect, was devoted to Natural Order Beds, some hundred families being represented on the open ground. This outdoor collection is further supported by a range of glasshouses covering tropical, subtropical and temperate plants, bringing together a collection suitable to meet the many requests received from the various University Colleges, Polytechnics and the more advanced schools, not only within the City and Home Counties, but from many other parts of the country. Although the garden is strictly private to the general public, it is an open garden to all students and teachers.

After all those changes it is nice to record that the early medicinal connections are still maintained through devoting a section of the garden for the growing of those plants used in the teaching of Pharmacy today and the supplying of teaching specimens to the various teaching hospitals within the City. In all, some 50,000 specimens are sent out in the course of the year for both teaching and examination and some 3-4000 students visit the garden each year. The laboratory and lecture hall were overhauled and re-equipped last year to meet present day standards and, at the same time, a further addition was added to the

laboratory for the increased research work now being carried out by the Agricultural Research Council, Imperial College of Science and Medical Research Council.

The lecture hall is fully occupied by the various Imperial College of Science departments for their day-time teaching and by University of London Extra Mural Studies in the evening.

To meet the varied demands received from teaching, research and examinations a plant collection comprising some 5000 species is maintained, but here again a change is taking place from the usual botanical requirements to that of the plant physiologist and bio-chemist. The recent additions to laboratory and glasshouse building have resulted from the growing needs of those newer sciences.

To conclude, a brief mention must be made of some of the original plants or early plantings which can still be seen throughout the garden. Outstanding amongst them is a particularly fine tree of *Koelreuteria paniculata* which flowers and fruits freely most years. The Caucasian and Japanese Zelkovas, *carpinifolia* and *serrata*, both mature plants, as are the Cork and Kermes Oaks. The *Catalpa bignonioides* from the E. United States makes an excellent city tree and the large specimen in the garden is a pleasant reminder of Mark Catesby and his expedition to Carolina and Florida which had Sir Hans Sloane's support. The English Yew which occupies a central position in the garden was said by "Webster's London Trees" to be one of the largest in the Metropolis. Although there are a number of large and flourishing mulberries left, the one remaining plant from the very early planting was removed during the last war to make way for an air-raid shelter. The two fine specimen Ginkos on the main avenue are said to have been raised from the original removed at the end of the last century when the widening of the roadway on the Northern boundary took place. Standing in the open ground can be seen a large specimen plant of the Olive (*Olea europaea*) which produces small fruit occasionally. On our walls are a number of plants mentioned in the early records, including the Storax (*Styrax officinalis*) and a very old and large specimen of Pomegranate, together with some of Fortune's introductions, *Jasminum nudiflorum*, *Wistaria sinensis* and the Forsythia named after William Forsyth, who followed Fortune as Curator at the garden.

It would have been pleasant to end this brief report with a word on the early Cedars, but as they are no longer with us it is hoped that the two plants—*Metasequoia* and *Taxodium*—now occupying the same sites, may in time be respected and admired, as the Cedars were, for over two hundred years.

WHY DO THEY GROW THERE ?

By Dr. DENIS RATCLIFFE

WHEN I started to prepare this talk I began to realise how little I know about rock garden species and their cultivation, so I am not going to attempt to tell you about growing alpines in gardens, but to try to tell you something about the growing conditions alpines experience in their natural habitats and to relate this to some extent to their cultivation. I invite you to correct any of my misconceptions and tell me what you think I ought to know about rock garden plants after I have finished.

What do rock-garden plants have in common ? It seems to me that their most important features are small size and/or convenient growth form and slow growth ; most are cushion plants, low-growing shrublets, plants which die down to ground level or below each year, or bulbs. We all know how much rock-gardeners dislike lush-growing, rampant species which can swamp other plants in a single season. We also know that most of the species we grow are from mountains, and perhaps most belong to what has been called the Palaearctic element of the world's flora, the families and genera of which, if not individual species, are to be found in cool temperate conditions in northern North America, and northern Europe and Asia, and extending further south at the higher altitudes down the Rockies, in the Alps, in the Balkans and Asia Minor and into the Himalayas and China and Japan. The only notable exceptions, in terms of number of species, as far as I know, are bulbs from areas of a broadly Mediterranean type of climate.

What is it that makes species from these places suitable for rock-gardens ? As a first approximation it might be said that the desirable features are adaptations to exposed conditions ; that is, in their native habitats they experience quite extreme conditions of wind, cold, snow cover, etc., and their characteristics enable them to survive where larger, more rapid-growing, more vulnerable species could not. In the case of bulbs, a drought period is the most extreme feature of their environment and they spend this time dormant, or nearly so, beneath the surface.

What I have implied, and this is an implication which is basic to an ecologist's thinking, is that plants are adapted to the environment in which they grow in nature—this is easy enough to understand, for you all know that you don't find rock-garden plants in a tropical forest

or tropical plants on the tops of mountains ; plants are not distributed at random ; they all have their preferences. How is it, then, that one can bring together plants from various parts of the world and grow them in a rock-garden in, say, Edinburgh ? What features of their environment are they adapted to ?

To pursue this question further we must look at the various features of the environment, and see what is known about the way in which it can affect rock-garden plants.

First, the soil. It is well known that some plants are lime-lovers, and others lime-haters, and that they must be grown in the appropriate kind of soil. Obviously this is one kind of adaptation, but soil is a much more complex part of a plant's environment than it looks and there are many chemical aspects of the soil which plants can be adapted to. For instance, soils over large areas of Australia are deficient in phosphorus and in some areas only plants able to live on soils containing very small amounts of phosphorus are able to survive. Again serpentine, a rock rich in metals toxic to plants, produces soils on which only certain plants can survive. In the case of alpines I think the most important point here is that rocks contain very little nitrogen and since many alpine plants grow on glacial moraines, screes, or rock ledges, places where the soil is little better than crushed rock, it is likely that many are adapted to grow in soils where the nitrogen level is rather low.

Physical aspects of the soil, particularly water content and drainage, are also important, so that, for instance, plants of scree, where water content is low and drainage good, are not likely to grow on shallow waterlogged soils. Here, of course, we see a good reason for making a special scree or moraine bed on which plants adapted to these conditions can be grown.

Nevertheless, most species are fairly adaptable to soil conditions so long as their basic nutrient needs are provided—were this not so it would not be possible to grow such a large range of plants in John Innes compost.

Now let us turn to the aerial environment and consider how plants can be adapted to this, to the varying *light* and *temperature* conditions of their surroundings.

Light affects plants in two ways—by its amount, or intensity, which affects the amount of growth, and by the time that it lasts each day—the daylength, which has profound effects on both growth and flowering of many plants. Daylength we must take particular note of,

because it varies with distance from the equator and time of year and it is known that many plants are strongly influenced by it. For instance, some plants can only flower in days of more than 12 hours or so, some only with days of less than 12 hours, though many are what is known as daylength neutral—daylength has no effect. Vegetative growth may be affected too—birch trees will only grow in long days, in fact their growth can be started and stopped by changing the daylength artificially. If we realise that at midsummer the length of day in Edinburgh is about an hour greater than in London you can see that plants in N. Europe experience quite a different daylength from those in the Alps or even further south.

Temperature also affects both growing and flowering. Its effect on growth is obvious, but high temperatures all the year round can prevent flowering completely (it would be most unwise to grow alpines in a warm greenhouse) and many alpine species actually need to experience a winter before they can form flower buds. We have a picture, then, of plants in a particular place reacting to the daily and yearly variations in daylength and temperature. This does not mean that they all react in the same way ; each species will react differently, one growing and flowering in relation to the progression of daylength through the year, another to temperature, some reacting to both, and so on. Nevertheless, over the whole geographical range of species each local population will be slightly different, perhaps to the eye, as in the case of leaf size in *Dryas octopetala*, but also in a less obvious way physiologically, according to the way in which adaptations to the local characteristics of the climate have occurred.

What is the importance of these effects to plants growing under natural conditions ? The short explanation is that they use their reactions to the seasonal changes in climate to synchronise their life cycles with the climate. If they were not able to do this, growth and flowering would be rather a random process and they just would not be likely to survive year after year. I will illustrate this, using for an example some annual plants in which I was interested some years ago. They were not alpines, in fact the only connection with alpines I can think of is that I found one of them growing by Mrs. Boyd-Harvey's front door. They grow in dry places in various parts of Britain. The point is that these plants germinate in the autumn, grow until about December, flower in the spring and shed their seeds in the early summer. The seeds will not then germinate, having to mature as they lie on or

in the soil in a fairly dry state for about three months. Eventually the soil becomes pretty moist with the increase in rainfall in the autumn and then nearly all the seeds germinate and growth goes on at quite low temperatures. In fact during these low temperatures in December, January and February, formation of flower buds takes place and when higher temperatures and longer days of spring come along there is a quick development of the flowers, followed by seed formation again. So the cycle is repeated year after year, because the combined effect of the inability to germinate during the summer and the necessity for low temperatures during the winter synchronises their life cycle with the yearly climatic cycle of the places in which they are found, and growth and flowering take place at the most favourable times. Finally, after collection of one of these species from localities as far apart as Spain and Scotland, it was obvious from various experiments that there were differences in the amount of cold necessary to bring about flowering according to the amount of cold experienced in their place of origin.

Each species therefore has its own mechanisms by which it maintains constant growing and flowering behaviour in any one place, but varies from place to place to maintain the same cycle under varying local conditions. What happens when we bring together species from parts of the world with various climates and try to grow them in a rock-garden in, say, Edinburgh ? To this question I can't give you a complete answer. How many of those which have been sent as possible rock-garden plants have proved unsuitable ? What degree of selection has there been of those that we do have, to find the 'best' individual plants—the answer lies with the botanic and horticultural gardens where the plants first arrived. I suspect that many failed and that of the remainder a lot of selection has been made. Perhaps someone here can tell me. I am told, reliably I think, that the Japanese equivalent of the Scottish *Phyllodoce caerulea* is the best and that Irish *Gentiana verna* is easier than that usually sold by nurseries. Is the reason Gentians are so notoriously fickle that they are at the limits of their climatic preferences in this country, or are they just very variable ?

Finally, I am going to show you some pictures of alpines in the Alps and in Scotland which might show you that our climate is not quite so different as it might appear, but that other factors make them less common in nature than otherwise would be the case.

You can see that glaciation in the Alps, or elsewhere for that

matter, is a process in which thick layers of ice slowly scrape over rock surfaces, flows (very slowly) down valleys, making them U-shaped by further scraping, and deposits crushed rock material at the points at which the ice is melting. At the present time the alpine glaciers are shrinking at an appreciable rate and have been doing so for some hundreds of years and as this process continues the glaciers recede towards their source in the high level snow fields. The actual mass of ice is still moving forward, of course, and their recession simply means that the melting process is quicker than the production of ice. The overall result is that below each glacier and along the sides of the valleys are moraines which are slowly invaded by plants.

In Scotland these features are present, as shown by the slides of the Cairngorms, Sutherland, Ben Nevis and the Moffat Hills, but here the ice disappeared so long ago that the moraines are completely colonised by plants, in fact there has been enough time, of the order of 10,000 years, for bogs or closed grassland to develop and there are no open habitats present on the moraines. Furthermore, a process of leaching has occurred which has washed a large proportion of the mineral nutrients from the surface layers of the soil and left it at least rather acid, and sometimes extremely so.

However, we still have alpines on our mountains, but they are to be found principally on cliffs or very steep slopes at fairly high levels, usually 2000 ft. or above, where it is not possible for a stable cover of vegetation to develop and where there is sufficient break up of the rock and enriching of the soil by seepage of mineral-rich water from still higher levels to keep the pH. of the soil high—that is, the acidity is low. The slides show *Veronica fruticans, Myosotis alpestris, Silene acaulis, Saxifraga oppositifolia, Gentiana verna, Gentiana nivalis, Salix reticulata, Lloydia serotina, Arenaria ciliata*—all species (or their relatives) which in the Alps are usually found on moraines but in Scotland on cliffs or steep slopes *above* old but thickly vegetated moraine systems.

What does all this mean to rock-gardeners ? Let me summarise as follows :—

1. The climate in Britain is not *very* different from that which alpines from the 'classical' areas for collection require—as indicated by the presence of many species in Britain which are also present in the Alps.
2. The majority of alpines are likely to be plants which do not relish competition or an unduly acid soil.

3. Alpines are not likely to demand large quantities of nutrients for their survival.
4. A lot of alpines probably prefer good drainage.

Perhaps I should here add a word or two about bulbs—characteristic, for the most part, of climates with a mild winter and hot summer, such as round the Mediterranean. They are completely hidden during the summer, of course, but respond to the steadily decreasing temperatures of the late summer and autumn by forming flower buds, which are subsequently stimulated to develop by the higher spring temperatures ; because most of their development takes place underground, daylength has no effect. Perhaps the most characteristic part of their environment is the summer drought and I think the key to the rock-gardener's success with bulbs lies in providing well-drained soils in which bulbs can 'feel' at home in the summer.

Finally, then, I would put down the success of rock-gardeners with their chosen plants to the fortunate (to rock-gardeners only, of course) compromise of climate we have in Britain and in Scotland especially, and to the fortunate choice of compact plants, undemanding in their nutrient requirements, whose natural habitats can be easily simulated on any scale.

JAPANESE PLANTS FOR THE ROCK GARDEN

By D. M. MURRAY-LYON

WHEN I was asked to give this lecture I was very doubtful about my qualifications to do so. However, on checking up I found that I actually have over seventy different species and varieties of Japanese plants in my garden. I also had a number of slides of them and I knew that I could get others on loan, so I decided to take on the job.

I wished to give a little background to the talk in the way of climate, soil, etc., in Japan, so I had to find a book which would give me the necessary information, for I make no claim to having much knowledge of conditions of climate and so on in Japan. This was not easy. The R.B.G. Library has many botanical books on Japanese plants in English, Japanese and other languages, but it could produce nothing, in English at any rate, giving information about habitats. However, in the Library of the Royal Scottish Geographical Society I found a book giving me the information I wanted. Later I got Dr. Takeda's book, "Alpine Flowers of Japan." from the A.G.S. Library. From this I extracted further information.

The Sino-Japanese region is, I believe, considered to have the richest flora in the northern temperate zone, and it is the Japanese part of this region which I propose talking about.

Japan or Nippon is made up of many islands, large and small. The biggest or main island is Honshu. The extreme north of this group of islands which constitutes Japan is about the same latitude as the south of England. The extreme south is about the same latitude as Cairo. On a map of the world Japan looks roughly the same size as the British Isles. It has a climate varying from sub-tropical in the south to almost Arctic in the north.

It gets two monsoons a year, one in winter from Siberia which is naturally very cold. The other in summer blows in from the tropical seas in the south and brings hot, wet, steamy weather. The average rainfall varies from under forty inches to over one hundred and twenty according to latitude and height. Rainfall is also affected by the lie of the land. Slopes facing the monsoon naturally get much more rain than those which do not, just as happens in the Himalayas.

Japan is a mountainous country with peaks up to 10,000 feet and over. The mountains are mostly steep enough to make cultivation difficult and uneconomical. They are therefore largely left under forest, in fact over fifty per cent. of the whole country is under forest, largely coniferous. Many parts are covered in bamboo jungle and there are extensive peaty moors. It is not surprising, therefore, that so many of the Japanese plants we grow in our gardens are woodlanders and/or peat lovers.

Being a country of islands like our own, the climate of Japan is neither so hot nor so cold as the nearby mainland of Asia. The reason why so many Japanese plants flourish in Scotland, especially in the West, is, I imagine, because of this. The extremes of heat and cold are, however, greater in Japan than here. As far as alpines are concerned the extra cold in winter is offset by the better snow cover. Of course, owing to the differences in latitude, the same altitude does not necessarily present the same kind of flora. The flora will vary with the latitude and also with the amount of rainfall.

There are possibly other factors as well. The central part of Honshu (the main island) is about the same latitude as the Caucasus and also has mountains of a similar altitude. Here are a number of peaks of about 10,000 feet, and this area might be taken as a fair average of the mountainous parts of the country. Here, as in other mountainous regions, we find the usual variations in the type of flora according to altitude.

The lowlands, up to 1650 feet, are known as the Colline (or low hills) Zone. Characteristic plants of this zone amongst others are tall bamboos, the tea plant and camellias, a flora which does not, to any great extent, concern us as rock gardeners. Above this zone, from 1650 feet to 5000 feet, is the Montane Zone representing the cold temperate zone. Characteristic plants of this zone are oaks, birches, beeches, wild cherries, etc. There are also many conifers—*Cryptomeria*, *Abies*, *Pinus* and so on, again not a great deal for the rock gardener.

Above this is the Sub-Alpine Zone, from 5000 to 8000 feet, the latter height being approximately the timber line. Conifers tend to predominate in this zone—pines, larches, firs and so on, but there are also many birches and maples. In the mossy floor in the shade of these trees grow such things as *Shortia*, *Linnaea* and *Viola biflora*.

The next zone is the Alpine Zone, from 8000 feet upwards. In this zone the snowfall is heavy and any woody growth above the level of the snow is killed by the winter winds, thus keeping shrubs and trees really dwarf. This Alpine Zone is largely the territory of the creeping pine—*Pinus pumila*. At these altitudes this pine really is a creeping pine, this no doubt largely due to wind and the weight of the snow cover. Quite large areas may be covered by this pine, which spreads by layering itself. In old plants the original stem and lower branches may be quite dead, while there are many well-rooted growing tips. Some of these plants are said to be two hundred or more years old.

Growing with, but not over-shadowed by, *Pinus pumila* in the damper parts are *Phyllodoce* species, *Harrimanella*, etc. Tougher, more vigorous plants like *Empetrum nigrum* and *Gaultheria miqueliana*, for example, may be found growing actually intermingled with the creeping pine, in spite of being shadowed by it. More delicate plants like *Dicentra peregrina* 'Pusilla', also *Arcterica nana*, will not tolerate being overshadowed, and tend to grow rather apart on their own. In the less damp and more open parts grow Vacciniums, Aquilegias, Dianthus, etc. The mountain Fuji Yama takes in all four zones.

Having tried to describe the zones into which the mountains are divided, I will now show you the only slides I have been able to get to illustrate them. These slides will also, I hope, give you some idea of the natural habitats of Japanese alpine plants.

We will start at the bottom. The first is a view in the lowlands, i.e. below 1650 feet. The second illustrates the Montane Zone, i.e up to 5000 feet, with trees very similar to those found in the Highlands of

Scotland—oaks, beeches and wild cherries. The next is (wild flowers, etc.) Crofts and Trollius in the Sub-alpine Zone, i.e. 5000 to 8000 feet. This one shows Lochan and Cotton grass in the Alpine Zone, i.e. over 8000 feet (might be the Moor of Rannoch). This is another one showing the Alpine Zone and the ubiquitous *Pinus pumila*, The last is Mount Fuji Yama—12,000 feet—which has all four zones.

Cultivation.—Before saying anything about how we in this country cultivate Japanese plants, it might be a good idea to see what methods the Japanese use. My information on this subject is mainly derived from a book by Dr. Takeda, who is a well-known alpine garden enthusiast. The book, "Alpine Flowers of Japan", was published in 1938, so it is admittedly possibly rather out of date. I understand, however, that there have not been many changes or developments since then.

Cultivation of alpines only started in Japan a little over fifty years ago, and then only in pots. There are still few rock gardeners in our sense of the term. In the early days of alpine gardening in Japan it was customary to bring the soil from the actual habitat and to grow the plant in that. This, however, was found NOT to be a success. Many of us have of course experienced the same sort of thing when dealing with plants from the Alps. Exactly the same compost as that in which a plant grows in the wild quite definitely does not necessarily suit it under different climatic conditions over here. Methods of cultivation must vary not only with differences in latitude and altitude, but also with rainfall and the resulting humidity.

Sunshine and shade.—In the Alpine Zone in Japan, i.e. above 8000 feet, sunshine is limited to four or five hours a day as there is nearly always much cloud and mist. For many Japanese plants some shade around mid-day may possibly provide an alternative to the cloud and mist. During the last few summers here, actually the weather has provided us with plenty of cloud and mist.

I gather that in Japan alpines are grown in very sharply drained compost. In many cases this consists very largely of Lava sand, which is rather like crushed coke. There being very little feeding in this compost, plants are given a fertilizer once or twice a month. Fertilizers used consist (or did) of amongst other things, powdered oil-cake, bone dust and fish manure.

Plants requiring a constant supply of water such as *Andromeda polifolia* are grown in zinc trays or basins full of wet sphagnum moss with lumps of pumice or tufa and charcoal. This seems to be a sort

of Hydroponics system. Pots of certain plants which go dormant in winter are covered with thick rice straw mats to give "winter darkness".

Dr. Takeda, whom I keep quoting, lives in the centre of Tokyo, where the climate in summer is very hot and dry, and there on the roof of his hospital he grows his alpines. This probably explains why he finds certain plants difficult, which we over here find quite easy. For example, he describes *Cornus canadensis* as "not easy", grown in three parts tufa and one part leafmould. Another is *Cassiope lycopodioides* as "hard to grow"—compost, eight parts grit and two parts leafmould ; partial to fertilizer. No wonder, grown in that starvation diet ! Another is *Rhododendron camtschaticum* as "very hard to grow" —compost, two parts leafmould and one part sphagnum and seven parts fine gravel. There are three plants which, over here, are easy in humusy, well drained soil in the open.

Conditions under which plants are grown in Tokyo are so different from those under which most of us grow them in this country, that I doubt if we can learn very much from the study of Japanese methods. Of course, some of our Alpine house enthusiasts, who enjoy growing things the hard way, may get a few tips. The rest of us, too, might do well to give a thought to some of the items mentioned. The first one I suggest is—different climates entail different soil mixtures. The second is the question of part shade. That idea of "darkness for winter dormancy" is an intriguing one, but I doubt if it would work in our winters of alternating cold and mild spells.

I am now going to show you a number of slides of Japanese alpine plants. Most of them are of plants growing in Scottish gardens. There are, however, a few showing them growing in their natural habitats. For these latter slides we are indebted to Dr. Arakawa of the Tokyo Plant Society, who very kindly sent them to me.

The slides you have already seen, showing the general views of Japanese mountain scenery, were made for me by Mr. Stewart Mitchell from Japanese National Railways Coloured Calendars, which I got from a friend who has lived in Japan. The slides of Fuji Yama were kindly lent to me by the Japanese Embassy in London. With two exceptions, I am only showing slides of plants which actually grow in my garden. Though the actual photographs were not in all cases taken in my garden, many of them were. The greater number of slides are Mr. Stewart Mitchell's ; others are from the Club Slide Library.

While listening to a lecture myself I often wish to note down the

Photo—H. S. Wacher

Fig. 52—Daphne alpina (See page 234)

Photo—H. S. Wacher

Fig. 53—Daphne arbuscula (See page 234)

Photo—H. S. Wacher

Fig. 54—Daphne cneorum (See page 234)

Photo—H. S. Wacher

Fig. 55—Daphne collina (See page 235)

Photo—H. S. Wacher

Fig. 56—Daphne retusa (See page 236)

Photo—H. S. Wacher

Fig. 57—Daphne verlotti (See page 237)

Photo—R. M. Allen

Fig. 58—Galls of Wachtliella ericina on Erica carnea

(See page 239)

Photo—R. M. Allen

Fig. 59—Pupa of Wachtliella ericina (inside dissected gall)

(See page 239)

Photo—D. Holford

Fig. 60—Antirrhinum sempervirens (See page 249)

Photo—D. Holford

Fig. 61—Globularia pygmaea, Val d'Ossoue (See page 250)

Photo—D. Holford

Fig. 62—Scilla lilio hyacinthus (See page 251)

Photo—D. Holford

Fig. 63—Rhododendron ferrugineum, White form
(See page 259)

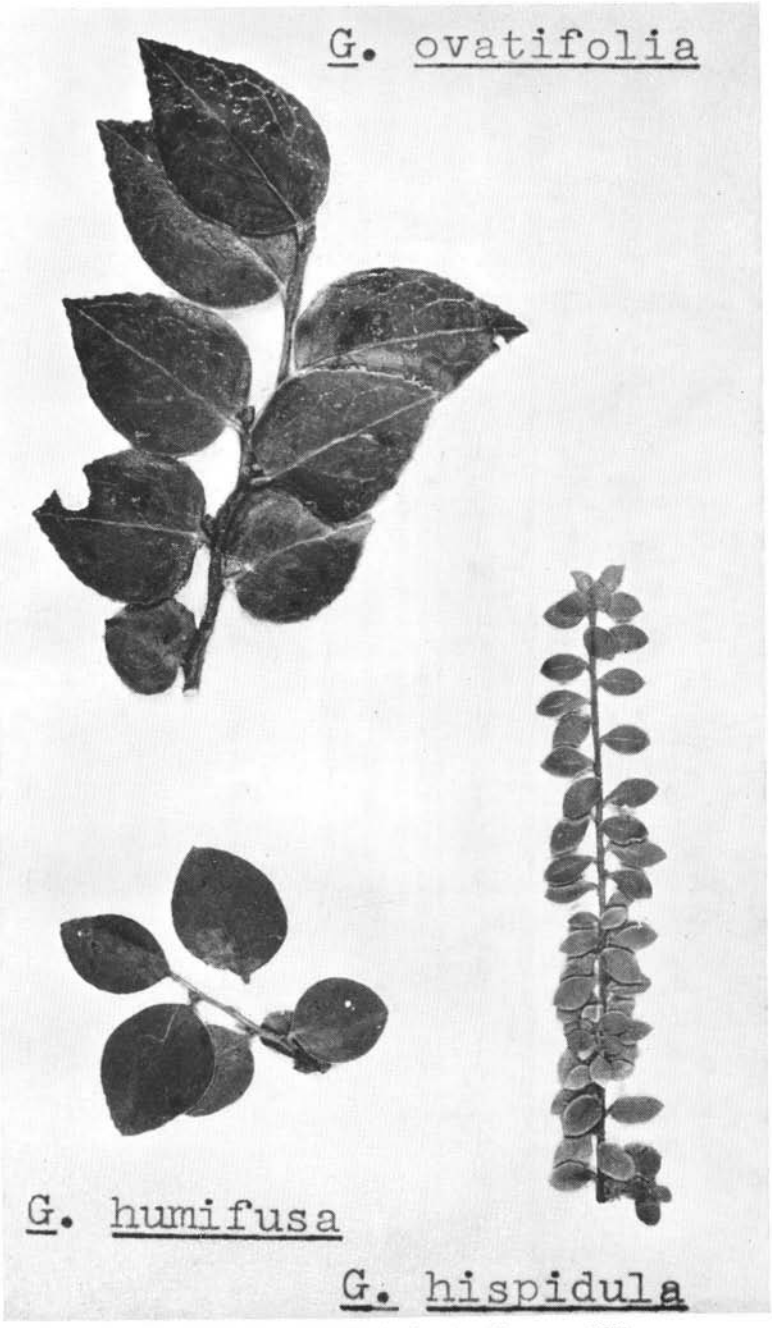
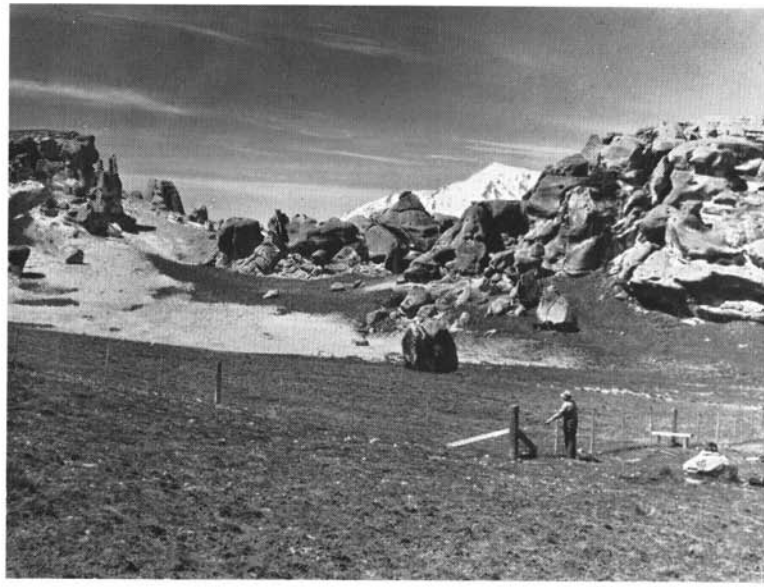


Fig 64—Three Gaultheria Species (See page 262)

Photo—R. C. Blackmore

Fig. 65—Ranunculus paucifolius (See page 264)



Photo—R. C. Blackmore

Fig. 66—Castle Hill Reserve (See page 265)
The home of *Ranunculus paucifolius*

name of a plant which takes my fancy. I find it difficult to write it down at all legibly in the dark. It is much easier, though, to write down a number. I shall therefore give the number of each slide as it comes, and if you want to know more about any plant just write down its number and at the end of the lecture you may look it up in my list of slides.

The first slide is *Pinus pumila* in the wild. Covers moorlands of Japan as heather does ours. *Pinus pumila* in garden. I have a nine-year-old plant about six by six inches raised from seed. Many other conifers inhabit the Colline and Montane Zones and I will now show some of them.

Chamaecyparis obtusa 'Tetragona Flabelliformis'. There seem to be endless different forms of this conifer, including many attractive dwarfs. *Chamaecyparis pisifera* 'Nana'. Hillier speaks of one forty years old and only two feet tall and four feet nine inches wide. *Chamaecyparis pisifera* 'Plumosa Compressa'. A variable plant, but the foliage usually changes to bronze in winter.

Cryptomeria japonica 'Spiralis', rather odd looking with its twisted ringlets. Slow growing, seldom above three feet high. Also *Pinus pumila* and *Chamaecyparis pisifera* 'Aurea Compacta'. There are many beautiful dwarf Rhododendrons in Japan.

Rhododendron chrysanthum, shown growing in the wild, is a semi-prostrate, up to a foot high. *Rhododendron chrysanthum* (close up) appears to be a white form (slide from Japan). *Rhododendron keiskeia* another yellow but more upright, up to eighteen inches and tough. *Rhododendron yakusimanum* (Ponticum section). Rounded bush up to three or four feet high. Flowers pink in the bud, but turning to white when fully open. *Rhododendron obtusum*. A very variable shrub, may be almost prostrate or up to three feet high. Evergreen or semi-evergreen. *Rhododendron kiusianum*. An azalea of the obtusum sub-section from which the Kurume azaleas are believed to have been raised. *Rhododendron camtschaticum*. Deciduous, up to a foot in height. Often described as difficult, but I do not find it so in a cool, partially shaded wall. There is a large plant of it in the R.B. Garden in a similar position. The flowers are usually rose-purple, too near magenta for my taste, but the one shown is quite a pleasant rose colour. There is also a white form which is not common. It crosses to Alaska via the Aleutian Islands. Syn. *Therorhodium camtschaticum*.

Shortias and Schizocodons are members of the Diapensia family. Very good value for a shady peat bed which should be moist but well

drained. They give flowers in spring followed by a display of autumn tints on their leaves.

Shortia uniflora in a partially shaded border. Var. *grandiflora* has larger flowers and more of them. *Shortia uniflora* showing autumn colour. *Orphanidesia* in background.

Schizocodon soldanelloides. A four-inch tuft of evergreen leaves with slightly higher flower stems. *Schizocodon macrophylla.* A similar but with larger leaves and usually with more red in them.

Menziesia ciliicalyx (*Ericaceae*)—two feet (also a dwarf form). Peat bed.

Acer palmatum 'Reticulatum' and *Acer palmatum* 'Dissectum Ornatum'. Both very good autumn colour, but also attractive all summer. About seven and four feet respectively, and about twenty-five to thirty years old.

Cornus canadensis—easy and a good doer. Useful as a ground cover in shade or part shade.

Aquilegia flabellata 'Nana. var. Kurilensis'. About six inches high—flowers mauvey-blue in the type form. Both forms easy in any reasonably decent soil. Best in part shade perhaps, but will stand full sun if the soil does not dry out.

Astilbes—all rather late flowerers and so welcome when flowers are getting scarce. *Astilbe crispa* (Var. Gnome) has various named cultivars—Perkeo and Peter Pan, both being good. They are about six or seven inches high. *Astilbe glaberrima saxatilis* is rather more dwarf. *Astilbe simplicifolia* is a little taller again with flowers either pink or white. All three are easy in moist humusy soil with some light shade.

Thalictrum kiusianum is a dwarf of four inches and likes similar conditions to the Astilbes.

Lilium rubellum grows to eighteen or twenty-four inches and looks best planted so that the flowers are more or less at eye level. It does well growing amongst dwarf Rhododendrons or similar shrubs. It really is a beauty and flowers in June. *Lilium tigrinum*—up to five or even six feet, is too tall for any but a large rock garden. It is a useful background plant, however, owing to its late flowering time. Good drainage, and full sun except for its roots, are necessary in Scotland, I think, for the best results.

Heloniopsis japonica is an evergreen liliaceous plant with clusters of pink flowers carried about six inches above the flattish rosette of leaves. In scree it has lived and flowered for me for some years. It has not flourished, however, so I have just lately moved it into the richer soil of a sunny peat border, with hopes of a better performance.

Now for some more peat border plants. First, a shady border.

Glaucidium palmatum—here we see it in the wild. This is a woodland plant found in the Sub-alpine or Montane Zones. The next slide shows it growing at Keillour. It is easy in moist, well-drained humusy soil, and is usually under a foot in height. There is also a form with white flowers.

Hylomecon japonicum is suited by the same conditions as those for Glaucidium. It is an attractive member of the poppy family and retires below ground soon after flowering in April or May. A number of violets enjoy similar conditions.

Viola biflora has a very wide distribution throughout the Northern Hemisphere, including the European Alps. Another viola I find well worth growing is *Viola dissecta eizanensis* with ferny-looking leaves and mauve, white or pink flowers.

Jeffersonia dubia (Syn. *Plagiorhegma dubia*) does well under the same woodland conditions. Most surprisingly, to an unbotanical gardener anyway, it belongs to the Berberis family. It disappears below ground for the winter. Flowers are followed by the leaves most attractively coloured in bronzy shades.

Gymnadenia conopsea or *Habenaria conopsea* is the sweet scented Orchis which also grows here in Scotland. Part shade or even full sun, if the soil does not dry out, will suit it.

Roscoea cautleoides is an orchid-like plant, though it belongs to another family—*Zingiberaceae*. Plant it deep, as much as six inches is not too much. It requires very well-drained woodland soil. Do not be too alarmed if it is very late in appearing above ground in late spring.

Next, two irises for a partially shaded peat bed. *Iris setosa* is about ten inches high and has rather sprawly foliage. *Iris gracilipes* is smaller and daintier, a real treasure, as too is its white form. This type has mauve flowers with a golden orange crest.

Arcterica nana is a neat dwarf shrub. An old plant may be eighteen inches across though only six inches high. The same conditions as for dwarf rhododendrons suit it.

Phyllodoces are dwarf heath-like bushes and all are happy under what I call dwarf rhododendron conditions. *Phyllodoce nipponica* is

a compact shrub of five or six inches with white bells. *Phyllodoce tsugaefolia* is similar to the last one but the leaves are slightly larger. *Phyllodoce aleutica* up to eight inches with greenish-yellow flowers. *Phyllodoce coerulea* obviously named from a herbarium specimen, I should say, as its flowers are certainly NOT coerulean. It is also found in Northern Europe, including Scotland.

Cassiope is another family of dwarf shrubs requiring similar treatment. *Cassiope lycopodioides* is probably the best known member of a most attractive family. It is almost prostrate and its small bell-like flowers are borne on inch-long wiry stems. *Cassiope tetragona* is taller and more upstanding, up to five or six inches. Some clones are freer flowering than others. *Cassiope stelleriana* is also known more correctly as *Harrimanella stelleriana*. This slide shows it growing in the wild in Japan, where it appears to be more floriferous than it is over here. *Cassiope hypnoides* is a moss-like plant with a circumpolar habitat but not too easily identified in a garden. The only plant of any size I have seen was in Mr. R. B. Cooke's garden. I got a tiny piece from him in 1960 ; it has grown a little but is still tiny, and so far has not flowered. Though growing in peat, possibly it is not moist enough to satisfy it, or it may possibly be too much in the shade.

Gaultheria miqueliana is a good strong-growing ground cover plant up to six inches in height. It is evergreen and the berries are pink. It does well growing amongst ericaceous shrubs. *Gaultheria adenothrix* is a shrub up to ten or twelve inches high and as much across. It has the largest flowers of the genus and they are pinky-white followed by red fruits.

Andromeda polifolia is another circumpolar plant. The one shown came to me from Japan under the name *Andromeda polifolia compacta minima*. Although I doubt the validity of the name, the plant is an attractive dwarf with pink flowers. Also a Scottish native.

Now we will have a look at a few primulas. *Primula japonica*, one of the Candelabra section, is so well known as hardly to require any description. It is easy in moist, rich soil in shade or part shade. The flowers of the type form are red, and there are named cultivars such as 'Postford White', the one on the screen now. 'Miller's Crimson' and others. They flower in May and June on stems up to two feet high. *Primula sieboldii* likes similar conditions to the last one, but good drainage is more important in its case. See that it is carefully marked, as it disappears below ground soon after flowering and seeding. Flowers may be pink, blue, mauve or white, height eight or nine inches.

Primula fauriae belongs to the Farinosae section. It requires the same treatment as *Primula frondosa*, i.e. cool moist position and plenty of humus. Both are about three inches high and quite easy. *Primula cuneifolia* is here seen growing in the wild in Japan. This looks a most attractive little primula, but it does not approve of me, apparently. I got plants direct from Japan, but they looked pretty seedy on arrival, if not already dead. The seed has failed to germinate for me. If there is anyone here who has been successful with it, perhaps he would tell us about his cultural methods.

Patrinia palmata is an easy going late flower about six or seven inches high in sun or shade.

Platycodon grandiflorum is another easy doer ; there are also white and pink forms and a four-inch high dwarf form called 'Apoyama'.

Now we will have a look at a few scree plants. *Campanula pilosa* is a variable species ; the one on the screen and most often seen in this country is var. *superba*. It runs happily in sharp scree. *Sedum cauticolum* is best in a wall or sprawling down over a rock. It is a late summer flowerer. *Dianthus superbus* is very widely distributed, being found not only in Japan but also in Europe. As might be expected with such a distribution, it varies quite a lot. Flowers may be pink or white with a green centre and fringed petals, and with a very pleasant somewhat elusive fragrance. Flowers in July or August (Alps). *Dianthus superbus* 'Albus' is not difficult in sandy well-drained soil. Being rather straggly, they probably look their best in or on top of a wall.

Dicentra peregrina pusilla. This is a tricky customer and I do not seem to have discovered what it wants. Leafmould and peat is what is usually recommended and full sun. This slide shows it growing in the wild in Japan in full sun at over 8000 feet. Apparently it is never found in large close colonies. *Dicentra peregrina pusilla* grown in this country dies soon after flowering.

Now I will show you three dwarfs for a cool peat bed. *Diapensia lapponica* has a circumpolar distribution, including Scotland. It grows in small tight rosettes not an inch high. It is doing all right with me in peaty leafmouldy soil with some gravel added. In a shady peat bank it has not flowered, but it has done so in more sun. A pot of it was shown at the Perth Show two years ago. My plants come from Lapland. *Lysimachia japonica minutissima*. This is a tiny relation of the much better known 'Creeping Jenny'. It hugs the ground, preferably moist, and covers itself with small yellow flowers. *Viola yakusi-*

mana is, as far as I know, the smallest of the violets. It is most attractive and a good doer too in peaty soil in part shade.

I will finish with two exceptions to my rule of only talking about plants which I actually grow. *Leontopodium fauriei* var. *angustifolium* is a Japanese form of Eidelweiss and requires similar treatment, I believe, i.e. scree. *Parnassia yakusimana* is quite the neatest little Grass of Parnassus I have ever seen and that was at last year's Discussion Weekend Show. I am indebted to the owner, Mrs. Simson Hall, for the loan of the slide. Peat bed in partial shade, but not in such moist conditions as our native species likes. So far I have not been able to get a plant of it, but it is on my 'wanted list' with a red star in front of it.

CALCEOLARIA DARWINII

MANY growers find this plant almost impossible to grow, but by using the following method I have been very successful with it. In a compost of 2 parts loam, 1 part peat and 1 part sand, made up in a trough which is sited to face north, I sow the seed directly into this trough, covering lightly with pure sand. In about 21 days the seed has germinated, and if thick I thin out to a spacing of roughly 2 ins. apart. This may appear very close, but they are quite happy like this and grow into a solid mat. The whole secret is that this plant resents disturbance, and grown in this way it grows and flourishes wonderfully. One patch throve and flowered for nine years and in early summer smothered itself with its quaint gnome-like flowers. *Calceolaria darwinii* (here at any rate !) will not tolerate a hot sunny place, but delights to grow on a north facing corner. Many plants that we grow in our garden miss the association of other plants that they enjoy in nature, and the siting of these plants where they are intended to grow and flower, in a suitable compost, leaving them fairly close, may be the answer to growing many that have proved difficult.

A. D.

Berwickshire

"WHAT KIND OF ILLUSTRATED BOOK ON ALPINES?"

By G. PONTECORVO

MANY rock gardeners are interested not only in growing alpines but in knowing from which regions they come and under what conditions they grow in nature. A useful type of guide-book on alpines would be, therefore, one which stresses these two points. This kind of approach was illustrated by showing slides of a variety of alpine habitats and discussing their common and distinctive features. The examples were drawn from the Pyrenees, the Massif Central, the Alps, the Tatras and ranges in Colorado and Utah.

The same approach was then followed in greater detail in respect of the Lombardy pre-alps ("Insubria") which are exceptionally rich in valuable species unique to that region. The slides illustrated some of the dolomitic and limestone ranges, and their plants, between Val Trompia, Valli Giudicarie and Lake Garda, all N.E. of Brescia.

The main thesis of the lecture was that a good guide to alpines in nature should not tell the reader the exact locations of each plant. This would remove all the excitement of discovery. Instead, it should provide the information on area of distribution, habitat and plant associations, enabling the reader to make an intelligent and often rewarding search.

A Well-Deserved Honour

IN THE recent number of the American Primrose Society Quarterly, just come to hand, we are delighted to read that Mrs. A. C. U. Berry has been made the Society's first Honorary Life Member. This is a most merited honour in appreciation of the great work she has done on the Primula family. An excellent article by L. H. Lucas in the same issue describes her fine work and illustrates some of the rare or difficult primulas she has been successful in cultivating and flowering. A photograph of *P. reptans* in full flower on a raised bed is a picture to remember, after our struggles in this country to keep it alive.

SYMPOSIUM ON DIFFICULT CUSHION PLANTS

THE SYMPOSIUM was chaired and introduced by Mrs. Tweedie, who showed slides of various cushion plants growing in their natural environment. These included some *Dionysia* sp. from the Taurus Mountains which Admiral Furse had sent immediately on his arrival back from his 1966 expedition. Mrs. Tweedie showed Patagonian cushions, notably *Anarthrophyllum desideratum*, bringing it home to us how very "out of character" are those which are being grown in cultivation. Dr. Tod showed slides which he had taken in the North American Rockies of cushions growing out of rock crevices. These included the difficult *Oenothera caespitosa* and *Kelseya uniflora*, which under its soft velvet foliage is a tough woody shrub.

Mr. H. Lincoln Foster, the President of the American Rock Garden Society, had sent slides taken in the dry-summer high country of the Rockies and Siskiyou Mountains, and these together with a general view of Waterworks Hill gave a very good impression of the harsh conditions where only tight cushions can survive.

Those of us who attend the S.R.G.C. Shows have been interested to see some of the fantastic little *Raoulia* and *Haastia* species which have been shown by Mr. Crosland and Mr. Esslemont of recent years. Thanks to the kindness of Professor Philipson and Mr. Hearn we were able to see slides of these "Vegetable Sheep" growing on the Southern Alps of New Zealand. Some of these were larger than any breed of sheep and could be likened in proportion to vast eiderdown quilts rather than cushions. The picture of Professor Philipson's son sitting on one of them "set the scale".

Mr. Crosland then gave a short but very informative talk on the propagation from cuttings of these New Zealand plants. His slides were most convincing. His statement that he puts his plants out for refreshment during rain-showers shattered many a deeply held conviction that velvety cushions must be kept perpetually dry at all costs.

Mr. Stewart Mitchell concluded with slides showing the same plants in the wild and in gardens, describing how his ideas for cultivation were based on what could be learnt from Nature.

In my contribution to this Symposium I will try to say something about the culture of Aretian Androsaces in the open garden by giving examples of two varying species, with slides taken in the Alps and in gardens at home.

One of our Presidents, Major Alan Walmsley, when opening the proceedings of the 1951 International Rock Plant Conference at Edinburgh, made this plea, which is quite relevant today, and was in fact repeated as a "quote" in the 1961 Conference Report.

> "I am convinced that a great many alpine plants can be acclimatised in the open in this country, if only we can find the right soil and situation to suit them, and that we should regard the growing of alpines under glass as a means to an end instead of the ultimate goal."

I am not claiming that Major Walmsley had Aretian Androsaces particularly in mind, quite possibly not. But I had at that time in my possession two booklets by Captain H. P. Leschallas, published before the Second World War, in which he related his success with all kinds of difficult alpines outside, and without winter protection other than the methods he elaborated very fully in his books. I therefore mentally included Aretian Androsaces as "probables", if not "possibles".

More recently Miss Barbara Clough, a skilled grower of Androsaces, in an article in the A.G.S. *Bulletin*, stated that she had all her collection, except *A. imbricata*, in open frames during the period from May to July and longer if weather permitted. She further states that there is no reason why they should not be grown outside except for our Autumn and Winter weather.

Unfortunately my own limited successes have been of short duration and have not been photographed, and I am dependent today on showing slides of plants grown by other gardeners.

Taking *Androsace imbricata* (*A. argentea*), which I first came across at Saas Fee in 1957. It was on primary rock, very definitely a cliff-dweller, and as the slides show, is most successful in nature in over-hung positions. The best plant was in a much recessed opening in the rocky crags, in a position similar to the corner of a room where two walls and ceiling meet. A certain amount of moisture would percolate to it from above through fissures in the rock. The slide showing several plants again indicates the most successful plants below projections. The crags had an eastern aspect and the over-hung places also protected the plants from the hottest sun. There were quite a number of dead plants in exposed positions, which nevertheless had grown for a year or so, judging from their size.

I have tried this Androsace in a wall, but did not succeed for long, even with the aid of pieces of glass in winter. The best and most lasting

experiment of this kind that I have seen was at Mr. R. S. Masterton's garden near Aberfeldy. Here he used the cover given by several large boulders to plant the Androsace in a position which very closely imitated its natural home. The aspect here would be approximately West, the stones being so situated that there would be some shade from hottest sun. The slide shows a mature plant which had been planted in the crevice as a seedling.

In rock garden construction all the experts advise against making such an overhanging bit of rock work, but as you see, imitation of nature was a success here. I might add that artificial places like this sometimes cut off too much moisture from the plants. There should be a bank behind, from which sufficient water can percolate to the roots of the plants. Unfortunately such cosy contrived positions also favour pests, such as aphis.

Androsace alpina (*A. glacialis*) I also saw for the first time in the wild in 1957, at the top of the Val Minor near Pontresina. It was growing at the side of the path among big stony scree, with its roots sopping wet from the melting snow coming down the hillside. This looks easy to grow, and it is an Androsace of different rooting habits to others, in that it has underground shoots which come up to the surface near the plant, and in some cases quite a number of inches away. Some of the slides show this, especially when growing on steep scree liable to movement, it has used these to anchor itself. This is really an enterprising plant which one imagines should live in captivity.

The illustrations show the Diavolezza Ridge near Pontresina, from near the Cable Car Station at the top. A nearer view of the very rough scree habitat, and two close-ups of individual plants ! Two further slides show the albino form found on the North slopes of the Padon Ridge near the Pordoi Pass, in the Dolomites. It will be noted the enterprising way the side shoots have been used to anchor the plants on the steep shifting scree composed of the decomposing conglomerate rocks.

I tried it in fairly rich scree with ample surface drainage, but only kept it a season. These were collected plants which did not arrive home in too good shape. I think it did not get enough water at the period approximating to its soaking with melting snow, but more likely too much moisture in late Autumn and Winter.

Once again I come to another garden where it has succeeded—Major-General D. M. Murray-Lyon's this time. He has it in one of his high screes at Pitlochry. I have watched his plants prosper over

many years, and only last winter did the central portion of a big plant collapse, but it has left about a dozen healthy little plants round about it, which will no doubt progress in the way the original small plants did. These small plants which have survived are not seedlings as I understand, but as mentioned, the growths at the end of the underground shoots, which produce their own roots.

This is growing in rough scree with ample drainage and with a South-West aspect. I would think something more nourishing will be in a second layer lower down, such as leaf-mould. A regular watering to approximate to its wet period in nature would be given when our natural overhead supply was not sufficient. The General does not use glass covers in his garden, so the scree has to be open enough to dispose of the surplus moisture we often get. Personally, I think that a glass cover in late Autumn and Winter would be beneficial.

One final remark, which I will not elaborate, is that in captivity *Androsace alpina* does not produce the richly coloured flowers it has in the wild—possibly a matter of the high altitude at which they grow. But the Androsaces at Pitlochry are really of a better colour than the transparencies indicate, which has possibly been the effect of the light or its direction when photographed.

The meeting was then opened for questions and discussion.

ENTRIES at the Autumn Show which was held at North Berwick in conjunction with the Discussion Weekend there on Saturday 1st October were disappointingly fewer than usual. Unfortunately, several exhibitors arrived with quite a number of plants much too late to be included in the Show. However, though exhibits were rather thin in numbers, there were many excellent and interesting plants on view, so that the standard on the whole was quite good.

The East Lothian Trophy—for three rock plants of different genera —was awarded to Mr. J. Crosland of Aberdeen for excellent plants in flower of *Dicentra peregrina*, *Helichrysum frigidum* and *Sedum hidakanum*; another interesting sedum, *Sedum oryzifolium*, was in Mrs. Maule's three pans which came second.

In Class—for three distinct plants of the same family—an interesting condition—Mr. and Mrs. Baillie's entry of *Helichrysum coralloides*, *Euryops evansii* and *Celmisia sessiliflora* were a most praiseworthy first.

In the 'new, rare or difficult' class the winning plants were *Bolax gummifera* (Mrs. E. Clark), *Eriogonum latifolium*, and *Kelseya uniflora*, while in the next class Mr. Laycock won with two very finely grown

plants—*Shortia uniflora* v. *grandiflora* and *Schizocodon soldanelloides* v. *alpinum*. Mr. Laycock again came first in class 8 with a well-fruited *Pimelea coarctata*, while Mrs. Boyd-Harvey had beautifully flowered pink and white forms of *Cyclamen neapolitanum* in class 9, and a nice *Cyclamen cilicium* in class 10, as had Mr. Crosland. Mrs. Simson Hall had a magnificent *Calluna vulgaris* 'Cramond' on view in class 11, and in class 12 three excellent gentians—*Gg.* 'Elizabeth', 'Macaulayi' and *sino-ornata*, which were well worthy of the Peel Trophy.

Class 15 produced some interesting sedums and sempervivums, and in the seven entries in class 19 a good *Sedum hidakanum* appeared again. The Logan Home Trophy (class 20) was awarded to Mr. and Mrs. Baillie, and the Wellstanlaw Cup (class 21) to Mrs. Cormack, while Mr. Laycock gained the Mary Bowe Memorial Trophy and the William Buchanan Memorial Medal for most points in the Show. In addition to the plants already mentioned, other interesting plants on view included *Trochocarpa thymifolia* and *Tsusiophyllum tanakae*.

EDROM NURSERIES had on display an interesting and attractive collection of Colchicums.

Daphnes

By H. STEWART WACHER

THIS GROUP of species is one of the most suitable for cultivation in the rock garden, ranging in height from a few inches to some three or four feet. All are quite happy in full sun or light shade, and are not particular as to whether the soil contains lime or not, although they appreciate some humus into which to root. This is my own experience with the plants which I describe, all of which I have grown ; although Bean, in his book "Trees and Shrubs Hardy in the British Isles", states that all the European species prefer to grow where lime is present in the soil.

On the other hand, I have found that nearly all the species, especially the larger growing ones, resent pruning to any extent. In my early days I was tempted to cut away some of the lowermost horizontal branches which were spreading across other smaller plants, but in every such case the plants died completely within the following year, although they were in their prime and quite healthy before receiving this treatment. Consequently it is important to have an idea as to the ultimate size a plant will reach, although in most cases it may take several years before doing so. It is safer to move adjacent plants as necessary rather than interfere with the Daphne in question.

With the exception of *Daphne genkwa* and possibly *Daphne odora*, all are extremely hardy and capable of surviving such severe winters as those of 1941, 1947 and 1963, when the temperature in this locality of East Kent fell to 0°F. and slightly below. Moreover, they all carry a delightful scent in the flowers, and most are evergreen and quite attractive when out of flower. In colours the flowers are predominately pink to pale purple and white and, although each flower is quite small, these are borne very generously in thick clusters of a dozen or more. The main flowering period is from April to June, but some flower again in autumn, although not in such abundance as earlier in the year. Several also give added attraction (to blackbirds as well as ourselves !) with the bright red fruits borne in profusion in most years, although these may fail to develop in *Daphne mezereum*, which flowers very early in the year, and the fruits are liable to be ruined by late frosts prior to complete ripening.

Increase is quite easy with those that set seed, which is usually in large quantity ; in fact, *Daphne mezereum* seeds itself freely. The

young plants should be put in their final quarters when about two years old, as older plants transplant very uncertainly. In the case of those which are reluctant to set seed, propagation is successfully dealt with by layering lateral stems which lie on the surface of the ground, by covering them at half length with sandy leaf-mould and placing a piece of flat rock on top to keep them held firmly. New plants should then be ready to transplant in the second year, by cutting through the stem behind the central part.

Taken in alphabetical order, I now describe those grown.

Daphne alpina makes a stiff bush some two feet high and through. It is not very spectacular, for the flowers are white and very small, although strongly scented and borne in quantity throughout the whole length of the stems. It is deciduous and freely sets seeds which are bright red in colour. I have found it in the Bernese Oberland of Switzerland, but it is not very common, or plentiful in large colonies, such as the other Daphnes which are to be found in the central European mountains (fig. 52).

Daphne arbuscula stays very dwarf and flat, and is very slow growing. The plant is perhaps intermediate between *Dd. cneorum* and *sericea* in its formation, with large, deep pink flowers, which are not produced as freely with me as with other members of this genus. Correvon says that it is a form of *Daphne cneorum* from Austria (fig. 53).

Daphne blagayana is to be found in the eastern European mountains. It carries trusses of pure white flowers with a very strong sweet scent. It is, however, a very straggly grower, producing stems of a foot or so, which lie flat on the surface. These should be pegged down with pieces of rock, when they will make new roots and extend the surface area of the plant, otherwise it is liable to die away from the central root system.

Daphne cneorum is one of the best of this group, which makes radiating stems with a circle of leaves at their extremity, in the centre of which appear (in May) the sweet scented deep pink flowers in great quantity. These stems also need pegging down as with the preceding plant, and in a few years the plant will cover a square yard or more, but never more than six to nine inches in height. This plant is to be found in great quantity in the Dolomite Mountains of N. Italy, where it develops large masses of lovely flowers, which are often seen happy in the turf as well as in leafy soil banks. Around Selva, Val Gardena it occurs in company with *Daphne striata*, but whether the two hybridise I would not like to say. My plants at home never set seed (fig. 54).

There is said to be a variety with white flowers, which I have never seen, and which I think would not beat the type plant. There are also *Daphne cneorum eximea*, in which the stems stand more upright for a foot or so, and *Daphne cneorum* 'Variegata' with leaves of green and white.

Daphne collina requires more space than the preceding, for it develops into an evergreen bush three feet high and as much through. The flowers, produced in great quantity, are of a purple-rose colour with white centres. It comes from Italy and Asia Minor and is said by Bean to be of doubtful hardiness ; but with me it came unscathed through the winter of 1947 with a temperature of 6°F., although I am afraid I killed it myself by pruning it too vigorously (fig. 55).

Daphne genkwa is quite different in many ways to any other of this group. It produces a lanky stem with few side branches to some two feet. The flowers are developed in the axil of the leaves, and consequently are not so conspicuous as when borne in clusters at the apex of the stem ; these are of a bluish violet colour. The plant is deciduous and I feel that it is not reliably hardy outside, for it departed in a moderately cold winter after only three years. It is native to Japan.

Daphne giraldii much resembles *Daphne mezereum* in growth and size, reaching some three feet in height, with branches spreading outwards from the central stem. Flowers are carried in twos and threes in the axils of the leaves, before the latter develope after being absent during the winter. It produces bright red fruits in quantity, which give the plant more colour than the flowers that are on the small side. It is perfectly hardy and comes from Kansu in W. China, being introduced by W. Purdom in 1911.

Daphne mezereum is, of course, one of the commonest shrubs to be seen in many cottage gardens, where it forms twiggy bushes some four feet high, covered in February, on the leafless branches at that time, with masses of flowers throughout their length, of a variable purplish shade. I have a plant collected in the Dolomites in which the flowers are a lovely pale pink, and have also one with flowers which are white but very dingy. It is very common throughout the central European mountains. Provided March is not too cold, it is covered later with many bright red fruits. But I have found that when these are borne the leaves do not appear to develop so readily afterwards and for this reason it does not produce so many flowers the following season. It seeds itself freely and is quite hardy.

Daphne odora makes a large bush some four feet high and five

feet across, and carries throughout the year leaves which are much larger than those of most species. The flowers are borne in small groups in the axils of the leaves, and are quite large, being purple without and white within. This plant is not reliably hardy outside, but the variety *Daphne odora* 'Aureo-Variegata' has come through winters of 0°F. It comes from China and Japan.

Daphne oleoides resembles what might be likened to a poor form of *Daphne collina*. It makes a leggy bush of three feet, with flowers of purple-rose with white centres, in small clusters at the apex of the stems. It has never set seed with me, but is evergreen and quite hardy. It hails from around the Mediterranean areas. It is very similar to *Daphne buxifolia* and may possibly be the same thing.

Daphne petraea (*rupestris*) is always one of the spectacular species at the annual spring Shows, where it is usually covered so thickly with the lovely large deep pink sweet-scented flowers that the foliage is completely hidden. These specimens usually being the variety known as "Grandiflora". In the wild it occurs only in the crevices of steep limestone cliffs in the Col di Tenda, and on the eastern shores of Lake Garda in the Dolomites. It roots so firmly in these crevices that it is quite impossible to extricate any length of root system, and consequently all the plants one sees at Shows, etc., are grafted on to other root stocks—usually *Daphne mezereum*. These are very slow in making new growth, especially when planted in the open, where they survive best in limestone scree mixture in full sun. Being on alien root stocks, these dislike attempts to grow them in tight crevices as in their natural state.

Daphne pontica I only mention to say that I do not think it is worthy of a place in the rock garden. It is a native of Asia Minor and makes an untidy bush of some four by four feet with inconspicuous greenish flowers hidden among large evergreen leaves. It is quite hardy and seems to merit a place in part shade under deciduous trees.

Daphne retusa is a very slow-growing evergreen shrub which eventually reaches three by three feet, forming a thick mass of branches from the surface upwards, with lovely large scented flowers of a bright purple with white centres, carried at the apex of each stem, and followed by large red fruits in quantity, which germinate readily. It continues to produce a few flowers throughout the whole summer. It is native to W. China and was introduced by Wilson in 1901. I have a small specimen under this name (with a number) collected by Ludlow and Sheriff, but it has not flowered as yet. (fig 56).

Daphne sericea, from the Caucasus, is one of the best for the smaller rock garden, where it very slowly makes a spreading evergreen a foot deep and three feet across. It covers itself in May with clusters of fairly large flowers of deep rose-purple. These are produced again in autumn, although not so lavishly, but more conspicuously than in any other of these species. It is perfectly hardy, but has never set seed with me.

Daphne striata is the little gem to be found almost everywhere throughout the central European Alps, round about 5000 to 6000 feet altitude, where it makes wide masses of bright pink flowers on almost sessile bushes. Yet, in spite of this ubiquity in its native surroundings, it is one of the most difficult plants to collect—in fact impossible !—and succeed with at home. It develops a spreading mass of twiggy stems running just beneath the surface, which develops a few bunches of roots here and there, but these never seem sufficient to support the divided stem in making new plants. Strange to say, I succeeded once with a plant from Selva, Val Gardena in 1951. It grew slowly larger and covered itself annually with flowers for some twelve to fifteen years, and then died without ever making any new underground stems. Since then I have tried on very many occasions without success. It was indeed "beginner's luck" on my first attempt. I have seen quite a few white flowered forms of this, especially around Lautaret in the French Alps. I have never seen seed on any plants in the wild.

Daphne tangutica from Kansu, W. China, and introduced by R. Farrer in 1914. It is very similar to *Daphne retusa* in growth, size and flowers, but develops a rather leggy stem of three feet without the bunches of side stems common to the latter. It produces odd flowers throughout the summer after the main flowering in May, and also sets quantities of bright red fruits. It is quite hardy and evergreen.

Daphne wilsonii. Bean regards this as being indistinguishable from the preceding. Wilson discovered it in Central China in 1900. I have had my plant of this for some twelve years, grown from seed. But it is today only nine inches high and has never yet flowered. The evergreen leaves are longer than those of my *Daphne tangutica*.

Daphne verlotii is said to be a variety of *Daphne cneorum* from the Dauphine Alps. But it is indeed a poor relation, for with me it produced a straggly flat bushlet of mainly naked stems, carrying very small flowers of a dirty pink colour (fig. 57).

So much for individual species. I conclude with a few hybrids which I have grown :—

Daphne x Burkwoodii "Somerset" is very similar in growth, size and flower to *Daphne collina*, although Bean states that it is a hybrid of *Dd. caucasica x cneorum*. It makes an evergreen bush, four feet high by five feet across, with a generous supply of pale pink flowers, and is quite hardy.

Daphne x neapolitana is a hybrid of *Dd. collina x cneorum*. My plant was very similar in every way to *Daphne collina*, except that the flowers were more pink than purple.

Daphne mazeli. Correvon describes this as a pink-flowered hybrid of unknown origin, but the plant I had under this name bore clusters of large white scented flowers on twelve-inch procumbent stems. In fact it was very similar to *Daphne blagayana* except that the flowers were larger and more numerous. Consequently and obviously I did not have the plant true to name. (Syn. of *D. japonica*-Edit.)

Daphne x rosetti is a hybrid between *Dd. cneorum* and *laureola philippi*, found in the Pyrenees. I have had my plant for some fifteen years. It is compact and still only one foot high and across but has not yet produced a flower.

Daphne x thauma from the Italian Alps is a hybrid between *Dd. petraea* and *striata*. In appearance it is somewhat similar to the preceding, except that it is rather leggy. It has behaved in the same way by never producing a flower over several years.

Thus I come to the end of my experiences with this very attractive group of species, most of which are quite hardy and long-lived, and I hope that these few notes will stimulate members to try their luck with them, if they have not done so already.

"WILLIE IN HIS GARDEN"

At North Berwick week-end Mr. Mackenzie spoke of his long-standing friendship with that great plantsman Willie Buchanan, and pictures, presented to the Slide Library by his niece Mrs. Maclean, were projected. These showed Willie working in the garden he had built at Bearsden, and taking visitors round his collection of rare plants.

Gall Midge damage to *Erica carnea*

By M. W. SHAW and J. P. SUTHERLAND
(North of Scotland College of Agriculture, Aberdeen and Inverness)

INSECT damage to ornamental heathers is not common. During the past few years, in a very localised area of Wester Ross, a species of gall midge known to science as *Wachtliella ericina* (F. Loew) has caused substantial injury to areas of *Erica carnea*. The varieties Vivellii, King George, Springwood White and Springwood Pink have all been affected, and injury has also been found on *E. vagans*. Similar damage in *E. carnea* has been found recently in a garden at Pitlochry, Perthshire.

Damage consists of terminal galls on the current year's growth, and they are easily seen on affected plants (fig. 58). Each gall contains a single larva, which is very difficult to find in the early stages of development (mid-late August). Galls, which are green in colour, are well formed by this time of year, but the outer leaflets soon turn brown, as does the complete gall as it matures. Mature galls of the previous year, which contain empty pupae, may also be present, and the lateral shoots initiated by the presence of these galls may also bear terminal galls. The injury results in poor flowering, and if examined at the usual time of flowering each gall contains a small greyish-coloured pupa (fig. 59). Two pupae, one above the other, were found inside a gall examined from the Pitlochry material, but this is not typical. There is only one generation each year, the adult insect emerging from the pupa in late June to early July. These are the first records of this type of damage in Scotland, although a number of cases have been reported from England during the last 20 years. Specimens of suspected damage would be welcome for examination, in order to know the extent of this midge in Scotland. Material should be sent to Dr. M. W. Shaw, Entomology Department, North of Scotland College of Agriculture, Marischal College, Aberdeen. We wish to thank Mr. R. M. Allan for the photographs, and Mrs. M. I. C. Harbord for her interest and help in our investigations.

Some Plants from a Yorkshire Garden

By Dr. P. RYAN

THE GARDEN I write about is situated a few miles south of the Tees valley and ten miles inland from the North Sea coast. The soil throughout the garden is a heavy clay with a high water table. There is good shelter on the east and west with a little shelter on the north boundary. The southern aspect is quite exposed. No formal rockery exists and all the plants are grown in small borders of raised beds. There are also a few stone troughs.

It is surprising what a large range of plants can be grown well in such a heavy soil. I will only deal with plants that have been grown here for a number of years. In order to keep this article brief I have decided to exclude mention of bulbs, dwarf shrubs and plants for the peat garden.

The first plant to flower every year is *Saxifraga x kellereri*. It usually comes into bloom in February and for this reason is very welcome. In early March *Primula clarkei* looks bright in a raised bed. If top-dressed with fine soil after flowering, and again in winter, it will thrive for many years even without division.

Saxifraga oppositifolia does well in all parts of the garden and likes some moisture at its roots. *Saxifraga burseriana* 'Crenata' flowers at the same time as the above and makes a nice contrast with its white flowers.

Soldanella alpina, which was raised from Swiss seed, flowers freely every year in a shallow wet trough. It always does better in a moist situation.

The different forms of *Primula marginata* grow and flower well in the raised beds. They like top dressing every autumn. I grow a number of varieties but can never decide which one I like best. *Primula altaica* 'Grandiflora' does well in heavy clay and flowers profusely. In March we also get the first of the pulsatillas, *Pulsatilla halleri* with the large colourful flowers. Some weeks later the attractive neat-growing *Pulsatilla vulgaris* 'Miss Beveridge' comes into bloom.

In late April some of the primulas make a good show. Varieties that do well are *Primula* 'Hyacinthia', *Primula* 'Mrs. Wilson', *Primula* 'Kingscote', and *Primula* 'Blairside Yellow'. The European primulas

—*Primula spectabilis*, *Primula pedemontana* and *Primula carniolica* flower well in early May. They like reasonable drainage and thrive in the raised beds. Another plant that gives lots of colour at this time is *Veronica schmidtiana*. It makes low mats of divided leaves and throws up numerous spikes of soft lavender-blue flowers. The flower spikes are about six inches high. I am not sure if this plant is perennial as it often dies in the autumn. However, it always leaves lots of self-sown seedlings that rapidly come to flowering size. This is a plant which should be more widely grown.

At this time also a dwarf red aquilegia makes its appearance. The parent plant was bought, unlabelled, at a plant sale as the foliage looked unusual. The leaves have a dark purple tint and the flower stems branch freely. It comes true from seed and may be a form of *Aquilegia canadensis*. Two forms of ranunculus do well in the heavy soil; *Ranunculus amplexicaulis* with white flowers and *Ranunculus gramineus* with yellow. Other plants that do well in heavy clay are the dodecatheons and *Aquilegia flabellata*. I grow all the dodecatheons I can get, but two that I particularly like are *Dodecatheon pauciflorum* 'Red Wings' and *Dodecatheon cusickii*. The first I like for its bright colour and the second for the fine vanilla-like perfume given off by its roots.

Phlox 'Rose Queen' thrives in all situations and *Phlox* 'Snow Queen' does well even on clay. *Phlox* 'Temiskaming' has never been happy here and always dies out.

The garden usually looks best in June. The first of the thymes to show colour is *Thymus s.* 'Bressingham Pink'. It likes a sunny, well-drained position. Another plant that comes into bloom now is *Semi-aquilegia ecalcarata*. It does well in most situations and its maroon-purple flowers are unusual.

An attractive early campanula is *Campanula tridentata*. It likes to grow in the cleft of a rock wall. As it makes a long tap root, it should be planted in position when young. Two saxifragas that bloom in June are *Saxifraga cuneata* and *Saxifraga x* 'Snowflake'. Both do well in a raised bed or the top of a rock wall. *Saxifraga cuneata* has small dainty flowers above neat green rosettes and *Saxifraga x* 'Snowflake' has spurs of clear white flowers above silvery foliage.

In June the irises also do well. *Iris setosa* dwarf form, *Iris tenax* and *Iris gormanii* thrive and flower freely in heavy moist clay.

The epilobiums *kaikourense* and *glabellum* come into flower now and continue for many weeks. Both are very easy plants to grow.

The dianthus family does well in the raised beds. Particular favourites are *Dianthus microlepis, Dianthus squarrosus* and *Dianthus corsicus.* The last named is not often seen in gardens but gives many pale pink flowers above grey foliage.

In July, *Sedum watsoni* flowers well with fine heads of pale lemon yellow. It is soon followed by *Anthemis rudolphiana* with silvery foliage and yellow flowers. Two plants with distinctive leaf scent now come into bloom—*Crucianella stylosa* and *Polemonium mellitum.* The crucianella needs room to spread and produces its bright pink flower heads over many weeks. I find *Polemonium mellitum* a good perennial in a moderately sheltered border and its creamy white flowers are a foil for some of the more colourful plants.

Gentiana septemfida, Gentiana lagodechiana and *Gentiana x sundermannii* do well in the heavy soil.

On returning from summer holidays one is always greeted by the bright flowers of *Gentiana farreri.* Two other blue flowers that come out at this time are *Cyananthus lobatus* 'Sherriff's Variety' and *Dracocephalum hemsleyanum.* Most of the sedums do well and autumn colour is provided by *Sedum floriferum* 'Weihenstephener Gold', *Sedum cauticolum* and *Sedum hidakanum.*

To round off the garden scene in October we get *Sedum sieboldii* 'Variegata', *Serratula shawii* and *Kniphofia galpinii.* The serratula will thrive on heavy soil but after a few years grows to a height of eighteen inches and makes a large clump. *Kniphofia galpinii* needs a well-drained site but likes some peat at its roots.

Ferns for the Rock Garden

By REGINALD KAYE

ONE OF the great families of plants which contains many species suitable for rock garden cultivation is that of the hardy Ferns. While they do not provide glowing colour, they have great beauty of form, serving as a foil to the more showy flowers of the flowering rock plants. A further virtue is that they prefer shade, and help to adorn the shady parts of the rock garden where the choice of suitable flowering plants is very limited.

Now that classes for rock ferns are appearing in show schedules it seems appropriate that the various types which can be used for the show bench and for rock garden cultivation be reviewed.

The cultivation of hardy Ferns is fairly simple, the chief requisites being a humus rich soil, some shade, and freedom from stagnant moisture, at the same time ensuring freedom from drought.

Propagation is usually achieved by simple division when the plants are sufficiently developed, and this is the only means to increase your stock of some of the special variations which are sterile or do not come true from spores. In the case of true species, spores enable the grower to raise adequate quantities fairly quickly—two to three years being the average time to get plants large enough to plant out in nursery beds. Spore sowing needs its own techniques if it is to be successful. Each fern plant produces millions of spores, and obviously there must be tremendous mortality amongst the sporelings, otherwise all available ground would be a mass of ferns in a short time. Fungi and other organisms, adverse weather and unsuitable media all take their toll. Sterile containers and sowing medium are essential, light shade and ever humid atmosphere after sowing, any necessary watering by standing the container in water until quite moist, the surface being always protected from dry air and contamination by foreign spores by means of a sheet of glass. When a fern spore germinates it does not produce a new fern plant immediately, but forms a tiny green scale-like body which bears the male and female elements. Fertilisation requires the presence of moisture, for the male elements are motile and must swim through the surface film of moisture to reach the female and effect fertilisation.

Then the young fern plants appear, six to twelve months after sowing, and these will need separating from others and pricking off as soon as large enough to handle. Grit, leafmould and loam in equal parts is a good mixture for most species.

When growing ferns in pans for show, in the case of the dwarfer species, three or more plants wedged in the pan with bits of weathered stone make a more effective exhibit than a single plant which might take years to fill a five- or six-inch pan.

Over-potting, that is providing more soil than the roots can take hold of quickly, is detrimental, causing sourness of the unoccupied soil and death of previously healthy roots. Needless to say, cleanliness helps to keep plants in good health.

Ferns are, generally speaking, little troubled by pests. Slugs can be a nuisance with *Asplenium fontanum* and *A. marinum* ; a little slug bait laid periodically will keep these at bay. Where vine weevil is common the grubs can damage roots extensively in pots. I find watering with colloidal gammexane is a good control.

Some hardy ferns, particularly the Lady Fern, *Athyrium filix femina* and its varieties, become subject to insect and fungus attack if grown continuously under glass protection, particularly if ventilation is poor.

Protection from strong winds and hot sunshine is best ensured by careful siting in the garden.

Mulching with good leafmould and an annual dressing with bone meal seem adequate to keep ferns growing well. Alkaline beech leaf mould is better than peat for all except Blechnum and Cryptogramma which, being calcifuge species, prefer peat. Acid peat actually can be detrimental to the growth of some ferns, particularly Polystichum.

The following species and varieties have been selected on account of their suitable stature.

Adiantum pedatum aleuticum. There seem to be two or three dwarf forms of the American Maidenhair, the dwarfer form, four inches or so with glaucous fronds, is believed to be the correct form.

Adiantum venustum. Charming vivid green fronds becoming slightly glaucous with age, bright brown in winter—deciduous. The rhizomes should be barely covered with soil, deep planting can be fatal.

Asplenium. This genus contains many suitable species for the rock garden ; all the British species are rock ferns. All except perhaps *A. marinum* are calcicole, like stony soil, with old mortar rubble and leafmould and little loam.

Asplenium marinum is confined to sea cliffs and caves round the coasts of Britain and is best left out of the species tried in the garden, as it seldom succeeds away from the coast, except under glass.

All the Spleenworts resent over-watering and, if grown in pans, they are best plunged in sphagnum moss which keeps them moist. A frame light so fixed as to divert rain but allowing maximum ventilation will be useful.

In the garden Spleenworts should be planted in vertical crevices with north or north-west aspect. Aspleniums are evergreen.

Cryptogramma crispa (*Allosorus crispus*), the Parsley Fern, is calcifuge, likes a very gritty fibrous loam top-dressed with granite chips. Freedom from lime is essential. Otherwise this is an ideal rock fern. Deciduous.

The Lady Fern, *Athyrium filix-femina,* is too large for the rock garden, in its normal form, but there are a few dwarf varieties of suitable stature.

A.f.f. acrocladon is a ball of ever-branching verdure of nine inches or so. Very rare nowadays, but in cultivation.

A.f.f. caput-medusae is even dwarfer, a mass of intertwined crests. Has a superficial resemblance to triple curled Parsley in the eyes of the uninitiated.

A.f.f. minutissimum is a perfect miniature Lady Fern, three to four inches high in exposed places, six inches in shade.

Other dwarf varieties. *A.f.f. crispum* and *A.f.f.c. coronans, A.f.f. congestum* in several forms may be found occasionally.

Ceterach officinarum, the Rustyback, is a first class evergreen dwarf species, and like Ramonda has the ability to recover completely after being withered up in drought—fatal to the great majority of ferns. The Ceterach does well in sun or shade and makes a fine pan.

Dryopteris (the Male and Buckler Ferns) has few real dwarf forms. *D. filix-mas linearis congesta* is a neat thing, six to nine inches, and *D.f-m. congesta cristata* is glossy and well crested, four to five inches. *D. assimilis*, a dwarf species in the Broad Buckler Fern group, is found in the mica-schist of Perthshire and is a nice neat plant.

Cystopteris has two very dwarf species in *dickeana* and *regia*, quite deciduous, extremely rare natives, but readily raised from spores quite true to type. The finely dissected fronds of *C. regia* are very elegant, six inches average height. *C. dickeana* is about three inches.

The Oak Fern, *Gymnocarpium dryopteris*, is splendid in woodland but perhaps too large for the smaller rock garden. Incidentally, it is to be hoped that the botanists have reached finality in placing the Oak Fern in *Gymnocarpium*, in which genus the Oak Fern reposed over a hundred years ago. Since then the Oak Fern has been placed in Polypodium, Polystichum, Dryopteris, Phegopteris and Thelypteris, only to revert back to *Gymnocarpium* within the last four or five years. R.I.P.

Grown as a specimen pan the Oak Fern is a lovely plant, but not a real dwarf. The Hartstongue, *Phyllitis scolopendrium*, again is a bit on the large side for the small rock garden, though here again some of the crested varieties are sufficiently compact to use in the rock garden of moderate area. They are a little too large for entering in classes for dwarf ferns.

Polypodium vulgare. The Common Polypody. This fern is now separated into three definite species—diploid, tetraploid and hexaploid—*australe*, *vulgare* and *interjectum* respectively, not easy to dis-

tinguish without the help of a microscope. It is a rock fern in nature, often epiphytic on trees, and is useful in the garden as it remains fresh green all winter.

There are several beautifully dissected varieties such as *P. v. cambricum*, *P. v. cornubiense*, *P. v. pulcherrimum*, and the like. The especially fine form of *P. c. cornubiense*, known as *P. v. elegantissimum*, very finely cut, makes a fine pan for exhibition.

All forms are ideal foliage plants in the rock garden, but there are not any large stocks about at present.

The Shield Ferns, *Polystichum aculeatum* and *P. setiferum*, have numberless variation in frond form, but only one really dwarf enough for the show bench. This one, *P. setiferum congestum*, is a really beautiful evergreen fern not exceeding six inches, when pot grown all the time. In the rock garden itself it may attain nine inches or even more in very favourable conditions.

The Holly Fern, *Polystichum lonchitis*, is a grand rock fern, perhaps a foot high generally, often less, sometimes a good deal more when suitably planted. Rather a scarce plant in nature except in one or two localities, it can be raised easily from spores. Collected plants are difficult to get going again, often a spore-raised plant catches up and makes a better and more permanent specimen, to say nothing of the virtuous glow experienced by the raiser who withstood temptation and left the wild plants intact except for a tiny bit of fertile frond. Of course, it is possible to purchase plants.

The truly alpine ferns, the Woodsias, are amongst our rarest natives and on no account should be collected, especially as they are raised fairly readily from spores—when spores are obtainable. I, personally, have never seen a living plant of *W. alpina* to date, but *W. ilvensis* is coming along nicely from spores sown two years ago. I have spores of *W. alpina* sent in from correspondents still to germinate.

Both Woodsias make grand show pans and present no particular difficulty.

From overseas there are a number of hardy ferns very suitable for exhibiting. The New Zealand *Blechnum penna-marina* makes a well furnished pan of glossy evergreen foliage, *Pyrrosia serpens* is good as a pan plant or as a climber up a mossy rock in a sheltered garden. Another N.Z. fern which I had years ago as *Polypodium varians*, now *Phymatodes diversifolium*, makes a good pan, its sea-green rhizomes wandering freely over a pan of suitable compost, the handsome erect glossy green fronds being of varying shapes.

From the European mountains come many rare Spleenworts, species and hybrids, and Cheilanthes, the Lip Ferns, which are not in general cultivation as yet in this country ; some of these are delightful foliage plants and it is to be hoped that spores of these will be forthcoming in the near future.

In America, too, there are many species of Asplenium, Cheilanthes and Pellaea, the Rock Brakes, and Camptosorus, the Walking Fern, which grow in such latitudes as to suggest their likely success in this country in the rock garden. One needs to raise adequate stocks of these species and try them out in varying conditions before making statements as to their suitability for outdoor cultivation, although some of them have been grown as cold house plants with every success.

There is a wide field here amongst the hardy Ferns for introducing new delights to our rock gardens.

MARGYRICARPUS SETOSUS

Margyricarpus setosus, though it has long been known as a very worthwhile rock garden plant, has never seemed to establish the place for itself that one would have expected. A member of the Rose family, native of the Andes of South America, it is a low-growing, evergreen shrub with small, crowded, deeply cut leaves. The flowers are quite small and inconspicuous with no petals, but the fruits are numerous, long-lasting and attractive, persisting well into the Autumn. These axillary white fruits, about three-eighths of an inch in diameter, are really one-seeded berries or achenes.

The plant delights in a sunny, well-drained position on a ledge in the rock garden where it will often propagate itself freely from self-sown seeds. It can also be propagated easily by cuttings taken in summer and rooted under glass in a mixture of peat and sharp sand.

A Holiday in the Central Pyrenees

16th JUNE—4th JULY 1966

By D. M. P. HOLFORD

IT WAS on 16th June that three of us started off on a holiday of nearly three weeks in the Pyrenees. Our flight was Gatwick-Lourdes, and then on by train and bus, arriving at Gavarnie at around 7 p.m., having left Gatwick at mid-day. It was an easy and comfortable journey. We had booked beforehand at the Hotel des Voyageurs for a few days, leaving the rest of the holiday more or less unplanned. Our movements would depend on the season and what local transport was available. Our timing on the whole was good, but it was not a normal season, for we were told that there had been unusually late and very heavy falls of snow in May, and there was still a great deal of it around the 8000 ft. level. We found that we were too early for quite a lot of the really high alpines, but we cannot have it all ways. We found the Ramondas in perfect condition, and who could bear to miss these wonderful plants in all their glory on a visit to the Pyrenees ?

We had six full days at Gavarnie and were sad when we had to leave such a wonderful centre and a most delightful hotel in every way. But other places and plants called.

This was our first plant-hunting trip to the Pyrenees, although I hope it will not be our last visit to these wonderful mountains. Please, therefore, bear with me, if in moving from place to place plant names are repeated a number of times—that is the way we found them.

I had spent one night in Gavarnie during a somewhat hurried motor trip around France in August 1939, and it was nice to see it so unchanged. There were still the numerous very smelly and noisy mules, ponies and donkeys carting the pilgrims, on their day trip from Lourdes, up to the famous and very grim Cirque de Gavarnie. But these worry one not at all, in fact Gavarnie would not be Gavarnie without them, and I hope they never build a motor road up to the Cirque. However, one is away in the morning before the crowds arrive and they have departed by the time one returns.

Our first day was spent pottering on the hillside on a slightly lower level than the path that leads up to the Port de Gavarnie. The lower meadows were ablaze with *Viola cornuta*, with *Aquilegia pyrenaica* around the edges and quite often in the meadows too. Along the banks of the Gave de Pau *Vicia pyrenaica*, a little creeping reddish-

purple pea flower, was common everywhere on dry rocky ground. Also on all sunny rocks a Moschata type Saxifrage with quite large creamy-white flowers, was a lovely sight. An early and exciting find was *Antirrhinum sempervirens** in full sunshine and on one rock only in this area. This small pale yellow snapdragon with pink markings and tiny grey-green leaves to my mind ranks very high amongst the gems of the Pyrenees. *Iris xiphioides*, still in tight bud, grew all over the hillsides, and on every likely dampish rock was *Ramonda myconi*. Certainly some forms of Ramonda were better than others, but there was seldom a poor one. Possibly not found on southern exposures, but on all others they consequently got and enjoyed a considerable amount of sun, and there were some even growing down on the turf. Orchids were abundant on this hillside, too, and amongst the scrub along the roadside on the way down to Gèdre. Ramondas were a sight on these roadside rocks too. Of the orchids, *Platanthera bifolia* was the most common with its glorious scent, *Gymnadenia conopsea*, *Orchis ustulata*, a large form of *Nigritella nigra*, and a purple marsh orchid. *Lonicera pyrenaica* was here too—and what a lovely shrub it is ! *Saxifraga aizoon* had been with us for some time and the odd rosette of *Saxifraga longifolia* began to appear, and hybrids between the two. Then suddenly, on a high rocky ridge were the wonderful plumes of *Saxifraga longifolia*. They were impossible to get at from below, but by climbing round the ridge and approaching from above we got to within easy photographing distance. With a background of the Cirque de Gavarnie and the Pic de Pimené, it was an unforgettable sight. Up on the ridge too was, I think, the best *Erinus alpinus* we were to find. Of all plants in the Pyrenees, this is, I suppose, the most plentiful. Here there were a few very good white forms also. *Pinguicula grandiflora* was over lower down, but up here it was still out, sharing all the marshy places with *Primula farinosa*.

Of all walks at Gavarnie, I think perhaps the Val d'Ossoue takes pride of place. This is a lovely valley around seven miles long running up to the mighty Vignemale. The road for about the first four miles is very good, but the remaining part up to the dam, although possible, would be somewhat hard on the springs of a car. However, I would not miss walking it as the views all the way were superb, looking back towards the Marboré and Pic de Pimené, and fairly soon ahead of us, to the snows of the Vignemale. A fine stud of brood mares and their foals added to the charm, but were no help to the flora, I fear.

* (fig. 60)

Around the statue of the Virgin of the Snows at the entrance to the valley were to be found seed heads of *Merendera bulbocodium*, and higher up on the rocky mound a pretty pink Sedum, some nice Sempervivums, and *Orchis sambucina* just over. Ramondas were on rocks at the lower end of the valley. The meadows were full of Iris, *Viola cornuta*, *Paradisia liliastrum*, *Anthericum liliago*, Asphodel, and the lovely little "blue-bell" of the Pyrenees, *Hyacinthus amethystinus*. Along the rocky roadside grew large- and small-flowered forms of a yellow rock rose, with a white one amongst them. *Potentilla nivalis* and the endemic *P. alchemilloides*, *Ononis natrix* with yellow and brown flowers, a white Candytuft, and *Reseda glauca*, the perennial mignonette, were also seen. *Lonicera pyrenaica* was even better here and a charming very prostrate deep cherry-coloured Pyrenean form of *Rosa alpina*. A little further on, where the limestone cliffs fall steeply down to the road, thousands of *Saxifraga longifolia* were in full flower, gleaming in the sunshine of this lovely day ; what a sight ! Most of them were a good 18 ins. in length, some possibly more. It was almost sad in a way to see them flower, when one knows it means the end of their life is near. However, by the vast number of rosettes around, seed must set well, and germinate very freely. And how lovely these rosettes are, almost as beautiful as the plant in full flower. Who would wish to pass all this sitting in a car ?

A mile or so on, a gully with quite a lot of snow in it looked worth exploring. Here were *Gentiana verna*, an Acaulis Gentian, and *Ranunculus amplexicaulis*. The Ranunculus is a lovely plant, 8 to 10 ins. high, mostly pure white, some semi-double, but the most beautiful of all with pink-backed petals. The fairy-like *Narcissus juncifolius* was still out here too. How lucky we were, as out of flower with its rush-like leaves it would be impossible to find. *Narcissus pseudo-narcissus* was flowering around the snow and on a rocky slope *Fritillaria pyrenaica* ! These were difficult to spot until one nearly stepped on them, and they varied to an amazing extent, some chequered, others deep plum-coloured, but the most beautiful was a chocolate and yellow form. A fine form of *Primula veris* was in quantity, and all the rocks were miniature rock gardens in themselves. Even the old Asphodel looked quite attractive here ! One could have pottered for hours. But our intention on this day was to reach the foot of the Vignemale. Not far from the dam another rocky pasture was covered with Fritillaria and this was a fine place to eat lunch and glory in their strange beauty. Large rocks around the dam were covered with *Globularia pygmaea*.* * (fig. 61)

G. cordifolia and *G. nudicaulis* were around too. We also found *Phyteuma hemisphaericum* and *Jasione humilis*, with its pretty powder-blue phyteuma-like flowers, and all around were fine forms of *Androsace villosa*.

The flat grassy valley alongside the lake was blue with the finest *Gentiana verna* I have ever seen. A very deep purple *Linaria alpina* grew in the scree beside *Draba aizoides*. On some large rocks were big cushions of the yellow Kabschia *Saxifraga aretioides*. The hillside on the right was a carpet of *Narcissus pseudo-narcissus*, varying a great deal, some with long trumpets reminding one of *N.* 'Peeping Tom', others with strange twisted petals. On reaching the snow bridge at the head of the valley, two of us decided we had had enough, the third member of the party went on over the snow and round the shoulder of the Vignemale.

While waiting his return we crossed the torrent and were rewarded by the discovery of a fine colony of *Scilla lilio-hyacinthus*,† a pink Corydalis, *Anemone narcissiflora*, *Primula elatior* and *P. rubra* on the wet rocks. On our return we came on *Linaria origanifolia* and an attractive pink thistle. This thistle we were to see a lot of later, and it was identified as *Carduus carlinoides*.

A lift from a very fast driving young Frenchman the last four miles was very welcome, if somewhat alarming !

A visit to the Cirque on a rather dull cold day was the least enjoyable of our trips here at Gavarnie. We went up leaving the Gave de Pau on our left to avoid the Pilgrim's way and the somewhat overpowering smell of mule ! *Geranium cinereum*, only in bud, grew along the river banks. In the woods as one climbs up to the hotel, *Geum montanum* forma *pyrenaicum* was in flower, a tall, not particularly attractive plant, this. However, *Pinguicula grandiflora* here was superb. *Pyrola rotundifolia* was as yet only in bud. Exploration of the steep bank and screes leading up to the cliffs of the east side of the Cirque only revealed *Scilla verna*, *Androsace villosa*, *Saxifraga aretioides*, *Daphne philippii* and *Passerina nivalis*. There was still an awful lot of snow on the floor of the Cirque and there was as yet little out apart from a small form of *Primula integrifolia* and *Saxifraga oppositifolia*.

I feel that the west side might have been more rewarding, but snow made it difficult to get over to that side without returning to the bridge below the hotel and then mounting up again and energy had run out. It's rough going on the very steep Cirque screes !

† (fig. 62)

The Port de Gavarnie was our next expedition. This one reaches by the path that runs past the church. It soon mounts steeply by a series of zig-zags and one needs to start early as the sun beats down on this in the morning. The flora was magnificent and a repeat of our first day a little lower down. It was impossible to pass a "Ramonda rock" without wandering all round it to gaze at these lovely flowers and take yet another photograph. *Asperula hirta* bordered the path growing right into cracks of the rocks. It looked most attractive just coming into flower with its bright pink buds that open to white flowers. *Eryngium bourgatii, Potentilla alchemilloides, Salix pyrenaica* were found and of course everywhere *Erinus alpinus* and *Androsace villosa.*

On reaching the flat terrace where on large flat rocks we had expected to find *Saponaria caespitosa,* we were disappointed not to be able to find a trace of it. Then on across the Vallée de Pouey Aspée, across a rough scree where grew a small yellow Erysimum. Soon the stone refuge hut came into view and a welcome cool, in fact a cold breeze blew off the snows. All wet places were a picture with *Pinguicula grandiflora* and *Primula farinosa.* Just beyond the hut and round patches of by now fast-melting snow grew a mass of a poor form of *Ranunculus pyrenaeus,* while dotted around on the turf was a Gentian of the acaulis type. *Gentiana alpina* is said to be up here, but this had too large a leaf for that.

The path up to the Brêche de Roland and the Cylindre de Marboré branches off to the left around here, disappearing into the snow almost immediately and must still be several hours climb and not possible at this time of year. Around 7000 ft. *Androsace carnea* var. *laggeri* began to appear, with some fine forms of a good clear pink. I found a pure white one too. Oddly enough up here, so much higher, *Geranium cinereum* was out and white forms of it also. All along the banks of the stream were lovely forms of *Primula integrifolia, P. rubra, P. viscosa* and various hybrids. *Androsace villosa* was everywhere, *Saxifraga oppositifolia, Silene acaulis* with albino forms, also a few plants of *Ranunculus alpestris,* but we did not find *R. parnassifolius. Primula elatior* grew around the snow with *Soldanella alpina.* The Soldanellas did not appear to be at all common in the Pyrenees.

Along to the right on drier ground a mass of yellow turned out to be *Douglasia vitaliana.* Unfortunately the actual pass was blocked by a large snow cornice, so we were prevented from peeping over into Spain. This had been a lovely and easy walk for the Pyrenees—the view up here across to the Pic de Pimené was magnificent and we were

able to pick out a possible route that might get us up there the next day. There still looked to be an awful lot of snow where we thought we had to get up to, to find *Androsace ciliata.*

A return by the other side of the torrent was a mistake and ended in a precipice. We did find *Scilla lilio-hyacinthus* again though, but had to wade back across an icy and extremely fast flowing torrent !

Our last day at Gavarnie we had left for the Pimené journey in the hope that some of the snow would have gone. An early start is necessary for this walk to enable one to get up at least part of the steep path out of the valley before the sun gets into it. This day unfortunately had the feel of thunder about it, also we did not start early enough. The flowers were good alongside the path although nothing new was seen. In the wood at the top of the zig-zag path and just before going onto the open downland, we found a magnificent colony of *Paris quadrifolia.*

Possibly the best way up after this would be past the stone hut and up the steep cliffs just beyond. But this was completely blocked by snow. So guided by the landmarks we had spotted from the Port de Gavarnie, we struck off and up to the left. It was a long grind and very barren as regards flowers—sheep, cows, and horses as usual ! Soon on looking back one got a marvellous view across the valley to the Brèche de Roland on the skyline. This amazing cleft in the rock of legendary fame is said to be the home of *Androsace pyrenaica,* and the nearby Cylindre de Marboré of *A. cylindrica,* but that day we were hoping to find *A. ciliata.*

On some large rocks near the snowline were *Primula rubra,* really fine forms and in perfect condition. *Primula viscosa* was there too, including a white one, and possible hybrids. Around the snow *Ranunculus pyrenaeus* and *Androsace carnea* var. *laggeri.* Up here, too, was a tiny "dog violet", an endemic, I believe, and *Douglasia vitaliana* also.

Thunder was by now almost upon us, so we had a quick lunch. A hurried search of the screes and some of the lower rocks of the Pimené and a steep and very slippery scramble a short way up the mountain before the deluge broke was all we could manage. And no *Androsace ciliata* did we find !

The views up here were terrific. We could see the whole Marbore group with the Brêche de Roland away across the snows, the Port de Gavarnie and the mountains of Spain beyond, up the Val d'Ossue to the Vignemale massif and away beyond to the Basses Pyrenees in the

far distance. On this day of rolling thunder clouds and alarming flashes of fork lightning it was a most dramatic sight. We tried to shelter and waited some time for the storm to ease off, but it showed no sign of doing so. It was sad to have come so far for this to happen. A zig-zag path disappearing into the snow and leading up to a shoulder just to the south of the Pimené is, I feel, where we might have found the Androsace. But it would not have been possible to get up there for another ten days or so. The walk home was none too easy, paths, where they existed, having turned into torrents, and it took three hours to get down to the village—torrential rain all the way ! This always happens when one has to pack. However, Madame and her cheerful and efficient staff had everything expertly dried out by morning.

Our next move was only seven kilometres down the road to Gèdre and the Hotel Pyrenees. By the way, the owners of this hotel had the only taxi in the district. This we felt would be of enormous assistance in lifting us up the Val d'Héas on our way to the Cirque de Troumouse. Again we were very happy with our hotel.

Our first afternoon, having come down from Gavarnie on the 2 p.m. bus, was spent exploring the little plateau which one reaches by mule path from behind the Hotel de la Grotte. Here was the strange little green-flowered bulbous plant *Dipcadi serotina* and a tiny yellow rock-rose-like plant *Fumana procumbens* (*F. nudifolia*). The views up the Vale d'Héas and up the valley to Gavarnie, and the mountains beyond in the evening light were enchanting. This evening light of the Pyrenees with the faint mistiness is of peculiar beauty and I have never seen it in the mountains elsewhere. A very luscious group of *Iris xiphioides* growing in a ditch and just about to open were picked for our table and were fully out next day, a wonderful rich purple.

It was the Cirque de Troumouse that had really brought us to Gèdre and the taxi rapidly whipped us up to the small hamlet of Héas. We then set off across the fields, leaving the stream on our right. A large bus-load of Spanish students preceded us. Rare this, to be on the mountains around here with other human beings, and lucky as it happened this time, for the path was none too obvious. But they seemed to know it and every now and again we caught sight of them away ahead. Our usual diversions round rocks, etc., to admire once more a wonderful display of Ramondas delayed us somewhat. The little Moschata type Saxifrage was covering every rock too. Not long after one starts the steep zig-zag, a slope was covered with Fritillaria, just over their best, unfortunately. Quite soon *Daphne cneorum* began

to appear, very prostrate and, of course, smelling delicious. On and on went this path with several rather nasty torrents to cross. But at last we were up and what a fascinating place this huge Cirque is. It seemed to have everything—huge limestone cliffs, screes, large rocks scattered about the floor of the Cirque, and a lake.

But only for about ten minutes were we allowed to see all this. We had realized that a mist had been following us up the valley and it soon enveloped us ! One had heard about these Pyrenean mists and their danger. Luckily we were near the path, so just sat and waited for at least two hours. But it showed no sign of clearing, and in the end, in the company of the students, we were forced to grope our way down. The only, but small consolation being we were obviously too early for this height. *Gentiana verna* and *Androsace villosa* were only just coming into flower. As we were too early for our taxi we walked on down the Val d'Héas. This was lucky, as on a most uninviting rock tumble quite a number of plants of the lovely little *Antirrhinum sempervirens* were growing. The light was non-existent, so we planned a visit to them next day. This we did before starting off up to the dam and the Val d'Estoube.

This valley was rather a shot in the dark as we had heard nothing of it. But from what one could see from the lower road and the Troumouse path, it looked good. *Rhododendron ferrugineum* grew all over the hillside on the left of the track, and *Pulsatilla alpina*, and on the grassy slope just below the dam fine *Gymnadenia conopsea*. An interesting discovery on flat rock slabs were very strange fossil remains, which looked like slip marks of a large clawed animal, and others that looked like fish. *Saxifraga cotyledon* grew here, too, but not in any quantity.

Crossing over the top of the dam we took the path on the right-hand side of the lake. A lovely view opened right up to the snow-capped Pic de Pinède and the Marboré at the head of the valley. A very deep purple *Gentiana campestris* grew along the edge of the path. *Saxifraga aizoon*, *Saxifraga longifolia* and many hybrids grew alongside the torrent on large rocks, and *Sax. oppositifolia*, too, a rather nice pale pink form. On scree on the right-hand side of the path *Arenaria purpurascens* grew in large patches. Crossing by the new bridge, we set off across very heavily grazed pastures. Rather beautiful cream-coloured long-horned cattle were there, but we wished them elsewhere. The only thing of real interest in the way of flowers was a very deep red *Lychnis alpina*.

But this is such a beautiful valley, remote and on all sides surrounded by lofty peaks with eagles hovering overhead, that one hardly notices it being, in places, rather flowerless. Also, for a change, it was almost flat, although quite a long way to the end of the valley, which as usual ended in a Cirque.

In the turf around here were *Gentiana verna*, and on the river shingles *Chrysanthemum alpinum*, also a form of Thlaspi with a tight dome-shaped head of pale lilac flowers. The *Geranium cinereum* here were magnificent. A large Doronicum grew along the banks of the stream too. But the most exciting find this day was *Pinguicula longifolia*. Bigger in all its parts than *P. grandiflora* and a much paler shade of purple, it had, as one would expect, very long leaves of a yellowish green.

We returned by the opposite side of the stream. *Androsace villosa* was very fine here, and on one mound was *Daphne cneorum*. Here I nearly put my hand on an adder ! These are much too common and we never went a day without meeting up with several. A good stick is definitely indicated.

This time we walked right back to Gèdre, down the last part of the old mule track which one gets on to by crossing the Gave d'Héas by the old stone bridge a short way down the Val d'Héas. It was a pity that we were really too leg- and foot-weary to stop and appreciate more the beauty of this end of the valley, with its tiny meadows, each with its group of tall poplars, planted for shade, I suppose, and haymaking was still in full swing.

Our last day at Gèdre was spent with some French fellow guests who were anxious that we should share a taxi with them to the Port de Spain. We felt that an easy day was about due anyhow. A chair lift takes one up to the Lac de Gaube from Port de Spain. This was a luxury here and the view across the lake to a different side of the Vignemale was very lovely. But there were rather too many people around. We really did only potter this day, but all the same found something new, *Saxifraga exarata*, a lovely little sticky cushion in a minute cave giving it complete protection on a fairly small boulder that I imagine had tumbled down from the heights. This was the only time we were to find it. *Gentiana alpina* grew near here too.

The next day at crack of dawn we took the bus for Lourdes. It had become apparent that we must have a car if we were to carry out our plan of a visit to Oô in the Luchon area of Haute Garonne, and subsequently back to Gourette in the Basses Pyrenees. We had found

out about the hiring of cars before leaving London, and Madame of the Hotel Pyrenees had done the rest for us over the telephone. Difficulties arose, however, when almost three times the deposit we had been quoted at home was demanded on the car. But we managed to settle things and set off in the small Renault estate car which served us well for the next eight days.

It was a nice drive over the Col d'Aspin, golden with Broom and Genista, and with a magnificent view across to the Maladetta Massif in Spain. Oô is a tiny quite unspoilt village and the Hotel Spijoles only a simple village inn, but adequate. One could have done without the flies, but the answer to this was to close the shutters tight as soon as the sun came into the room in the early morning. Oxen are used for all farm work in this area, and a lovely peaceful sight it is to watch them at work. We had not much time on arrival to walk very far, also it was much too hot, but we did find *Saxifraga media.*

The next day we got off in good time. It is possible to motor up the first two miles of the valley and then walk on and up through the woods to the Lac d'Oô. This is a reservoir with a fine waterfall (900 ft.) at its far end. But our destination was the higher Lac d'Espingo and Lac Saussat. And what a stiff climb this was ! Really a rather alarming path it was, too, very crumbly in spots, with torrents to cross and a sheer drop a lot of the way, and a grilling hot day in addition. One rock cliff was covered in Ramondas, amongst them the only white one we were to find. On one bank was a mass of *Lilium pyrenaicum,* fully out, which we hadn't dared to hope for as early as this. A few plants of *Ranunculus amplexicaulis* grew alongside this path too, and on a very wet cliff a large form of *Primula integrifolia* with very ragged petals, but strangely attractive. The only plants of *Geum montanum* we were to see were up here too.

At last one was at the top and looking down on the lakes and on up again to the Port d'Oô still about four miles further on, I would guess. Rather to our surprise a Refuge, open too, was on a grassy mound just on the right. Had we known, we could have spent a night up here. All around, and in fact all over the floor of the valley ahead, was *Erythronium dens-canis,* unfortunately over. Nearly as thick on the ground had been *Narcissus pseudo-narcissus* and *N. poeticus.* It must have been a glorious sight a few weeks earlier. Several drinks were more than welcome at the Refuge before setting off down to the far lakes.

Daphne cneorum was good down here and on the stony ground

above the lakes were growing fine *Silene acaulis*, *Chrysanthemum alpinum*, *Linaria alpina*, *Armeria alpina*, a Doronicum and good *Anemone narcissiflora*. These Anemones in the Pyrenees never seem to have the pink-backed petals that they have at the Col du Lautaret or in Switzerland. Alas, our energy ran out completely and we could not face the climb on up to the Port d'Oô. We returned to the Refuge for another drink or two. It can be very hot in this part of the world ! And so home—a pretty long walk.

Next day the clouds were well down, so we paid a visit to Luchon, a very pleasant town. We then drove on up the Val Lis, but could see nothing, and it all seemed rather hopeless. However, we decided to drive up to the Hospice de France to eat our lunch. This road is a very pretty one through lovely beech woods, badly scorched by frost this year. People were picking what looked just like a red "Sweet William".

As we got to the Hospice, not a very attractive place, the clouds lifted. We had meant to make this an easy day, but the path up to the Port de Vénasque was too tempting. A large yellow Gentian grew in quantities at the start of the walk, *G. lutea*, I think, and on marshy ground masses of really beautiful pink-spotted Orchids, which I cannot identify. The meadows were very gay with *Viola cornuta* and *Geranium sylvaticum*, the latter in a wonderful range of colours. Higher up a small and particularly attractive form of *Aquilegia pyrenaica* grew all over the rough stony ground. A small form of *Pulsatilla alpina* and *Primula elatior* grew around the snow. *Saxifraga oppositifolia* and *Silene acaulis* were both over. And actually on the cliff face, a pink cushion plant was growing ; could this have been *Androsace ciliata* ? We think so. Soft snow and then a big gap below the foot of the cliff made it impossible to get near enough to be certain, and we had no binoculars—very frustrating !

A run up to the Super Bagnères, a rather grim and flowerless looking spot, ended this day, and the following one we set off back to the west. An afternoon spent pottering on the Col du Tourmalet didn't produce much. I think we were still too early ; also this is heavily grazed by sheep. Strangely enough, though, the only *Iris xiphioides* we were able to photograph was out in a sheltered place here. We spent the night at the Hotel la Mongie and decided to push on and have an extra day at Gourette.

This was a lovely drive on and over the Tourmalet, down to Luz, and from there down the main road to Argelès-Gazost. Leaving the

main road here one passes through a beautiful stretch of country with several small and most attractive towns and with wonderful views of the surrounding mountains.

The Col d'Aubisque is definitely not one for a nervous driver and all the cows in the district seem to wander about on it for the shade of the steep cliffs and are most reluctant to move out of the way. We hoped they would not butt us over the very crumbly edge ! Only two days before, the Tour de France had come over this Pass, as was only too apparent by the litter left around at every vantage point. I only hope they kept the cattle off that day ; one can imagine the most almighty pile up otherwise ! Gourette, like La Mongie, is a ski resort and both boast some of the ugliest modern blocks of flats and hotels I have ever seen. Practically all are closed at this time of year. We booked in at the Hotel de L'Amoulet, possibly we could have done better as the food and service were poor. But its position facing straight down the Pass made up for a lot. It was strangely warm in the evenings here, and the sun didn't go down until around 9 p.m., and it was a joy to sit out on the dining room balcony after a hard day's walking. A shower in our bedroom was also a luxury we hadn't had before, although all hotels we stayed in had constant hot water.

The village is dominated by the strange limestone peaks of the Pénemédas. Unfortunately, the chair lift was not in action and the path up out of the village is a particularly steep one. It was also mid-afternoon, but we hadn't many days left and *Androsace hirtella* was a big draw. This we found just where we expected to, a little past its best, although a few cushions were still in perfect condition. In fact we were to find it each day we were at Gourette, always with a north-west aspect and with complete shelter from overhanging rock. Some of the cushions were very large, but a lot of them looked rather sad and near the end of their days. This may have had something to do with particularly severe weather as the poor old *Saxifraga longifolia* had been swept off its heights by the hundred.

What a thrill it always is to see a rare Androsace in its native habitat, particularly this one, which is confined to this one area. Two other very thrilling finds this evening were the exceedingly rare *Lithospermum gastoni*, and a beautiful albino *Rhododendron ferrugineum*.* The latter had minute yellow specks on the inside and outside of the petals. It is a lovely thing and I am hoping that some cuttings taken will have struck. The Lithospermum, about six inches high with large,

* (fig. 63)

intensely blue flowers, is a wonderful plant. Only when I got home did I realise that in my excitement I had taken transparencies only and no black and white photographs.

There is a cable car at Gourette and this takes one right up on to the summit ridge of the Pénemédas. This, if we had had time, would have been nice to do for the view alone, but we felt that the intermediate station was the best bet, and this we did on our second day.

Daphne cneorum was everywhere around this station, a particularly large-flowered *Dryas octopetala*, and *Iberis spathulata*, a pretty little lilac-coloured biennial. Large holes that looked like bomb craters, were full of *Primula integrifolia* and *P. elatior*. On these slopes too were very fine cushions of a large-flowered *Silene acaulis*, *Passerina nivalis*, a charming pink catkined Salix, and *Linaria origanifolia*.

A little hidden valley that seemed to be, as yet anyhow, quite unvisited by livestock, was a carpet of flowers. *Primula farinosa*, *Dryas octopetala*, *Horminum pyrenaicum*, *Silene acaulis*, *Gentiana* of acaulis type, *Gentiana verna*, just to mention some of them, and of course *Pinguicula grandiflora*. In fact, it was hard not to think one had suddenly been transported to the Dolomites.

A strange thing about the acaulis type Gentians in this area is the very long corolla tube which comes out at right angles from the two- to three-inch stem. The leaves are short and narrow, the flowers, without exception, of the most wonderful deep blue, and the centres a luminous green. Although not in the area for *G. angustifolia*, they do seem to answer the description of this.

On our last day we decided to explore the Val Enlin. This valley, part limestone, part granite formation, runs more or less due south of Gourette, and to the east of the knife-edged peak, the Pene Sarriere. A small pale pink Saponaria was growing on some granite rocks near the entrance to the valley, but only when we got on a little further and back to the limestone did the mass of flowers appear. Rock roses and *Erinus alpinus* turned the screes into a yellow and rose carpet and there were particularly fine forms of Thyme. *Gentiana acaulis* type (Gourette form !) was even more plentiful than those found the first day, covering some of the rough grassy slopes which had also been a mass of *Fritillaria pyrenaica*. These were by now well over and the seed almost ripe. It appeared to be a very short-stemmed form and to have flowered magnificently. This is an attractive valley with the usual tumbling torrent with numerous others joining it, and all having to be crossed ! But apart from this it was an easy walk and not a steep

climb. Near the end the *Daphne cneorum* surpassed any we had seen before and we had seen plenty of good forms. The valley ended in a Cirque guarded by a big rocky mound and on this, catching the breeze to keep off the flies, was the finest herd of long-horned cattle we had seen, looking quite magnificent against the sky line. We climbed up to have a closer look, but made a very hurried retreat when we saw that three of them were bulls !

The Cirque was only just out of the snow and was somewhat flowerless apart from *Primula integrifolia.* An interesting path led up to where there is a lake on the Penemedas side of the valley and it would have been nice to have followed it, but the thought of the final packing to be done turned us for home rather early. Also, I am ashamed to say, my legs were feeling that this hadn't been a very restful holiday. This by no means for the first time !

Now, a few months on, the urge to go back one day in the not too distant future is very strong. Certainly there is rarely the display and variety of flowers that one meets in the Alps, the Dolomites and the mountains of Dauphine and Haute Savoie. But there is the wonderful wildness of the mountains unspoiled as yet by cable car, chair lift, or the like, although this, of course, means long walks. And there are the endemics !

We made our return trip to Lourdes, with a slight diversion to Gabas and on towards the Spanish frontier. But this valley didn't really appeal to us, and also all the sheep in the district seemed to have been gathered into it for their annual dip and it was eaten bare.

Our flight was by internal airways to Paris (Orly), time for dinner, and on by Caravelle to London Airport.

A good but fairly exhausting holiday !

Three American Gaultherias

By SALLIE D. ALLEN,
Seattle, Washington

FOR THOSE who are interested in the Ericaceae Family, the Gaultherias present a never ending source of year around pleasure. They will not give a flamboyant seasonal display, but quietly please from season to season. Their dainty flowers can often only be seen by lifting a branch. The fruiting time is usually their showiest, but their subtle colour changes of foliage in the fall are equally desirable. For me they can be grown solely for their interesting leaf shapes and textures, and their attractive forms. If they flower and fruit, that is an added bonus.

The Eastern native *Gaultheria procumbens* is well known in gardens here and in Great Britain, and is delightful in foliage, flower and fruit. There are three other small members of the genus native to North America that are not so well known and should be grown much more in gardens.

Gaultheria ovatifolia ranges in nature from Southern British Columbia to Southern California on both eastern and western slopes of the Cascades. It is usually found in coniferous forests from about 2500 ft. elevation to something over 5000 ft. It is a spreading, low, evergreen shrub with heart-shaped, alternate, crisp serrulate leaves, prominently veined. The leaves are convex, a distinguishing factor when trying to determine whether you have *G. ovatifolia* or *G. humifusa* ; the two are often confused. The corolla is campanulate, small, white or pinkish, appearing singly in the leaf axils. The fruit is red. It is very similar in form and habit to the Japanese species *G. adenothrix.*

When found in the forests it forms an extensive ground cover. If pieces are collected, they seldom survive. I have found that it is well worth the time and effort to find small, compact seedling plants with good root systems. *Gaultheria ovatifolia* is extremely adaptable to conditions other than the normal open woodland, and will grow in full sun. This I discovered when driving through a logging cut, completely devoid of timber by a logging operation several years previously. Nice seedling plants had cropped up everywhere, fully exposed to the elements.

Gaultheria humifusa, smaller in all of its parts and with a more concave leaf, is found in wet peaty locations in mountain meadows, near a stream or lake. It is usually at or above timberline in Alberta, southern British Columbia to Northern California, and in Colorado.

The leaves do not have the shiny crisp texture of *G. ovatifolia*, and are more densely arranged on the short branches. The flowers are pink, borne singly in the axils of the leaves, campanulate, shallower and broader than those of *G. ovatifolia*, giving the impression of a very short full elfin ballerina skirt. The fruit is red.

Gaultheria hispidula (Chiogenes), called the Creeping Snowberry, is the smallest of the three. It does not seem to occur in Washington, but southern British Columbia across Canada to Newfoundland and in the United States, in Idaho, Michigan, Wisconsin, Pennsylvania and Connecticut. I have never seen it in the wild, but it is described as growing in wet coniferous forests or peat bogs. It forms a dainty, matted shrub. The leaves of my plant do not exceed one-fourth inch in length and are numerous along the trailing stems. The whitish flowers are insignificant and would go completely unnoticed unless you lifted a tiny branch to discover them growing singly from the axils of the leaves. The white fruits are very large in proportion to the plant, and a peculiar egg shape. In spring this miniature shrub forms a fresh green mound and in fall takes on a subtle hue of dark reddish brown.

All three of the small Gaultherias are grown in my garden under the same conditions of morning sun and an open situation. The soil is made up of peat and rotted wood mixed with the existing rather poor gritty acid soil. If small, nicely shaped moss covered logs are planted here and there among such plants, a pleasing natural picture can be created. In November, as I write these notes, I discover other delights as a result of incorporating logs and gnarled roots in the landscape scene. Miniature mushrooms and colourful fungi are present here and there on the wood, lending a touch of imagination and "airy fairy" atmosphere to the garden. (See fig. 64).

Although *Gaultheria humifusa* and *G. hispidula* grow under boggy conditions in the wild, constant moisture is not necessary in the garden. As a matter of fact they form more compact plants under cultivation than in their native habitat, where they meander beneath the moss, poking up branch tips here and there. They cannot be allowed to completely dry out, however. All three species are delightful small ground covers, in a limited sort of way, although I must confess *G. hispidula* does not cover much ground. It is, however, quite suitable for the smallest of miniature gardens.

Ranunculus paucifolius, Kirk

By L. W. McCASKELL

(The story of the preservation of a rare species)

THIS PLANT is confined to a small limestone basin in the Castle Hill area, 60 miles west of Christchurch, New Zealand. The area on which it grows naturally is situated at an altitude of 2500 ft. and is composed entirely of rocks and debris weathered from massive piles of Tertiary limestone. The rainfall is about 30 inches, but its effectiveness is greatly reduced by the almost constant, often dry, wind. Snow lies for a few days at a time, on several occasions each winter.

The height of the plants is rarely four inches, usually less than two. Leaves were originally described by Kirk in 1899 as being three to eight in number (hence the specific name), but under present freedom from trampling and grazing by stock, plants with over 40 leaves may be found. A plant in cultivation in the homestead garden near the reserve had 200 leaves. The leaves are radical, on rigid petioles with the blade up to two inches across, deeply lobed, greyish-green in colour, coriaceous and deciduous. The flowers which appear in October are up to two inches in diameter, have five pale-yellow sepals and five to ten golden-yellow petals. Up to 20 flowers may be produced by one plant. (See fig. 65).

Arnold Wall studied the plant over a number of years from 1918 and successfully cultivated it in his Christchurch garden. (It was grown for many years in the rock garden of the Royal Botanic Garden, Edinburgh). Wall described it as growing only in an area of 300 yds. by 60 yds., surely one of the most restricted areas for any plant. Nearly all were on ground sloping at 6° to 8° ; few were found on level spots and none on very steep ground. He counted 70 plants in 1919 and thought there might possibly be about 100.

In 1940 Mr. W. B. Brockie of the staff of the Christchurch Botanic Garden made a study of the area and counted 75 plants which were under constant grazing and trampling by sheep, rabbits and hares. He fenced a few square yards containing two plants, each with four leaves. Into the enclosure he transplanted two other plants with the result eight years later being as follows :—

Undisturbed plants	(*a*)	23 leaves,	6 flowers
	(*b*)	14 „	5 „
Transplants	(*c*)	35 „	7 „
	(*d*)	24 „	9 „

Numbers of seeds were produced, were sown within the fence and developed into vigorous plants. It was obvious that disturbance by animals was an important factor in the welfare of the plant.

In 1942 the Annual Conference of the Royal New Zealand Institute of Horticulture urged the Department of Lands and Survey, the Department in New Zealand responsible for reserves, to have the Ranunculus preserved. But it was war-time and action was delayed until 1948. Part of the land was freehold, part Crown leasehold. The owners of the sheep run agreed that fencing should proceed at once ; survey and other negotiations could follow. The Department made funds available to the writer to have the fencing done. It was a time of desperate shortage of materials, but obtained they were, and the students of Lincoln Agricultural College erected the fence in March 1948. A count of plants at the time showed the numbers to be down to 32. (See fig. 66).

The first result was that within a year there was a spectacular increase in the number of plants to 135, most of them new seedlings. It seemed obvious that stock disturbance must have been a major factor in preventing or severely reducing increase from seed. But within a year or two stabilisation of the limestone scree by other vegetation (especially a native grass *Poa acicularifolia*) and exotic weeds appeared to threaten the welfare of many plants. The policy was therefore adopted of sowing seed and transplanting rooted pieces of mature plants to other parts of the reserve. In this way several new sites of varying slope, aspect and stability have been colonised (contrary to Professor Wall's observation on the original colony). By 1963 there were 160 mature plants and by November 1965 at least 200, the target set years before as the number to be reached before it would be considered the plant was safe.

To ensure the health and vigour of the plants in the more stable areas, competing vegetation is removed by hand over an area of several square feet.

On 16th July 1954, pursuant to the Land Act 1948, the area of 15 acres, 3 roods, 12 poles was formally gazetted as a reserve for the preservation of native flora. This means that access to the reserve is permitted only by obtaining the written authority of the Commissioner of Crown Lands, Christchurch.

The writer is Honorary Ranger for the reserve and will continue to sow most of the seed available each year in new sites within the area. His present aim is 400 plants by 1970. Each year some seed will be sent to botanic gardens and commercial growers in other parts of the world.

Some Plants of Alaska

(From a letter to Miss J. Halley)

By Mrs. L. STRUTZ

I HAVE just prepared and sent off my collection of seeds from some of the native Alaskan plants in my garden, and some that I have collected in the wild. Perhaps a few notes on some of them may be of help.

Aconitum delphinifolium ssp. *paradoxum* heads the list, and I think would make a very good subject for the rockery or anywhere that an 8-inch plant is wanted in a perennial bed or border. It does not seem to require any particular kind of soil. My plants are on a slight slope to provide good drainage, and the soil is sandy, with some peat. The dark blue flowers are much larger than those on the taller *A. delphinifolium* and seem almost incongruous on the smaller plant. I have not raised any from seed as yet. The plants that I have were collected on St. Lawrence Island by Dr. Christine Heller of Anchorage and given to me in 1964.

Aquilegia brevistyla is well-known to many, but I have not seen it listed in any plant- or seed-list, perhaps because it is not a particularly showy plant. The small blue and cream-coloured flowers are seldom more than three-quarters of an inch across, and the plant grows to 2 feet tall in my garden. This would probably make it too large for the small rock garden but suitable for a border.

All of the Arnicas that I have collected are most attractive plants, but some are much too tall and invasive for the rock garden. *A. lessingii*, *A. louiseana* and some forms of *A. alpina* are usually no more than 6 to 8 inches tall and bloom quite profusely. *A. lessingii* is a nodding one, with purple anthers. *A. louiseana* has bright yellow blooms similar in size to *A. lessingii*. All seem to be quite happy almost anywhere and are not at all particular as to soil.

Aster junceus is a newcomer to my garden, having been collected only last summer. The small white flowers, about an inch across, are carried on very slender, usually branching, stems, sometimes 2 feet tall in its natural habitat, which seems to be the swampy areas. It has been blooming very well on my rock wall and the plant is no more than 10 inches tall. I have read that it sometimes has purplish flowers which should make it a more attractive plant.

Cerastium maximum I have had for several years and it attracts a great deal of attention from visitors to the garden. It is another of the 'invaders' so must be circled around with a metal collar and the

blooms cut before seed is formed. The large white blooms are rather tulip-shaped, the 'raggedy' edges of the petals contributing much to the attractive appearance.

I have had *Cypripedium guttatum* for thirteen years and have sent roots of it to numerous people during that time. Some seemed to have trouble in getting it established, but it grows freely here and as I have it in several different locations in my yard I can't think that it is too particular as to soil conditions. It has never failed to bloom, but sometimes fails to set seed. I do not know if anyone has succeeded in getting plants from the seed that I have sent to the Societies. I have no seedlings. The plants grow to about 8 inches in height : the blooms are blotched with rose-red.

Delphinium brachycentrum was collected at Pt. Hope in 1963. It was not then in flower but has since grown well and flowered in the garden. It grows to about 15 to 18 inches ; the flowers are an attractive dark blue with some pink showing in the upper petals.

Draba crassifolia (identified by Dr. Ira Wiggins) forms a compact little mound of rather grey-green foliage which can hardly be seen when the plant is in bloom. The bloom is bright yellow, on 2 to 4 inch stems. This makes a very good wall plant. Another *Draba* species from Pt. Hope has rather pale yellow blooms and is similar to the above in habit, but the leaves are much larger (in my garden) and the whole plant has a 'stouter' appearance. At Pt. Hope the whole plant is not over 3 inches high, and mostly much less.

Most of the Erigerons are attractive plants. *E. compositus* has pinkish flowers ; the plant, with finely-cut foliage, is about 5 or 6 inches tall and blooms for a long time ; some are in bloom now on October 11, as is *E. peregrinus*. *E. glabellus* I found first in 1959 on the Dawson-Mayo road in Yukon territory. It is one of my favourites but is a little 'pushy' for the small rock garden, and seeds itself very freely. It grows to about 10 to 12 inches tall ; has pubescent, grey-green leaves. Its one and one-half inch flowers, which gradually turn to pink or lavender, are very freely produced, so that white, pink and lavender show all at once on the same plant. *E. humilis*, a real cutey, is about 3 to 4 inches high ; the whole plant is pubescent, the stem and involucre covered with long, purple hairs ; the phyllaries are deep purple, the petals white, which sometimes turn to lavender. I had *E. hyperboreus* for a time but it seems to have disappeared. I can only hope that it may return from self-sown seed as it is a very attractive plant. *E. peregrinus* seems to grow just about everywhere, so is known to many.

One of its best features, it seems to me, is that it blooms over quite a long period, an attribute not shared by many of our native plants

Oxytropis nigrescens really surprised me this summer by its very profuse bloom, and it was a lovely sight. I have moved it now into our rock wall. We collected small plants of *Astragalus nutzotinensis* this summer and hope to have seed of this next year. It has a trailing habit, with very pretty pink flowers.

Primula borealis has grown to quite a good-sized clump in my garden since I collected it at Nome in 1963, and each year has produced a goodly quantity of bloom. It is a tiny thing, up to 3 or 4 inches high, with half-inch flowers of several shades of pink. I had hoped to collect seeds of *P. tschuktschorum* too, but the birds beat me to it ; they love the little fat pods of *P. cuneifolia*, too.

One of the rather showy *Saxifraga* is *S. radiata* that I collected in Nome in 1963. It was not blooming at the time, so I was very pleasantly surprised when it made its first showing in 1964. Dr. Eric Hulten, who visited our garden that summer, identified it and many others for me. *S. radiata* grows to 5 or 6 inches ; the white flowers are quite large and freely produced.

Two of the Saxifragas that are more for the collector than for 'show' are *S. eschscholtzii* and *S. bracteata*. I have collected *S. eschscholtzii* in the mountains about 40 miles from Anchorage, on a rock ledge close to Eklutna Glacier not far from Anchorage, and at Pt. Hope, where it grows at sea level and makes compact mats so large that it is difficult to walk without stepping on them. The little leaves are crowded ; the whole plant not over an inch high. The tiny flowers are very inconspicuous ; in fact, many botanists seem to think there are no petals at all, but there are—very tiny ones, and most that I have seen seem to be white, sometimes with a decided yellowish cast, or really quite yellow. This plant seems to favour plenty of grit in the soil and, of course, good drainage. *S. bracteata*, about 2 to 3 inches tall, is quite a 'stout' little plant, with very small greenish flowers and little roundish, lobed leaves.

A real jewel, *Androsace ochotensis*, a compact little mound smothered in bright pink flowers, grows at Pt. Hope where we collected it this summer. Hope to have seeds of it next year if all goes well.

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SLUGIT LIQUID—Dilute with water and apply to both soil and plants. The treated area becomes lethal to the pests. 3/-, 4/6, 10/6, 19/3.

LINDEX GARDEN SPRAY—Lindex kills Aphids (Green and Black Fly) and most other insect pests. It can safely be used on most garden and greenhouse plants. 3/6, 6/6, 13/-, 24/-, 80/-.

MURPHY LIQUID ANT KILLER—Use 1 fluid oz. in 1 gallon water and water on at the rate of 1 gallon per 6 square yards wherever Ants are seen. Used in this way it is harmless to plants. 3/9.

MURPHY SEQUESTRENE—Murphy Sequestrene may be used to enable lime-hating plants such as Lithospermum diffusum, Erica and Gentian to be grown on chalk and limestone soils. Write for leaflet.

THE MURPHY CHEMICAL CO LTD.
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