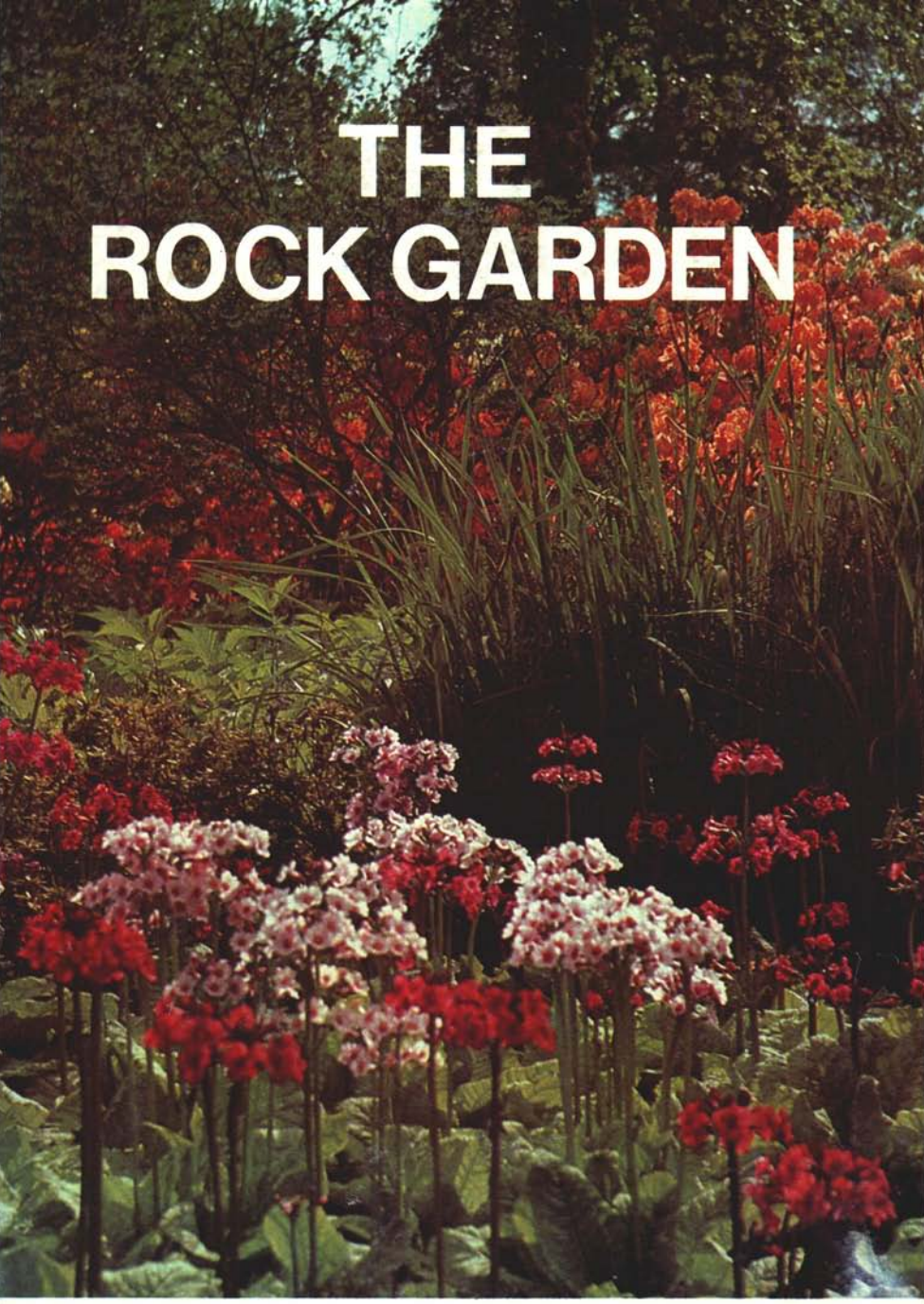
THE ROCK GARDEN



THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XIX Part 2 Number 75

Subscriptions

SUBSCRIPTIONS for 1984/85 became payable on 1 October 1984 and should be sent to the Honorary Subscription Secretary, SRGC, Miss K. M. Gibb, 21 Merchiston Park, Edinburgh EH10 4PW, Scotland.

The rates are as follows:

Ordinary Membership ..... £5 or $12 US
Family and Junior Membership ..... £1 sterling only

PAYMENT UK Members should follow one of the methods of payment which are listed on the Giro Form enclosed with each June issue of the Journal sent to a UK member.

OVERSEAS MEMBERS have a choice of taking the most convenient and economical of the following methods of payment:

EITHER paying £5 in British Currency, by cheque if drawn on a bank in the UK or by National Giro to the Club's Account No 182 2756 or by International Money Order (available in most countries).

OR by paying $12 US. Regretfully the Club cannot accept membership fees in dollars for varying amounts corresponding to what might be the rate of exchange at the time the member writes the cheque, and remittances for amounts other than $12 or $24 (see below) will have to be returned.

CHEQUES should be made out to SCOTTISH ROCK GARDEN CLUB and it would greatly assist if the envelope is marked SRGC in the top left-hand corner.

COVENANTS (UK members only). If you Covenant your Subscription the Club can recover the current rate of Income Tax. Forms are available from the Subscription Secretary. Completion of a form enables members to pay by Banker's Order which are otherwise not now acceptable.

If the Subscription should change Covenanters will be expected to pay the increase.

CREDITS In order to help members, they may pay the Subscription for two years at the same time, if they wish, on the understanding that they will be billed for the difference if the Subscription should change. Credits in excess of these amounts cannot be held for Members.

Secretary's Page

JANUARY 1985

1. **EXECUTIVE CHANGES:** As from 1st January 1985 the Hon. Secretary is Dr. E. Stevens, 'Scolty', Doune Road, Dunblane, Perthshire FK15 9AR. Mrs. Law has resigned as Subscription Secretary and as I have taken over from her, all matters relating to your Subscription should be sent to Miss K. M. Gibb, 21, Merchiston Park, Edinburgh EH10 4PW. We take this opportunity to thank Mrs. Law for the many laborious hours of work she must have done sorting out members' subscriptions in the initial period of our computerised subscription payments. It is not amusing to have to sit inside and do 'office' work when you would rather be in your garden and we hope that Mrs. Law will have more opportunity to enjoy her unique place.

   The Curator of the Davidson Slide Library is now Dr. Peter Semple 103, Southbrae Drive, Glasgow G13 1TU. Dr. Semple takes over the Slide Library from Mr. R. S. Masterton.

   The following four members were elected to Council for three years at the A.G.M. on 20th October 1984:– Mr. R.J.D. McBeath Edinburgh, Mrs. E.M. Bezzant, Glasgow, Mrs. E. Ivey, Ayrshire and Mr. V. Chambers, Killearn.

2. **CONGRATULATIONS:** All Club members will wish to join in congratulating Miss Joyce Halley on the occasion of her being awarded a Scottish Horticultural Medal by the Royal Caledonian Horticultural Society in the New Year. The Club President Mr. J. Harley Milne announced this honour to be bestowed on Joyce after he had presented her with our Jubilee Salver at the A.G.M. in recognition of her outstanding service to the Club as Manager of the Angus Seed Exchange.

3. **DISCUSSION WEEK-END 1985:** This will be held at St. Andrews on 28th & 29th September.

4. **SHOW DATES:**

Morecambe	–	23rd March
** Stirling	–	30th March
Newcastle	–	13th April
Perth	–	20th April & J.R.G.P.C.
Aberdeen	–	27th April
Glasgow	–	11th May
Edinburgh	–	25th May
St. Andrews	–	28th & 29th September & J.R.G.P.C.

**Lunch price £2.00 will be available at the Stirling Show. Names and £2.00 to be sent to the Show Secretary Mr. Alexander Leven, 2, Leighton Court, Dunblane, Perthshire. FK15 0ED by Wednesday 27th March.

Show Secretaries are reminded that they meet at the Stirling Show and Council will meet at the Glasgow Show.

5. **GIFTS**: The Club acknowledges with gratitude the following gifts: Books belonging to the late Mrs. Loraine Smith have been gifted to the Library by her husband. The Widow of the late Mr. Bruce Robertson has given a collection of his Slides to the Slide Library. £75 has been gifted to the Library by the Aberdeenshire Group and the Club has received £100 from the Newcastle Show and £40 from the Morecambe Show.

6. **THE ROYAL HIGHLAND SHOW:** Mrs. Jean Wyllie and her helpers set up a magnificent display and were rewarded with a Gold Medal and a 1st Class Certificate for the best display of Alpines. Prize money donated to the Club after the deduction of expenses was £400.

7. **FORREST MEDAL BARS:** Members who are eligible for these should contact the Convener of the Show Secretaries, Mr. Alexander Leven.

8. **NOMINATION DAY:** 15th May 1985. Nominations for a President and for four members of Council should be lodged with the new Hon. Secretary, Dr. Evelyn Stevens by that date.

9. **R.H.S. TICKETS FOR CHELSEA:** Our allocation is solely for paid up members of the S.R.G.C. Members are asked not to request them for relatives or friends who are not S.R.G.C. members.

10. **WISLEY TICKETS:** These will be available for borrowing and are returnable to the Secretary on the completion of your visit. Please apply to the Hon. Secretary. Each ticket admits two persons.

11. **THE ANNUAL GENERAL MEETING 1985:** This will be held on Saturday October 19th at Clarkston Community Centre, Glasgow. The A.G.M. will be followed as usual by the Clark Memorial Lecture.

12. **A French Member** wishes to get in touch with others interested in exchanging plants, of which he has a long list. He would also like to have a Scottish correspondent. Please apply direct to:— M. Christian Lavaysse, Loupiae, 46350, Payrac, France.

13. **COVENANTS:** You are reminded of the benefit of these to the Club. Each covenanted £5 Subscription gives an extra £2.14 to the Club. The advantage to members is that they may reinstate their Bankers Order. In view of steadily rising administrative costs we recommend this form of payment to you. Covenant forms are available from the new Subscription Secretary. At present the Club has only 300 Covenanting members out of a total of 2680 U.K. members.

14. **THE TWICE-YEARLY COMPETITION:** Winners of the Autumn Competition who were presented with their prizes at the A.G.M. by the President:—

    Mrs. Anne Chambers in the Painting and Drawing Section;
    Mrs. Lyn Almond — Black and White Section;
    and for Coloured Photographs — Henry and Margaret Taylor.

    Mrs. Isobel Simpson says the Editor has promised us a new lease of life! In future look out for some of our prize-winning entries being used as illustrations in, or on the cover of the Journal.

Would you, or a member known to you, like to write a "Plant Portrait"? A tailor-made competition could be arranged for you. There are categories for paintings, drawings (almost any medium), coloured or black-and-white photographs. You are asked to support these competitions.

The spring competition will be mounted and judged at the Stirling Show on 30th March 1985. **Closing date is 25th March 1985.**

Please send your entries to Isobel Simpson, 2, Dalrymple Crescent, Edinburgh EH9 2NU (and write to her if you want more information.) You need only send details of your entries if you can deliver personally before 10 a.m. on the day of the Show.

SPRING 1985 – Any DWARF BULBS – in the wild, in the garden or in a pot.
AUTUMN 1985 – DWARF RHODODENDRON – in the wild, in the garden or in a pot.
SPRING 1986 – Any plant in the GENUS RANUNCULUS – in the wild, in the garden or in a pot.

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15. **SECRETARY'S PAGE JUNE 1985:** Material for this should reach Dr. Evelyn Stevens not later than 30th April 1985.

16. **KINDLY REMEMBER TO SEND A S.A.E. FOR REPLY WHEN CORRESPONDING WITH THE SECRETARY OR THE SUBSCRIPTION SECRETARY.**

Dr. Evelyn Stevens,
Hon. Secretary,
'Scolty',
Doune Road,
Dunblane,
Perthshire FK15 9AR

Miss Kirsteen M. Gibb,
Hon. Subscription Secretary,
21, Merchiston Park,
Edinburgh EH10 4PW

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The Rock Garden

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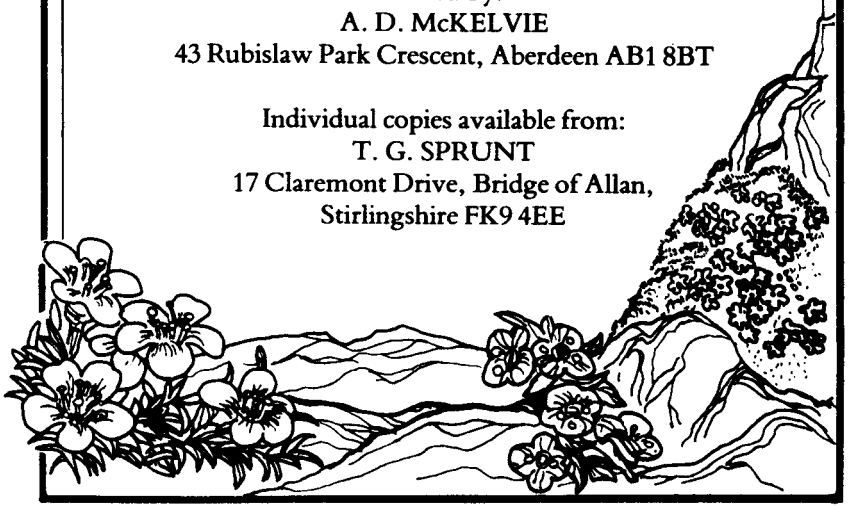


Front cover:
Primulas at Inverewe

Contents

Editorial

THIS ISSUE of 'The Rock Garden' is one of contrasts. Contrasts, that is, between the high-powered expert growers and botanists who shape the fashions in rock gardening and those more home-spun members of the Club who follow along and take the lead from the more exalted members.

The recent issue of the Alpine Garden Society Journal devoted to the Sikkim Expedition was a superb production which was a fitting climax to a well-organised purposeful expedition. Barry Starling who was on the expedition has kindly written a short article in this issue so that SRGC members who are not members of the AGS can get a flavour of the venture.

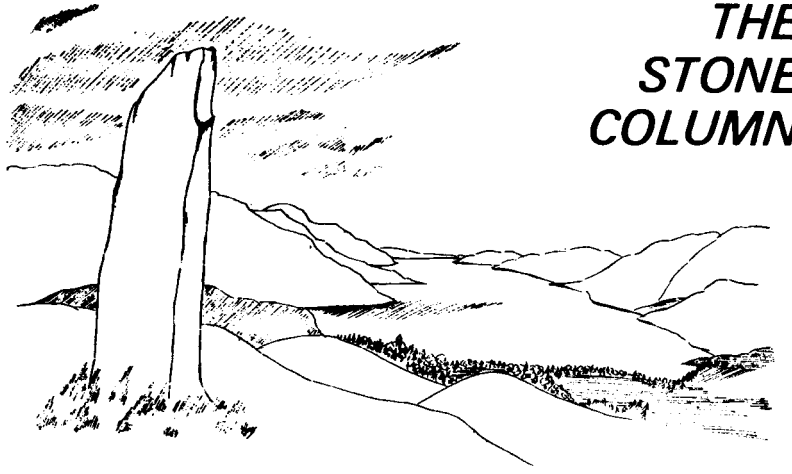
On a slightly less highly organised scale was the seed-collecting trip to Nepal which Ron McBeath describes in this issue. Equally as profitable as the AGS trip it seemed to manage with less organisation – or perhaps Ron's article simply implies this.

At the lower end of the spectrum is the expedition described by Wilf Holmes; where he simply asked a friend who was going on a trek through Sikkim to collect handfuls of seed as he went along. The resulting collection of seed has given Aberdeenshire members a great deal of fun and has resulted in the germination of many of the same plants as brought back by the AGS Expedition.

One of the strengths of our Club must be the wide diversity of interests of members. We should not forget that the majority of members never show at Shows, never speak at monthly meetings, enjoy plant-collecting talks and grow a very limited range of alpines. Judging by their many letters to me they enjoy 'The Rock Garden' and I am overjoyed when they tell me how useful it is to a beginner.

Apart from expeditions what else do we have in this issue? Well, we have at least one article that is not for beginners and that is the one by Professor Crawford on arctic vegetation and its adaptations. In a learned account he shows how arctic plants have adapted to their hostile environment and thus he enables us to understand a bit better what makes our alpines tick and how to grow them that bit better. This, at the end of the day, is what it is all about.

ALASTAIR McKELVIE



THE STONE COLUMN

Diary of 1984, annus notus

As the years pass, memories tend to merge together and gardening experiences are no exception. We often find ourselves having to refer to our gardening diary, being unable to recall when a certain bed, or part of a bed, was constructed or replanted. Some years always stand out, of course, say 1976 for the drought, or 1981 for the Nottingham Conference. 1984 has the advantage of the notoriety conferred by George Orwell's famous novel. There is no room for the beauty of alpine plants in Orwell's bleak, utilitarian, imagined world. However, we should not be too concerned; he was not really writing a "vision of the future", more a warning about certain contemporary trends in the late 1940s. Orwell simply reversed the last two digits of the year 1948.

We have already described in our last column how 1984 came in with a bang; several severe storms swept Scotland during January and February and we were still clearing up the aftermath at the beginning of April. As the famous military writer Clausewitz, once said, "One can always retake lost ground, but never make up for lost time." How right he was. There has been a knock-on effect all year. It is only now, in the middle of October, that we feel able to relax slightly and draw breath.

In a normal year, after deciduous leaf-fall and dying top-growth of herbaceous plants have been cleared to pit and compost-heap respectively, we use the late winter/early spring period for the construction of new beds. One inevitable consequence of seed propagation is that there is a continuous flow of young plants for which homes have to be found in the garden. Any hold-up at planting-out end of the chain has repercussions right down the line. Plants cannot be put into suspended animation; they grow inexorably. Potting-on is not the answer; the

larger pots require more frame-space. Also, they cannot be allowed to become too pot-bound, otherwise they may never make decent specimens.

Earlier this year, instead of adding new planting areas, we had to deal with the bed containing the remains of the fallen larch. The area around the up-ended stump was first cleared of plants. Fortunately most were dwarf Ericaceae with fibrous rootballs. Thus they moved easily, to be heeled into odd corners. Next the stump was dug out. This sounds easy on paper, but actually took over ten days, before it was rolled away through the new side gate. The hole was refilled, the retaining wall of this low raised bed rebuilt and the plants returned. By now we were well into April and routine tasks like rose-pruning were overdue. As growth accelerates with the spring, weeding and mowing must start. The latter was far more tedious this year because of having to 'break-in' the new half-acre of up-and-down field at the back of the garden. Poll started her potting at this time, with the Ericaceae seedlings that had spent their second growing season lined-out in deep plastic seed-trays. Now they must be moved on and potted individually for their third year.

Although concentrating on maintenance and potting, we were able to repair the trough that had been speared by the branch of the falling larch. Badly cracked in several places, and with roughly one third of the bottom punched out, this hypertufa trough could be saved thanks to its reinforcing. When made, it was cast around a substantial basket of 4mm fencing wire, bent so that it fitted in between the inner and outer moulds. First the top-dressing of small pieces of green 'Honister' slate was removed and saved for reuse. Next the plants were carefully dug out and heeled into two boxes of peat placed in the shade. One good thing came of this; we were able to divide a plant of a very good dark red-purple form of *Primula* x *muretiana* (*P. integrifolia* x *P. latifolia*) and return part to its finders. The outcrop on the trough, of larger pieces of the slate imported from a quarry in the English Lake District, was carefully removed and laid in order on the gravel alongside. This didn't work! We couldn't get it to go back the same way when the time came. The trough was emptied of compost, turned upside-down and the loose pieces of bottom broken away. The distorted reinforcing was hammered back to shape and fresh bracing wires added. The trough was turned right-way-up again, on to a plastic sheet on the ground. A patch of ordinary three-to-one mortar was cast in situ to reconstruct the bottom. For extra strength we missed out the measure of peat we usually add to trough mix. This patch doesn't show. Finally, a week or so later the trough was replaced on its stone supporting plinths and

refilled with fresh compost. At the same time seven other troughs were filled. These had been cast during the school summer holiday of 1983. Normally we allow new troughs to overwinter empty and fill to plant in April.

By now, we have reached the middle of May and our lecture trip to Asheville, North Carolina, was looming large. With preparations etc another month went by before we could think about troughs again. On our return it was becoming obvious that 1984 had another trick up its sleeve – a hot, dry, continental summer. According to some scientists this unusual weather could have been caused by the eruption of a Mexican volcano, blasting dust high into the stratosphere. We hope this was so; meaning 1984 is a 'one-off'. As Jim Cobb said to us at the St Andrews Weekend, "If these continental-type summers become the norm, then we shall have to change our cultivation techniques." We delayed trough-planting, waiting for the weather to break, but it didn't! We have found that up here in Fort Augustus autumn-planting should be avoided. Our growing season is short and such plantings do not get established before their first winter outside. Losses can be relatively heavy, especially amongst plants brought up from the south. Choosing the lesser of two evils, we planted-up the new troughs in July, shading them well afterwards with dozens of slatted wooden tomato boxes. Even though we had shaken all root-balls loose, failures were very few – seven deaths so far out of 185 plants.

As the almost rainless summer wore on, much time was taken up by watering. It was like painting the Forth Railway Bridge; the sprinkler went round and round the garden. Fortunately we had no watering restriction for most of the summer. When eventually a hose-pipe ban was imposed on 1 September, it rained that night and all the following day – over 75mm in all; you can't be unlucky all the time.

During August we managed to complete one badly-needed new area, a bed of leafy soil for Ericaceae. It was planted-up, starting with the largest potted specimens to relieve the congestion in Poll's frames. It has been her habit to stop pricking-out seedlings at the end of July, the theory being that plants should fill their pots with roots before winter. This year she was still potting-up well into August. It will be interesting to see what happens to these seedlings. There is no contradiction in planting-out Ericaceae in early autumn (August is early autumn here); their root-balls are only scratched on the outside, unlike scree and trough plants. This planting work displaced trough-making later into the autumn. Since the rainstorm mentioned above, it has rained nearly every day. In spite of the sudden change to Atlantic weather, autumn

colour has been superb. Even *Acer palmatum* 'Osakazuki' did its thing at last. Usually it is frosted before the leaves fully colour up.

On the odd dry October day, we made six more troughs. Will these be planted on time next spring?

Covered screes: an Ulster postscript

There is always a strong Northern Ireland representation at the Autumn Discussion Weekends. Although technically an AGS Group, it is rather easier for them to reach our meetings in the Central Belt, than to attend the equivalent AGS Study Weekends, held in the south of England. As was pointed out at a previous SRGC Discussion Weekend in Edinburgh, the ferry notwithstanding, it's actually a less arduous car journey from Belfast to Edinburgh than for our Thurso members.

The 1984 meeting in St Andrews was no exception, and so it was that we found ourselves sitting next to Harold MacBride one lunch time. During the conversation he informed us that our fears (see No 74, page 16) about the cover over his raised bed had been realised. This had blown off during a winter gale, but fortunately no real damage had been done. He further told us that he had now fastened it down to prevent a recurrence. The legs of the long low table-like cover stand on a concrete path alongside the raised bed. Harold drilled the path and inserted Rawlplugs. Angle brackets were then screwed to the legs and to these plugs. During the summer, when the cover is removed, the tiny holes in the path scarcely show and, being flush, will not trip anyone up.

Label stalks

We should like to add a few words to our Editor's excellent survey of labelling techniques. We use the Hartley aluminium type for two reasons:

(a) they do not suffer from degradation by ultra-violet and the consequent embrittlement.

(b) they can be bent over at right angles, so that the writing is horizontal.

At one time, all our garden labels were as in Diagram I (page 115) using the 4in size in troughs and the 5in size in beds. We found the latter were often covered by plant growth, blown leaves or other debris and really needed to be raised-up on stalks. We obtained some 2mm galvanised wire, thin enough to be cut and bent easily with a pair of pliers, but thick enough to make a rigid stalk.

Our first attempt (Diagram II) was unsatisfactory for two reasons. It swivelled in the soil turning the label out of view. We cured this by putting in a Z-bend below soil-level. Also the labels, simply twisted

around the ring, tended to hang down. It becomes tedious always turning one's head sideways. This second problem required a few attempts at solution before we came up with the following design (Diagram III).

Cut a length of about 30-35cm using the notch in the pliers. Bend over about 1.5cm for the end, then again 5cm further on as shown. Put the Z-bend in the middle.

In use, we write the label first, then thread it on to the stalk so that the hole is half-way along the horizontal part (Diagram IV). Part of the pointed tail is then wrapped tightly around the vertical part at X (Diagram V).

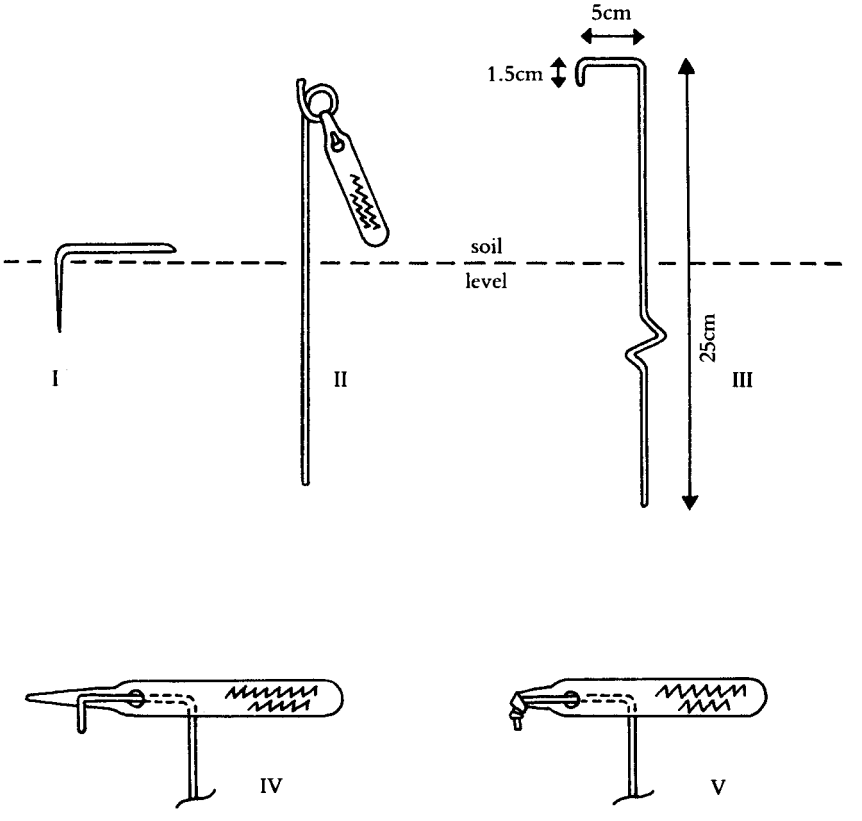
The hole prevents vertical movement of the label; the wrapped tail prevents horizontal movement. One can even rotate the label, about a horizontal axis, by bending the end X up out of the plane of the paper. By having the label at an angle it is easier to read when looking down from a standing position.

Arcterica nana in Australia

Writers and lecturers learn early on that it is advisable not to make too many dogmatic statements, especially negative ones. Unqualified pronouncements like, "not in cultivation," or ". . . is very difficult to grow/flower," are almost guaranteed to induce some member to answer that in their garden, ". . . flourishes like the green bay tree." So it is with *Arcterica nana* in an Australian contributor's garden.

"Apropos of Brian Halliwell's article entitled 'Some peat garden plants from Japan', in the January, 1984, Journal, I was most surprised to read that Mr Halliwell includes *Arcterica nana* among plants rarely seen in cultivation and difficult to flower. Where I live at Kallista, in the Dandenong Ranges, about thirty miles from Melbourne, Australia, we find that it is one of the easiest of the choicer dwarf Ericaceae, reliable in its flowering every year, and posing no problems at all, provided one considers its few simple requirements. It loves a moist peaty soil which is never allowed to dry out, in a semi-shaded or shaded spot, with just morning sun. My first plant was imported some years ago, and until last year was pot-grown, flowering generously every year, although not spreading. Last year it was transferred to a raised peat bed facing east and since than it has romped, spreading with its underground runners, and the runners are flowering just a year later. I might add that during our drought early last year it withstood temperatures up to 40°C without burning a leaf. I think this is one of the most delightful and rewarding miniature shrubs that one can grow, and should be widely-grown."

Diagrams of labels



While we endorse the writer's views on soil conditions and general ease of cultivation of *Arcterica nana*, we do have some reservations on one point, namely "just morning sun". We imagine the reason for this position in Australia is so that the plant receives a measure of direct sunlight before the day really warms up. High day temperatures are not normally a problem in Scotland; but late-spring frosts may well be. Its flowers are much more frost resistant than most rhododendrons, but we still feel it advisable not to expose frozen flowers to the rapid thawing in direct sun. In Scotland a west-facing position may be preferable. The greater difficulty of some dwarf Ericaceae in the south of England is caused, not by slightly higher temperatures than here in the north, but by lower atmospheric humidity. Too much shade to counteract the dryness can be detrimental to flowering; this is particularly true of some cassiopes.

Annual General Meeting

The
ANNUAL GENERAL MEETING
will be held in the
HALL of CLARKSTON COMMUNITY CENTRE
GLASGOW
on
SATURDAY, 19 OCTOBER 1985
at
2.00 PM

Members are notified that nominations are required for President, Executive Office-Bearers and for four members of Council to serve for three years.

Nominations in writing and seconded by another Club member or members should be lodged with the Honorary Secretary, **Dr Evelyn Stevens** not later than **15 May 1985,** the nominator/s having ascertained that the nominee is willing to serve if elected.

Mr J. Harley Milne having served as President for three years, is not eligible for re-election but, as immediate Past-President, will serve automatically on the Council as a Vice-President.

All Executive Office-Bearers retire annually but are eligible for re-election.

The following, having served for three years as Ordinary Members, are not eligible for re-election to Council for one year: Mr A. Evans, Mr W. D. Holmes, Mr T. G. Sprunt, Mrs J. Thomlinson.

Honorary Secretary:
Dr Evelyn Stevens, Scolty, Doune Road, Dunblane, Perthshire FK15 9HR.

Seed from Sikkim; a mountain holiday bonus

WILFRED HOLMES

A YEAR AGO I was invited to join a small holiday party to walk and climb in The High Country south-east of Kanchenjunga. I declined but suggested to a member of the group that he would be walking through good plant country and a few seeds would be most welcome. He returned in early November and handed over a squashed and battered shoe box partially filled with match boxes, old food packets, envelopes and lots of loose plant debris. Much of this debris was fluffy and highly aromatic. Some partially opened capsules were recognisable as to genus but much of the haul was rather like the contents of a pot pourri.

Hours of sorting followed, teasing through fluff, capsules and dried-up flower heads. There were notes and some were obviously applicable to the contents of matchboxes or packets but other notes were difficult to attach to specific collections. However, in the end thirty-two seed lots were identified plus an additional five lots of miscellaneous debris. Over 300 packets of seed were prepared and 130 of these were distributed to Club members. We knew that the collection included roses, lilies and blue poppies, several species of Primula and Saussurea plus intriguing unknowns.

The thirty-seven seed lots were sown on 20 November 1983, sowing on the levelled surface of a John Innes potting compost and covered by coarse or fine grit depending upon seed size. The pots were plunged in sand, in the angle of east and north-facing walls, cold, damp and sunless.

About this time it was realised that our party had covered virtually the same route as the AGS Sikkim Expedition. We now had competition, the tyro (not quite) versus the professional plantsman, but, more important, we had a valuable source of additional information from their collection notes and subsequently the illustrated articles in the AGS Quarterly Bulletin, Volume 52, Number 3.

Over Christmas and New Year the weather was open and the temperature approached 5°C. On 1 January seven seed lots had germinated, four were suspected Saussurea species, one a dwarf composite described as no more than 5cm tall, one was miscellaneous debris and the seventh was described as a shrub – tough plants to

germinate in the coldest corner of the garden in late-December inland from Aberdeen. With New Year over the snow came, about 60cm in all, augmented in early February by snow and ice sliding off the house roof. By 18 February most of the pots had emerged from the melting snow and ice, some were shattered but most survived intact. Unfortunately the New Year seedlings had suffered, the composite and a Saussurea had gone and cotyledons of three lots were rotting but an additional seven seed lots had germinated while under snow. Because of the damping-off, all pots with seedlings were placed in the alpine house which gave partial shelter as heavy snow had shattered several panes. Next came rain which resulted in the loss of a further lot of seedlings, drips washing them out of their pot.

In early March twenty-two duplicate lots were sown using packets remaining after the Club distribution, one of which was the rot-prone composite. By 25 March germination was underway with numerous seedlings of our friend the 5cm high composite. By this time two Saussurea species had produced true leaves, one had thick fleshy glossy leaves with marginal spines and the second soft hairy leaves with crenate margins. Germination continued apace and a great deal of pricking-out followed. Unfortunately although I used a potting compost with a great deal of added grit I added a booster in the form of powdered sheep manure which subsequently broke down into a green-brown sludge. This probably contributed to the very heavy pricking-out deaths, augmented by the hot dry summer with a really hot period coinciding with our two weeks' holiday. Deaths were numerous.

At the end of August, nine out of thirty-seven sowings, had failed to germinate and of these three were willows and one a rowan. Because of sorting problems seed lots were duplicated but in August there appeared to be twenty-four species, either surviving pricking-out or showing good germination.

The little composite is almost certainly *Tanacetum gossypinum*, sensitive to wet at all times but a vigorous grower and even with maximum light far removed from the 5cm compact cushion described by the collector. One seed lot from Dzongri at about 4,000m from a plant 20-30cm high, described on sowing as chaff, produced a mass of minute seedlings developing into lots of healthy plants. Flower buds appeared in early-September on one plant only and opened shortly after the St Andrews Weekend. A lop-sided head of deep mauve-purple flowers with a heavy scent fitted the description and illustration of *Primula crispa*. One other collection flowered, minute green flowers over very dull fleshy leaves, its only redeeming feature being a scarlet winter-resting bud.

Winter survival is now the problem. Most pots have been plunged in cold frames or in a very well-ventilated glass house. I await next season's growth with eager anticipation. There is one lot from the Goecha La at 5,000m which produced vigorous cotyledons expanding as summer progressed but, as with some Lewisia species, no true leaves were produced. I have resisted the temptation to probe for bulbs or fleshy roots.

This continues to be a fascinating collection and I recommend that if any of you have friends going to the Andes, Rockies or Himalayas give them something constructive to do other than admire the view and take photographs. Jim Archibald in 'Alpines '81' stated that the world belongs to the amateur plant hunter. I think that the results from this hike in high Sikkim substantiates his thesis. However, to muster the energy and to search for seeds at 5,000m requires a rather special enthusiasm and dedication whether amateur or professional.

AGS Salver

To mark the occasion of the Golden Jubilee of the Club our sister society, the Alpine Garden Society, presented a silver trophy.

This trophy came, in the words of their President, Mrs Kath Dryden, "with no strings attached for our Council to agree the wording and decide for what the trophy will be awarded".

It was decided that the salver, 'The Plantsman of the Year Award', would be awarded annually to the member who has gained the highest aggregate of first prize points in Section 1 at the Club's shows held during the current season.

The trophy has now been engraved and a picture of this beautiful salver appears opposite (Fig 98). Our grateful thanks go to the Committee and members of the AGS for this most generous gift which further strengthens the bond of friendship between our Club and their Society.

In 1983 the salver was presented by Mrs Kath Dryden to Margaret and Henry Taylor of Invergowrie and in 1984 the winner was Sandy Leven of Dunblane.

Fig 98 Alpine Garden Society Salver (see page 120)

Fig 99 *Erythronium* 'Pagoda' (see page 121)

Photo: A. Stevens

Fig 100 *Tulipa batalinii* (see page 122) Photo: A. Stevens

Fig 101 *Ranunculus parnassifolius* 'Nura Form' (see page 121) Photo: A. Stevens

Fig 102 *Cypripedium montanum* (see page 123) Photo: E. Dusek

Fig 103 *Paris quadrifolia* (see page 123) Photo: E. Dusek

A prize-winning trio

EVELYN STEVENS

I HAVE TO ADMIT that the only genuine connection I can see between these three plants, apart from the important attribute of exceeding attractiveness, is that they were photographed during 1983 by my son Andrew and submitted by him for the Jubilee Black and White Photographic Competition sponsored by the Aberdeenshire Group. (As mentioned on page 179 these prints formed the winning entry – Ed).

Ranunculus parnassifolius 'Nuria form'

Ranunculus parnassifolius, (Fig 101) a buttercup on screes and moraines from high altitudes of the Pyrennees and Alps, is more usually a white-flowered species; less commonly it is pink petalled, and a particularly fine, large-petalled form of the latter, which grows at 2,400m in the Nuria district of the Spanish Pyrenees, has been introduced by Margaret and Henry Taylor. They have written about it in Vol XVII of the Journal, pp 346-347, and they were awarded the Forrest Medal for this magnificent specimen at the Glasgow Show 1983.

They find that it thrives well in a trough or rich scree, but that it is particularly well suited to alpine house culture in a plastic pot. It increases well with them vegetatively and can be propagated from seed but the seedlings may not necessarily be of such a good form. It is occasionally available commercially but hopefully will become more readily so in the future.

Erythronium 'Pagoda'

The Erythroniums, in the family Liliaceae, form a genus of about twenty species of lovely woodland plants, all, with the exception of *E. dens-canis*, the dog-tooth violet from the mountains of south Europe and Asia, and *E. japonicum* from Japan, being natives of North America, mostly of the western states. The dainty flowers, borne either singly or severally at the apex of a leafless flower stem, resemble little lilies with reflexed tepals and protruding stamens and pistils.

Erythronium 'Pagoda' (Fig 99) is a very garden-worthy hybrid, one parent of which is known to be *E. tuolumnense*, a deep yellow-flowered

species from California with plain green leaves; the identity of the other parent appears uncertain (? *E. oregonum* 'White Beauty', ? *E. revolutum* 'White Beauty'). The glossy leaves, arising as a pair from ground level are, in *Erythronium* 'Pagoda', slightly mottled and they form an attractive foil to the one to three yellow flowers which are borne above the foliage at a height of about 45cm during March and April.

In our garden (central Scotland, 75m above sea-level, annual rainfall 110cm) it has multiplied and flowered pleasingly in a somewhat shaded position in a herbaceous border beneath a young specimen of *Betula nigra*. The soil is a well-drained sandy loam to which no additions of leaf-mould or peat have been made, although these additions are frequently recommended. Corms are available from specialist bulb nurseries and should be planted immediately on receipt as they are susceptible to drying.

Tulipa batalinii

We go to yet another continent, Asia, for the home of our third plant, *Tulipa batalinii* (Fig 100). Central Asia is the centre of evolution of the genus *Tulipa*, and a large percentage of the species comes from this part of the world. From central Asia they have radiated out as far east as Japan and China (*T. edulis*) and as far west as the Mediterranean; for example, *T. cretica* comes from Crete and *T. sylvestris* from the western Mediterranean. The latter has become naturalised in more northerly parts of Europe including England and Scotland.

Tulipa batalinii is a native of the province of Uzbekistan in the USSR. It is a very attractive species with soft creamy-yellow flowers. In their native habitat tulips experience a long cold winter, a short warm spring with plenty of snow meltwater which is when they flower and set seed, and then a long, very hot dry summer. Thus, in cultivation the species tulips should be grown in a sunny position in the rock garden with good drainage, or in raised beds, and most species should be lifted in the summer for a dry rest. But, according to Paul Christian, *T. batalinii* is a species that thrives in the garden without annual lifting, and this has indeed been our experience over several years. Alpine house culture also suits it well, as seen in the photograph.

Tulipa batalinii is closely-related to the scarlet-flowered *T. linifolia* and is regarded as a colour form of the latter. Another closely-related species is *T. maximoviczii*, also scarlet but lacking the black blotches at the bases of the petals which occur in *T. linifolia*. They may all be grown from seed (available from the Seed Exchange) or obtained as bulbs from specialist bulb nurseries.

Some good garden plants from the USA

EDITH DUSEK

Along with photographs which Mrs Dusek submitted for the Jubilee Photographic Competition were some cultural notes about the species mentioned

Cypripedium montanum

Like many orchids, this species (Fig 102) is having a difficult time in the face of man's assassination of its habitat. While it settles comfortably in some gardens where it may even delight the owner by self-sowing moderately, in many gardens it staunchly refuses to linger. Even in chosen spots, be it in the garden or the wild, individual plants may flourish for many years only to suddenly vanish for no apparent reason. Plants may produce but a single crown or form a clump. Flowers are of generous size and quite showy. The slipper is white, the rest of the flower is somewhat brownish-red.

Paris quadrifolia

The genus Paris is closely related to trilliums and, as in that genus, there is considerable confusion about how many species there are. *Paris quadrifolia* (Fig 103) is a modest native of Europe. Like its American cousins, Scoliopus and Medeola, it must be seen close at hand to be appreciated. Exaggeration of colour and detail in the stamens make up for the slenderness of the petals. In the latter respect, it surpasses *Paris apetalon* which can boast no petals at all but it is greatly exceeded by some of its Asiatic cousins which are seldom seen on this side of the world. Members of the genus Paris are pleasant additions for lightly-shaded positions that are close enough at hand to offer close inspection.

Trillium erectum

Among those species of Trillium which pose the flower on a stem, *Trillium erectum* (Fig 107) may be considered to be by far the most variable. Plants may be found with flowers of any of the basic trillium colours (red, white, yellow, green) or in any imaginable combination of these colours. Some of them are extraordinarily beautiful. Rare double-flowered forms are also known.

Forms such as the so-called "green mutant" *grandiflorum* also occur. Indications are that more than one factor is responsible for plants lumped under this name. At least some of them owe their form to genetic misprints and as such they pose no threat to any other plant. Such genetic errors are known to occur in most trillium species even as they occur in all other forms of life. The eagerly-sought double forms of trillium represent one kind of genetic error. The plant in the photo represents another. It produces copious amounts of pollen but is sterile because of conversion of female parts into what appear to be petals.

Trillium recurvatum

Trillium recurvatum (Fig 108) is but one of about twenty species of trillium which lack a stem between the flower and the rest of the plant. Despite the unmistakably hang-dog look of its sharply-reflexed sepals, it is sometimes sent out as *T. sessile*. It may be of interest to note that the true *T. sessile*, which is often offered for sale, is so rarely sent that any plant received under this name should be looked upon with suspicion. Flowers may be any of the usual trillium colours except white. They sit nestled in a small hollow created by the upward canted petioles of the leaves. Although some authors state that they may soar to 45cm, in my garden they are closer to half that. It has been my experience that trilliums which do not have to battle for living space will remain appreciably shorter than those that do. Perhaps this explains why, instead of awkward giants, mine have retained a slender grace that makes them suitable rock garden subjects.

Cornus unalaschensis

Cornus unalaschensis (Fig 109) is a tetraploid species which originated during the last glacial period from a cross between *C. canadensis* and *C. suecica*. Both of the parent species are diploids. As the glacier retreated, *C. suecica* moved north while *C. canadensis* moved rather more north-easterly leaving this area with only *C. unalaschensis*. In a small area of overlap between the parental species some diploid hybrids still occur but they appear to be sterile or nearly so.

In all three species the showy bracts are white. Even the experts agree that it is not always easy to distinguish among the species but, for what it is worth, the distinctions are as follows.

Cornus suecica has three to six pairs of leaves, usually placed at intervals along the length of the stem though the upper ones may be fairly close together. Lower ones are quite large. The true petals are more or less purple.

Cornus canadensis has the stem leaves drastically reduced; the rest are gathered in a whorl at the top of the stem. True petals are white or greenish-white.

Cornus unalaschensis has the dark flowers and generous-sized stem leaves of *C. suecica* combined with the whorl of leaves at the top of the stem typical of *C. canadensis*.

The above information was gleaned from "Wildflower Genetics" by Anthony J. F. Griffiths and Fred R. Ganders of the UBC published in 1983. It is a very interesting book, well worth its price. This separation of the species may help to explain why the former *Cornus canadensis* is sometimes difficult, sometimes easy to manage in the garden. (These species of Cornus are usually placed nowadays in the genus Chamaepericlimenum – Ed.)

Anemonella thalictroides

Seed lists never seem to mention that the pretty little Anemonella (Fig 110) may be found in both white and pink-flowered forms. Doubtless there would be a rush for the less-common ones with variously pink flowers if these were to be segregated from the rest. Perhaps the botanists have a name for these blushing charmers but, if so, I have not yet come across it.

On the surface it would seem that our erudite friends have been more helpful in telling us that a 'multiplex' or sometimes 'fl pl' version exists. The problem is that both of these terms are botanical booby traps for the unwary gardener for friends both here and abroad write joyously that they have the double form of *Anemonella thalictroides*. When asked to describe the flower, their answers seldom match. The trouble is that the species has experimented more than once with doubling its petals and each effort resulted in something distinctly different from the others.

The first double-flowered form I met seems to be the only one anyone bothered to name, 'Schoaff's Double'. Even it got off to a shaky start for the finder could stir up no interest in it and the plant was nearly lost. It is a lovely thing with a fully double formal flower in soft lavender-pink. There is some suspicion that it may (very rarely) produce seed and that the progeny come true. Mine has been steadfastly sterile.

A rather similar fully double form with white (sometimes pale-blush) flowers also exists. It seems not quite as robust as Schoaff's but is no less a treasure for that. Apparently it also had a name at one time but the name has been lost along the way.

Some years ago I obtained what was said to be "the double white form" of *Anemonella thalictroides*. The name proved to be a misnomer for, while the flowers do have more petals than the "recipe", calls for,

they are never completely double. The number of petals is variable but the surplus petals do not result in complete sterility. Seed is reported to come true. It seems not to have a name which would distinguish it from others.

Apparently plants with green in the petals also appear from time to time and several doubles have been reported. Thus far I have seen none of them nor even a photograph to add to my photo record. As with green and white flowers in general, people seem to vary in their response to them. No information is available on their ability to produce seed or types of offspring which might be expected from them.

Undoubtedly other forms also exist which have yet to come to my attention. The lack of names is of no help in keeping these plants in existence. I would be most interested to hear from anyone who might be able to add bits of information to the Anemonella story for making gardeners aware that they exist is an important step in ensuring that they continue to do so.

Seed Exchange

The Seed Exchange is getting on with the recording of the donations at the time of writing. We would manage better if everybody remembered to put their names in the packets. We have three from Scotland, one from England and one from the USA – all nameless.

If you have not received an acknowledgement card for your seed please write to me giving me an idea of the contents. Failing this you will not have the advantages due to a donor.

New Zealand members please note that we – the sub-Post Office girls and I – make abject apologies for nagging about New Zealand stamps on British Postal Orders; they are legal tender and we have been straightened-out by a New Zealand member who sent the official notice. We are very sorry!

Seed lists will be available until 1 February. Members who wish a copy must send SAE to Miss J. Halley, 16 Abercrombie Street, Barnhill, Dundee DD5 2NX. Group Conveners who wish surplus seed should make application by 28 February. Surplus and unpacketed seed must be applied for by the same date.

Some Scottish natives

JOAN STEAD

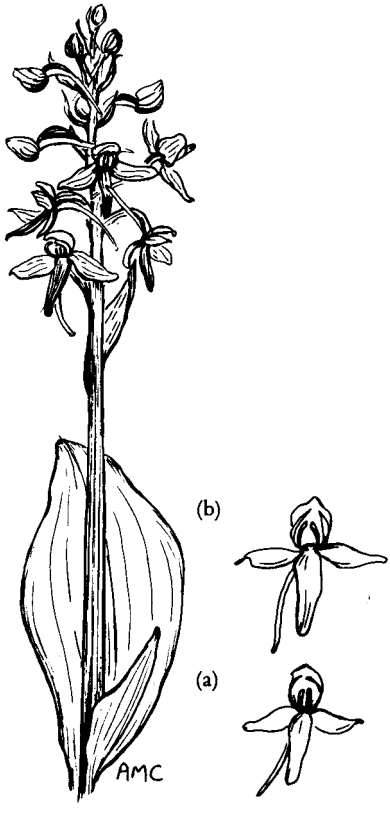
Drawings by Anne Chambers

Scilla verna
Spring squill, swine's beads (Orkney), swine's murricks (Shetland).

Scilla verna (Liliaceae) grows in turf, often by the sea. This little bulbous plant produces narrow, dark-green leaves in spring, which merge with their grassy surroundings, so it is with great pleasure that one comes across the delicate, purplish-blue flowers, with their contrasting violet anthers, starring the short turf. Where they do occur, they tend to be common, but the sites must be sought at the right time, in late April and May.

Platanthera bifolia – Lesser butterfly orchid.

Platanthera chlorantha – Greater butterfly orchid.



The common names of these orchids are deceptive. 'Lesser' can be bigger than 'greater' on occasion, either in spike size, or in floret size. The constant distinction between the two species lies in the two pollinia, which are prominently placed on either side of the wide opening of the spur; those of *P. bifolia* (a) are parallel, while those of *P. chlorantha* (b) are at an angle, converging towards the top.

Either species can be found in rough grazing, thin pasture, or along roadside verges, but not where the surrounding vegetation would block out light. *P. chlorantha* is also found in woodland. Stouter specimens tend to be in pasture than in peaty grazing.

The ribbed elongated-oval leaves reach towards the light on either side of the 15–25cm flower stem. The flowers are yellowish white, with the long, narrow labellum strongly tipped with green. The long spur means that the long probosces of moths are needed to effect pollination. The scent of the flowers, stronger at dusk, attracts the moths. The pollinia adhere to the sides of the insect's head, to be presented to the stigma of the next flower to be visited.

Flowers are spaced out from the stem by the ovaries, giving the spike a broad appearance, and are much less crowded than those of many British orchids.

The two lateral sepals, when fully open, are more like hawk-moth wings than butterflies.

The plants flower in early July.

Moneses uniflora – St Olave's candlestick, one-flowered wintergreen.

This exquisite plant of the family Pyrolaceae is such a rarity in this country that few people will have seen it in the wild. Those who have will remember it with great pleasure. It is more common in Scandinavia and north-west America.

In the British Isles, it is confined to Scotland, where it occurs in open mossy pinewoods, but so rarely that it must be strictly preserved. It is almost impossible to cultivate, or to raise from seed, being dependent on mycorrhizal fungi for germination and growth.

Moneses is single-flowered, differing in this respect from other pyrolas, with which it used to be classed, and carries its white flower modestly turned down – hence, no doubt, the Canadian common name of 'shy maiden'.

The style protrudes from the large green ovary, surrounded by ten prominent curved stamens.

Other descriptive common names are 'wax flower' and 'single delight'.

Moneses flowers in late June/July.

Cerastium alpinum – Alpine mouse-ear.

This charming white-flowered plant of the family Caryophyllaceae, with grey veining inside the petals, is one of the Ben Lawers specialities. It has a wider, but localised, distribution elsewhere in the Highlands.

It needs some searching to find a plant showing the beautiful hairy leaves (the mouse-ears) as Anne has shown it: often the flower stem is thrusting through a mat of *Alchemilla alpina*. It is a perennial plant, without the enveloping proclivities of its relative, Snow-in-summer, but it is a very ready self-seeder; this can lead to difficulties in the garden, especially if there are seed pots nearby, with more recalcitrant seeds sown in them.

Cerastium alpinum flowers throughout the summer.

Drosera anglica – Great sundew.

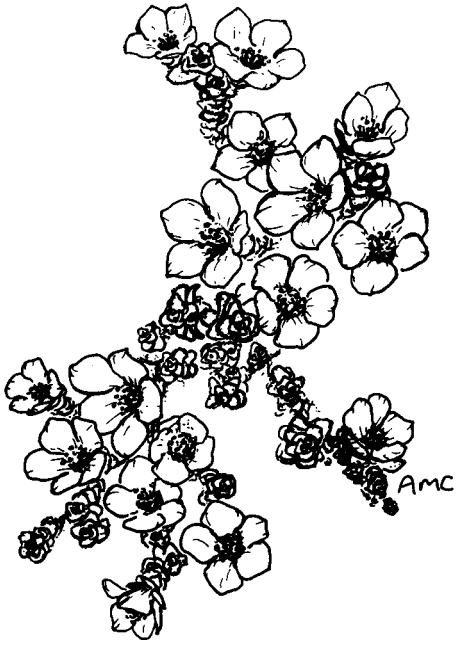
Drosera rotundifolia – Common sundew.

These sundews of the family Droseraceae grow in wet sphagnum bogs, on peaty ground, or on gravelly loch shores, places where they will not be overgrown, but which are very deficient in nitrogen. To compensate for this deficiency, the khaki-coloured leaves are armed with vivid ruby-red hairs, which emit a sticky secretion to attract and hold insects. To make doubly sure, neighbouring hairs bend over to reinforce the trap, even to the extent of bending the leaf over, to enclose the victim, whose death quickly follows. The victim's soft parts are then digested; the digestive juices contain an antiseptic which prevents putrefaction and, when the meal is finished, the bent hairs relax and the leaf resumes its former shape. The mucilage is strong enough to hold insects as big as butterflies or damsel flies, but the more usual prey is smaller.

The flower stem emerges from the centre of the leaf rosette, and the heads of starry white flowers open in July and August.

As well as reproducing from seed, Droseras can reproduce from leaf cuttings.

Saxifraga oppositifolia – Purple saxifrage.



Saxifraga oppositifolia (Saxifragaceae) must surely be on everyone's list of the 'twelve best alpines'. It is one of the early ones, flowering with me in April or early May. It is, in fact, an Arctic-alpine, and circum-polar as well, holding the record for the most northerly growing plant in Greenland, where it grows at sea-level. It is also found as far south as the Alps, and Sierra Nevada in Europe, and the Rocky Mountains in America.

The tiny dark-green, hairy leaves make a superb background for the massed, glowing flowers. Flower colour can vary, from a strong rosy-purple, through paler shades, to a rare, pure white. The white form of commerce is barely half the size of the named, coloured varieties, but a larger-flowered white does occur in the wild in Scotland.

In the wild, *S. oppositifolia* can grow on lime-rich mountains, but I have seen it on granite, well away from any lime in fact, with neighbouring *Calluna vulgaris,* and it certainly does not demand lime in the garden.

It does not like to dry out at the root, but flowers best where the trailing stems can get some extra reflected warmth from rocks. So in the garden give its roots the chance to delve behind a rock and its top-growth to clothe the rock with beauty. It makes an unforgettable picture.

Gymnadenia conopsea – Fragrant orchid.

The southern form of this orchid is apparently found on calcareous soil. The northern form, with which I am familiar, and which Anne has drawn, is a distinct form, for which the tentative subspecific name 'borealis' has been suggested.

It grows on acid soil, the typical 'rough grazing' of the Highlands.

The tubers are palmately lobed, to half their depth, the slender, pointed leaves markedly keeled, and unspotted, and the flower-stalk 7-10in high. The inflorescence is fairly dense.

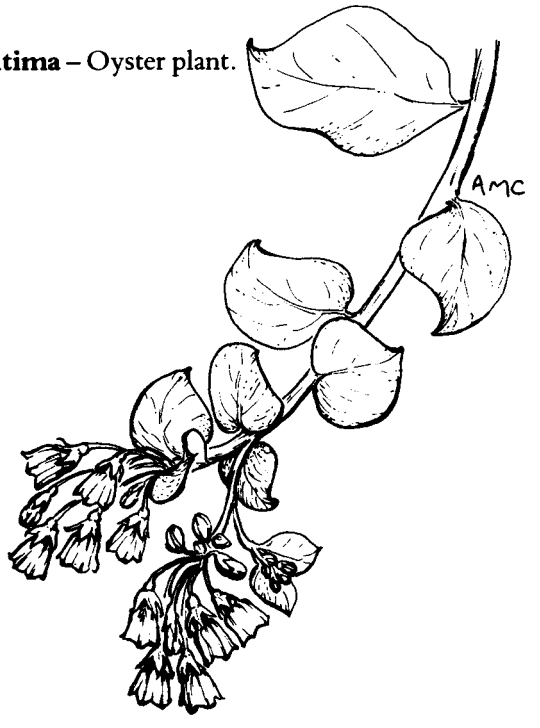
Flower colour varies from pale pink to a much deeper purplish pink, almost magenta in the bud. I have, regretfully, never seen an albino, it would be quite exquisite.

The lip can vary from three equal lobes to almost triangular. I have a photograph of a triangular one, with three darker spots on it. The spur is always long and fine, about twice the length of the ovary, giving an elegant appearance to the flowers; because of the spur length, only long-tongued insects – moths and butterflies – are able to reach the nectar stored there, so it is these insects which effect pollination, the pollinia adhering to the proboscis, and being carried to the next flower visited.

The popular name 'fragrant orchid' is well earned, the fragrance being compared to clove-scented pinks.

The plant flowers in July in the Highlands.

Mertensia maritima – Oyster plant.



This is one of the few true blue-flowered natives (family Boraginaceae). It occurs on coastal shingles in Shetland, Orkney, parts of the north, and some west coast beaches and, sadly, appears to be declining. It is a plant which does not transplant once the seedling stage is past, because of its fleshy tap-root. As it grows easily from seed, which appears regularly in the seed exchanges, there is no excuse for anyone to dig up a wild plant.

The plant is prostrate, and sprawling, and almost succulent in leaf and stem. The completely hairless leaves are of a most beautiful grey-blue, and admirably show off the flowers. These are pink in bud, and open to bells of sky blue. Seed, which is freely produced, is light enough to float for dispersal by water.

I have found *Mertensia maritima* a sound garden plant; it is completely herbaceous, but reappears unfailingly in spring in Lanarkshire. It does not do so well in Ardnamurchan, which suggests that it does not like the lime in shell sand. I must admit that I have not tested the common name by eating the leaves – but then I don't eat oysters either!

It flowers in August with me, normally, but in more kindly conditions the season can extend from June to September. This year, 1984, it has excelled itself, and opened its flowers in May.

Dianthus deltoides – Maiden pink.

In view of the persistence of the 'maiden pink' (Caryophyllaceae) in the garden, by self-sown seedlings, it is perhaps surprising that it is not more widespread in the wild in Scotland. The liking of the plant for dry grassy places may account for that, together with the family taste for limy soils. The cultivated forms are more accommodating, self-sowing into any soil, including peat.

The wild forms are more restrained in their colouring than their garden brethren, being basically pink, with paler spots, and a ring of darker colour towards the throat. They lack the rather strong, almost magenta-red, of some of the cultivated forms.

In Scotland, it occurs, very locally, in Perthshire and Angus.

Dolomites '83

LYN BEZZANT

AS PART OF THE Club's Jubilee celebrations in 1983, a group of twenty members visited the Dolomites on a two-week mountain flower holiday. Our base was the village of Arabba, 1,650m, at the foot of the Pordoi Pass, in the Sella Group, and just north of the Marmolada, the highest mountain in the Dolomites.

We left Edinburgh by air early in the morning of 3 July flying direct to Verona and were happily settled in the small and comfortable Sporthotel by late afternoon. Special arrangements for our transfer from the airport had been made with the local mini-bus driver, who was also a great help at other times during the fortnight, transporting us to convenient points to begin our walks into the mountains.

At Arabba, in the heart of the Dolomites, we were within reach of the four passes, the Pordoi 2,239m, the Sella 2,214m, the Gardena 2,121m, and the Campolunga 1,875m, with the spectacular mass of the Sella Group on our doorstep and great outcrops of non-calcareous primary rock across the road and up the hill. We had the characteristic dolomitic flora to study as well as the calciphobes.

Each evening plans were outlined for the following day's excursion, everyone being free to join in or not as they wished. Usually the party broke up into different-sized groups and went their various ways. One way and another, the meadows, woods, screes, rocky slopes and, where possible, the high tops were thoroughly scrutinised by our flower hunters, and no doubt twenty different stories could be told. The weather was for the most part very good, apart from the usual thunderstorm or two, without which no alpine holiday would be complete.

There was an incredible diversity of colour in the roadside meadow flowers seen on the journey from the village up to the Pordoi Pass. Out on the open grassy slopes of the mountainside to the north of the pass, on the Pra Pordoi, we found that it was an early season and *Primula auricula,* the smooth green-leaved form, was already in seed. *Primula halleri* was past its best but *P. farinosa* was in fine form growing in damper places in the short grass. Gentians here in the limestone meadows were at their peak. Especially good was *Gentiana clusii,* green-speckled, huge blue trumpets making a wonderful picture.

Fig 104 Plants of the Dolomites Photos: Mr and Mrs R. Bezzant

Eritrichium nanum

Ranunculus glacialis

Androsace alpina

Saxifraga oppositifolia

Gentiana verna

Cypripedium calceolus

Gentiana verna (Fig 104) made pools of brilliant blue, with the occasional plant having flowers of pale blue. Listening to the exclamations and shouts of delight from our 'first timers' to the European mountains we smiled, remembering our own first foray into the Alps to see the flowers. With the massive pyramid of the Piz Boe towering above us, dazzling white in the sunshine, the Sasso Lungo away to the west, the long ragged ridge of the Sasso di Capello and the Belvedere behind us on the south side of the pass, the scenery all around was breathtaking.

These meadows were particularly rich in orchid species. The grass was thickly sprinkled with pink-flowered elder-scented *Dactylorhiza sambucina,* interspersed with the ruby-red of *Nigritella nigra rubra,* having a delightful perfume, and there too was *Traunsteinera globosa,* with rounded heads of tightly packed flowers of lilac-pink. *Daphne striata* layered itself about, twining its wiry branches among the tough stems of *Erica carnea* and *Salix reticulata. Pedicularis rosea,* with bright pink flowers and ferny bronze leaves shared damp patches in hollows with *Pinguicula alpina. Soldanella alpina,* deep mauve fringed bells on 7cm stems and *S. minima,* slightly smaller and with pale lilac bells were flowering at and around the edges of a few remaining snow patches.

Higher up at the base of the cliffs and among fallen boulders *Dryas octopetala,* floriferous and widespread, draped itself over the rocks. Here also was *Leontopodium alpinum,* compact short-stemmed plants, densely white woolly, opening their flannel daisies to the sun. Filling rock crevices and forming huge mats of foliage, silky-haired, silvery-leaved *Potentilla nitida* was at its best, the big single rose-like flowers ranging in colour from deep pink to pure white, the white form being particularly well flowered. *Potentilla nitida* is the only pink-flowered European potentilla. *Paederota bonarota,* a pretty fringy blue-purple flower like veronica, shared rock crevices with two small saxifrages of the Kabschia section, *Saxifraga squarrosa* and *S. caesia. Saxifraga squarrosa* is the smallest of the group with minute silver-grey pointed leaves forming tiny rosettes crowded into iron-hard domes. The leaves of *S. caesia* are slightly larger and blue-green in colour. Both were in early bud.

A cable car took us up the sheer cliff to the Sass Pordoi, 3,000m. It was just like a ride in a tram except for the last few thought-provoking moments of the ascent, when the metal box paused, shuddered, stopped, shuddered again and finally decided that it could after all manage to heave itself over the lip of the precipice. We all resumed breathing and stepped out into a wintry landscape. Extra clothing was hastily put on and we were off to see what grew on this icy plateau, which was entirely composed of broken stones, a large area still snow-covered, with runnels of melt-water flowing away into the scree. There

was nothing much in the way of plant life. A few very compact clumps of *Hutchinsia alpina* and *Minuartia sedoides* huddled in rock crevices overhung by flat slabs. Here and there in the scree were tight wads of *Saxifraga oppositifolia* mostly in bud, but one 24cm mat was in full bloom (Fig 104) and a better specimen we have never seen, packed with big deep pink flowers, in perfect condition; the plant was set like a piece of jewellery, ruby encrusted in its rocky niche.

It was chilly up on this high perch and rather hazy all around, but we were able to look right across to the mighty bulk of the Marmolada and its glacier, south-westwards down the Val di Fassa towards the little town of Moena, and north-east towards the snow-covered peak of the Piz Boe, 3,152m. There was an easy path across the snow and some of the party reached the summit.

On a walk from the Gardena Pass down through meadows and woods to Corvara, *Rhododendron hirsutum* in full flower was everywhere on rocky wooded slopes. *Rhodothamnus chamaecistus* filled peaty rock crevices, but was mainly past flowering. In the cool, deep leafmould and moss in partial shade under shrubs, the waxy white flowers of *Moneses uniflora* were plentiful. Groups of *Pyrola rotundifolia* were scattered here and there among the rhdodendrons. *Clematis alpina* with its big four-petalled pendant flowers of violet blue twined its way through and over the undergrowth. Two forms of *Polygala chamaebuxus,* one golden-yellow with brown wings and the other with deep rose and purple flowers made prostrate mats of stoloniferous branches carpeting the forest floor. Out in the open in boggy patches were bright clumps of the early purple orchid, *Orchis mascula,* 20cm spikes of crimson-purple flowers, the lip white-spotted.

Corvara is a delightful village with plenty of shops and ice-cream cafes. It was a favourite place for gift buying and window shopping between times for chairlifts and bus journeys. Irresistible were the brightly coloured, frilled umbrellas, lengths of fine printed cotton, and Alpine flower calendars.

The Corvara chair lift took us up to the Pra Longa well above the town and started us off on a wonderful walk south to Arabba. These high grassy uplands were breathtaking in the quantity and variety of flowers. Orchids were again especially plentiful. In one place as far as the eye could see the meadow was pink with *Gymnadenia conopsea,* the fragrant orchid, elegant plants of about 40cm in height, the colour varying from pure white to pink, peach and reddish-purple, the scent a spicy carnation. The sun shone and it was warm. Butterflies and bees were busy about the flowers. To the north in the distance was the long line of snow-covered peaks marking the Austrian border, and to the south-east the Belvedere, the Padon and, recognisable from every

viewpoint, the anvil shape of the Sasso di Capello. Between the fragrant orchids grew the smaller white orchid, *Leuchorchis albida,* diminutive spikes of creamy-white, green-streaked flowers, also spicily scented. In damper hollows *Dactylorhiza majalis,* the broad-leaved marsh orchid, made vivid patches of red-purple flowers on 30cm sturdy plants, the leaves beautifully marked with black and purple.

Another meadow had as its dominant plant *Campanula barbata,* a blue field of fine big plants with as many as twenty silvery-haired flowers to the 25cm spike, colours deep to mid blue, and a number of white forms. A fairly tall form of *Aster alpinus* with big gold-centred, purple flowers made spreading clumps alongside the path. Much branched reddish-violet *Gentianella germanica* and the huge yellow flowers of the giant catsear, *Hypochoeris uniflora*, added variety and colour to the meadow. Down at ground level were the leaves of thousands of crocuses. The various tall grasses, some spiky, some feathery made a graceful background to the flowers. The plants of *Gentiana nivalis* which grew plentifully in thin short grass near the edge of the meadow were strong, much-branched specimens with dozens of blooms per plant, brilliant deep blue flowers with small pointed lobes.

In sunny clearings in woods to the east of the village, high up above the valley, *Paradisea liliastrum,* the St Bruno's Lily, was blooming with pure white tubular flowers on a 30cm spike. *Lilium bulbiferum* was also there, a beautiful 45cm tall lily with upturned orange-red flowers, some of which were further enhanced by the presence of a lovely little blue-green metallic shiny beetle. *Lilium martagon,* with reddish-purple, darker-spotted hanging flowers, was another inhabitant of these small clearings. But again it was the orchids in their great diversity and abundance which dominated the scene, *Anacamptis pyramidalis,* great big solid flower-heads on 40cm stems growing on dry open slopes, and fine clumps of sweetly scented *Orchis ustulata,* the burnt orchid, easily recognised by the striking contrast between the pink and white flowers lower down the spike and the very dark-red flowers at the top.

Sempervivum arachnoideum was a very attractive little plant when seen in the wild, contouring the pathside boulders, and tightly packing the crevices with its woolly cobweb rosettes, from which many short sturdy stems arose bearing bright pink flowers. Lower down on steep stony, earthy banks in sunny spots, *Saponaria ocymoides* cascaded down in brilliant red sheets of colour. *Saxifraga paniculata* was widespread, encrusting rocks with solid mats of silvery, lime-pitted leaves forming dense rosettes, and very pretty with its sprays of dainty white flowers. *Dianthus superbus,* with fragrant lavender-pink, green-eyed flowers, the petals deeply fringed, made a delightful picture, growing in long grass at the roadside at the edge of the village.

On the Plan de Sass near the Lago di Boe we found a grassy alp covered in frog orchids, *Coeloglossum viride*. This is an elusive little plant, having no bright colours to make it stand out, but once having spotted the insignificant 10cm flower spikes we soon realised that there were many plants varying in colour from greenish yellow to pink and green and deep chestnut pink. Down on knees to really see the orchids, tiny ferns came into view. Here growing in the short turf were *Botrychium lunaria*, the moonwort, 3cm long, upright fresh green fan-shaped lobes, with the fertile spike branching above it, and just a few *Ophioglossum vulgatum*, the adder's tongue fern, with a lance-shaped leaf. A large stand of another small white orchid, *Herminium monorchis*, flowered in steep stony ground just below the cliffs. Farther along in an isolated outcrop of fiercely jagged dolomite rocks, *Silene acaulis* flourished. It was here that we saw one single plant of *Gentiana utriculosa*, unmistakable with its brilliant-blue starry flowers and broad-winged calyces.

Going away south and then eastwards from the Pordoi Pass is the Vial del Pan, or the Bindelweg, and it was to the igneous rocks above this path that most of us climbed on more than one occasion, attracted back again and again by the marvellous richness of the flowers, here and on the steep, cindery north-facing screes below the rocks. While we were still well below the rocks, the first bright-blue gleams of *Eritrichium nanum* had been spotted through the glasses. (A useful piece of equipment on a plant-hunting holiday is a good quality, lightweight binocular for scanning difficult slopes to decide whether the long scramble up and down will reveal nothing more than a hieracium masquerading as a cypripedium, especially towards the end of a long day in fast-fading light, also very useful for searching out straying plant hunters on the next but one hillside!)

Eritrichium nanum (Fig 104) was there in plenty, dotted here, there and everywhere in crevices, many of the plants being quite inaccessible, high up in steeply overhanging rocks; but many were at eye-level and lower, growing even in the consolidated stony screes of the path. Breathtaking in its beauty is this enchanting little cushion plant with its dense silvery hairy rosettes of leaves and soft blue yellow-eyed forget-me-not flowers. Higher up on the crest of the Cima Crode Larice the black screes at our feet fell away steeply towards the road which far below us snaked its way from the pass down to Arabba.

Here in the screes were glorious great plants of *Ranunculus glacialis* (Fig 104) making solid tufts of deeply-lobed somewhat metallic dark green leaves. The big flowers on 5cm stems, each embossed with a central ring of golden stamens were pure white on some plants and a lovely deep pink on others. *Geum reptans* was at its best, with huge

prostrate golden blooms, pinnatifid fresh green leaves, and bright red running stems. Another treasure of these high screes was *Androsace alpina* (Fig 104), 12cm and more across, flat mats completely covered with pure white flowers. A few plants had flowers of soft pink.

In the thin grass of the open hillside away from the screes there were more interesting plants. *Primula minima* coloured the slopes with its big pink deeply notched flowers on very short stems. *Androsace chamaejasme* grew with the pretty little grassy-leaved *Lloydia serotina,* flowers tulip-like, creamy white with deep pink veining. *Loiseleuria procumbens,* the creeping azalea made wide mats of dark green-leaved, woody, closely interwoven stems studded with red buds and pink flowers. Farther on, south-facing consolidated screes were carpeted with well flowered clumps of *Vitaliana primuliflora,* the bright yellow contrasting with the silvery grey leaves of *Artemisia mutellina.*

Pulsatilla alpina ssp *apiifolia,* with deep sulphur yellow flowers and ferny foliage, dappled the mountainside, and once back on the limestone slopes we saw masses of *Pulsatilla alpina,* the white flowers faintly blue tinged. *Primula elatior,* pale yellow-flowered, made sturdy clumps at the base of the rocks, and everywhere in the short grass were magnificent plants of *Gentiana verna.* Whether they were single plants was difficult to say, but many appeared to have as many as fifty blooms. In the lower rock slopes of the Belvedere a few plants of *Androsace helvetica* formed small hard hummocks. The flowers were past their best and the plants were not very happy in the dry, sunbaked crevices.

A group of us spent a day at the Rolle Pass. We were following up a tip given to our Editor by a fellow-passenger in the cable car a few days previously. It concerned a very special plant, which we were all eager to see, some of us for the first time in the wild. We had been a little sceptical about the directions given. "Just park opposite Bend Number X about three-quarters of the way down the road towards San Martino, and there among the undergrowth in the loop made by the road, in thin scrub . . ." So we did just that and half of us made off down the slope while the disbelievers started on their elevenses. A few minutes passed and eventually Alastair's much-relieved face appeared above the bank. "Yes, it's there OK" So away we all went including Paolo, our faithful driver, who by this time was becoming mildly interested in flowers. Sure enough, there was several good stands of the incomparable Lady's Slipper Orchid, *Cypripedium calceolus* (Fig 104), about 35cm tall with leafy stems, each bearing a single flower, narrow maroon sepals and petals with a butter yellow shiny inflated pouch. It was easily observed that those plants which were in sight of the road had been well and truly stripped of their flowers. But there were plenty of flowers to please all

our photographers. This most impressive of European orchids was growing in dappled sunlight among hazel bushes. So engrossed were the plant hunters that they scarcely noticed the slender spikes of carmine pink-flowered *Cephalanthera rubra,* the red helleborine, which were sprinkled throughout this small triangle of woodland among the *Erica carnea* and *Polygala chamaebuxus.*

It was then back to the minibus and away up to the Rolle Pass to begin our walk south on to the slopes of Cavallazza, 2,324m, a non-calcareous mountain. Here I had hoped we would see the sheets of blue violet *Primula glutinosa* mingled with bright pink *Primula minima* which had delighted us on a former visit. But the flowers were nearly all over and we were to see only one or two primula blooms. This was obviously a much 'earlier' season than that of 1979. However, the lavender pink shuttlecocks of *Soldanella pusilla* were utterly charming, and *Pinguicula leptoceras,* purple flowers with a distinct white patch on the lower lip, was widespread. *Gentiana punctata,* 40cm tall, a maroon-spotted yellow-flowered plant, grew in stony meadows. *Saponaria pumilio* was there in broad cushions, its foliage difficult to distinguish from grass. There were plenty of dark red buds and the remains of last year's seed capsules. After negotiating the old and rotting bridging timbers around the higher rocks we were glad to see that *Androsace vandellii* was still doing well, tucked into crevices in the overhanging rock, tightly-packed, silvery white leaves, well-flowered plants with their white, yellow-throated blooms. Among these rocks slightly lower down, masses of *Eritrichium nanum* grew about the tunnels and trenches of long-ago battles. Bits of rotting barbed wire disintegrated underfoot and here and there lay bones, of mules or men, we did not investigate too closely.

We sat in the sunshine looking across to the east at the glistening white cliffs of the Cimon della Pala, and on down the length of the horizon, taking in all the peaks and turrets of the Pala Group. Southwards at the foot of the twisting Rolle road was the village of San Martino di Castrozza, which had been our base on that other Dolomite holiday. From there the chairlift had taken us up to the Col Verde and many delightful plants were found within easy walking distance. Immediately we had seen masses of *Rhodothamnus chamaecistus* in very good condition, well flowered, fresh and newly washed from a recent shower. Huge fallen boulders had weathered and collected humus in their cracks. In narrow crevices we had found bright pink-flowered *Primula tyrolensis,* like a slight larger *P. allionii,* very local and confined to the Dolomites. Nearby in a similar habitat, *Campanula morettiana* lined the higher cracks, not to flower till August but recognisable by its

softly hairy, small grey leaves. On the flat tops of rounded boulders was *Androsace hausmannii,* another plant endemic to the Dolomites, grey green downy rosettes of leaves, flowers white flushed pink. *Eritrichium nanum* lined the cracks in isolated rocks out on the open scree.

A climb to cliffs in the Val di Roda took us to the home of *Physoplexus comosa,* a tufted plant with big, dark green glossy leaves and maroon-coloured buds, curiously flask-shaped. These were growing in crevices high above our heads. Plants of *Aquilegia einseleana,* not in flower, grew with *Campanula cochleariifolia* in the screes at the foot of the cliff. Farther down, *Gentiana bavarica* var *subacaulis* grew in dripping wet Dolomite scree along with *Ranunculus seguieri.*

Gentiana terglouensis shared rock crevices with *Saxifraga squarrosa. Ranunculus alpestris* was charming, tiny white buttercups set off by dark, glossy green foliage, big drifts growing in stony places. In hazel coppices a little way south of San Martino, deliciously scented, bright pink-flowered *Cyclamen purpurascens* was abundant.

One could go on and on listing the flowers. Enough has been said to suggest that time spent plant hunting in the environs of the Pordoi and the Rolle Passes is very rewarding.

We had a marvellous and most enjoyable Jubilee holiday with good companions and an immense amount of fun and laughter. I must thank my two fellow-organisers, Ronald, my husband, and Jackie Thomlinson, for all the hard work they put in on our behalf, David Simpson for so cheerfully shepherding the 'lower slopes' parties on many occasions, Doreen Fraser for her great help with the Italian language, Joyce Halley for her great help to us all with the naming of plants, and everyone else for coming along and making Dolomites '83 such a huge success.

The Club is grateful to the West of Scotland Groups for financing the cost of the colour plate (Fig 104).

Visit the Schachen Mountain Garden

MARGARET and HENRY TAYLOR

THE CLIMB to the Schachen Garden in the mountains south of Munich is quite an adventure for any reasonably active alpinist. At the end of this summer's holiday, we drifted into Garmisch Partenkirchen at twelve noon. We had been warned by Jim Jermyn of Edrom Nursery that the climb to the garden and back deserved a full day, but after a fortnight's hill walking we reckoned we were fit enough to push over any mountain after lunch. The weather was not exactly promising, rain reminiscent of Glasgow's, the kind that stots up and skins your nose. As the German language is not one of our strong points, we motored past the 'No Entry' sign at the sports centre up to the end of the road at the Partnachklamm. A rapid snack in the car then on with boots, cagoules and plastic coats before plunging into the Klamm.

This Partnachklamm is a tourist attraction straight out of Tolkien, you could meet Gollum around any corner. A path has been cut into the vertical rock of a narrow winding limestone gorge, sometimes through black tunnels and sometimes along a ledge over the boiling torrent. The wild scene was accentuated by ample water pouring from above. For this experience we paid two DM (54p) each to the gateman, with whom we had a slight dispute. He declared that the climb to the Schachen Garden was too far for an afternoon, as it takes four hours up and another four down. We argued that from our information it could be done in half that time. Beyond the Klamm there are two tracks, one gently winding, but we chose the well-marked express route straight up the mountainside, in places up flights of wooden steps, reaching the garden in two-and-threequarter hours. The altitude of the garden is 1,860m and the climb from Garmisch 1,140m, some climb!

For those with more time to spare, a more leisurely way would be to stay overnight at the inn adjacent to the garden. This would allow time to visit the Schachenschloss, an ornate wooden hunting lodge built for King Ludwig II of Bavaria on a rock immediately above the garden.

Luckily, as we approached the garden, the rain dwindled to a few flakes of snow. The rare *Aquilegia nivalis* met us at the gate. Later we found this plant seeding all around. The garden is attractively constructed with large limestone outcrops, though in some places there are

pockets of granite chips for acid-loving plants like *Corydalis cashmiriana*. Seedlings of the corydalis were popping up well outside its allotted space.

Soon after entering, we spotted a cluster of official-looking gentlemen beside the chalet. I fancied a photo of the gents, but Margaret insisted that first I should cut away the green string wound around my left boot. Hopefully the Araldite alone would stick sole to upper without the slightly tramp-like appearance contributed by the string. My next move was to ask for "Ein Photo per favor". This linguistic expertise produced a big grin from the man whom we recognised as Herr Dieter Schacht. Our friend Jim Jermyn had worked here in the summer of 1975 and it was from his photos that we recognised Dieter, the man in charge. The Schachen is an offshoot of Munich Botanic Garden and Dieter explained that the Schachen had only been opened for the summer on the day of our arrival, 3 July. He left the other officials and very kindly gave us a most interesting tour of the garden. (His English is vastly superior to our German.)

He was justifiably proud of a very fine deep yellow *Primula strumosa* collected by himself in the Himalayas and of a flourishing carpet of rare *P. reptans*. We were also able to photograph scarce Europeans such as *Primula carniolica* and *P. kitaibeliana*. This garden is laid out in geographical areas and is extremely well labelled. While chatting we mentioned that during our holiday we had photographed the lovely rose-flowered *Androsace brevis* and *A. wulfeniana* in the wild, so Dieter showed us flourishing plants of both but pointed out that the former flowers well, whereas even in this high altitude garden *A. wulfeniana* rarely produces a flower. When reading about these plants subsequently we found Farrer also stating that *A. brevis* is by far the better garden plant, though it seems rare in cultivation.

The flowering season seems to be compressed at the Schachen, saxifrages and *Primula chionantha* were flowering simultaneously, whereas in Scotland they flower at different times of the year. Dieter mentioned that a fortnight earlier the garden was still under two feet of snow. For this reason the garden of approximately half an acre is only open to the public during the summer months. All the weeding, planting and labelling has to be completed within this short summer period.

Late that evening we descended through the Klamm. By the way, the gate in the gorge is never closed; wives worry about such things. We were tired but very pleased with ourselves for making the effort to climb to the Schachen, it was well worth the toil, but next time we will listen to advice and allocate a whole day.

Some Swedish surprises

TONY COLMER

The 1984 Clark Memorial Lecture

IT MAY NOT BE entirely usual to do so, but if I may I should like to dedicate this talk to a particular individual.

I consider myself most honoured and wonderfully fortunate to have been one of those from this country who went to Gothenburg in 1983 for the first Alpine Weekend of Lectures and a show to be held by the Swedish Garden Society (the Swedish equivalent of our RHS).

At the time of our Alpine '81 Conference at Nottingham one of the Swedish delegates, my good friend of longstanding Allan Hansson, mentioned to me that their Society was planning its first venture into the field of alpine shows. Some discussion took place regarding how they might go about this and about the need that they believed they had to call on "international expertise" to assist them – furthermore it was to the United Kingdom that they were turning for this expertise because of what was described as "the long established experience we already had in the field of alpine shows".

Some time later, after numerous telephone calls and much correspondence during which I suggested a number of names, I heard from the organisers that they were concerned that the income from what had now developed into a full-blown conference of some stature might not be likely to stretch as far as had been hoped. As a result they were forced to reduce the number of those they had considered as judges and lecturers.

Naturally a name that had been first on my list of recommendations had been Alfred Evans – nobody one could think of has a wider knowledge and at the same time is a more skilful ambassador on behalf both of the Scottish Rock Garden Club and the Alpine Garden Society. The Swedish organisers said that they were faced with a most difficult choice and hoped that they could leave the final decision between Alf and myself as to which of us should go to Gothenburg. How typical it was of Alf in his charming and unselfish way when he proposed that it should be I who should go.

As a small token of my gratitude, therefore, I dedicate this talk to my good friend (still I hope) Alfred Evans.

I first visited both Sweden and Norway in 1981 with my wife and daughter, and it was at that time that I had my eyes really opened. How

parochial we can be in this little island of ours and what a shock it was to have this first taste of some of the finest public and private gardens I have ever had the fortune to visit. Can you imagine therefore the thrill and apprehension when in May 1983 I once again set off for Gothenburg?

On arrival I was met by my great friend Knut Egeröd, who was to be one of the escorts for our little party, which included Eric Watson from Newcastle and Tony Hall from Kew, for the whole of our time in Sweden. Additionally Knut and his wife Netty, most generously put me up once again in their delightful home on the outskirts of Gothenburg.

The following day, the first day of the Conference, started well; a large number of very enthusiastic exhibitors and delegates descended on the Botanic Garden to stage a huge number of plants.

I will not go into detail here about the Show, suffice it to say that where the plants and their presentation may in some cases have lacked a little finesse there was ample compensation by the number, quality and range. However, judging proved to be something of a challenge. All of us were used to the types of classes we have at home, so it came as something of a shock, for instance, to be asked to consider a single Primulaceae class containing Dionysias and Border Polyanthus alongside Androsaces, Show Auriculas and Cyclamen, I suppose a total of 100 or more plants in one class! In fact it did no harm, since it rapidly burst the bubble of pre-conceived ideas we each had, and hopefully we were able to offer some guidance to the organisers for their next big event.

After judging, Eric Watson and I were each required to deliver two lectures – fortunately for us, I suppose, all in our audiences spoke excellent English and generally speaking our talks seemed to go down reasonably well. But this is not about us, but about the plants, the gardens and the wonderful and friendly enthusiasts who nurture them. We were honoured in being given an opportunity that must be second to none to see gardens and to be entertained in the most hospitable way imaginable over quite a large area of the centre of Sweden.

The climate in Sweden varies enormously over such a large land mass, but on this occasion we were taken from Gothenburg roughly eastwards towards Jönköping, a little farther inland than Huskvarna (of motorcycle and power-saw fame). During this time in addition to a considerable number of very happy hours in the magnificent Botanic Garden in Gothenburg, we visited some astonishing private gardens, mostly in very good weather conditions. I was fortunate that on a previous visit I had already had an opportunity to see one or two of

those we visited on this trip and my slides include a few that were taken on that earlier visit as well.

Gothenburg Botanic Garden is very exciting and very special. Naturally a large range of plants is grown, but I am happy to say for those who have not themselves visited the Garden, at least in recent times, a major element of the work they are doing concerns alpines.

There is no doubt that Jimmy Persson, with the quite remarkable assistance of Henrik Zetterlund have had a major influence on this trend, as did the recently-deceased previous Director, Professor Wendelbo, and the new Director, Professor Gunnar Weimark. This enthusiasm has manifested itself in the almost total rebuilding and much replanting that is going on in the huge rock garden and also in the development of a splendid new and most sophisticated Alpine House which encompasses a wide range of climatic environments with natural planting, as well as pot culture, ranging from almost desert and mediterranean conditions to high mountain and arctic.

One of Jimmy Persson's great joys is his "new America" – a magnificent vast and apparently random placing of rocks, including a very effective glacial moraine through which a flow of water can be controlled so as to replicate the varying seasonal conditions one would find in nature. New Zealand Celmisias and Hebes, Swiss Gentians and Androsaces, Japanese Shortias, North American Erythroniums, Himalayan Primulas and Dionysias from Afghanistan were all growing in profusion and seemingly totally at home.

After Gothenburg we visited a truly dedicated gardener – Svante Andreasson. Quite frankly it is not possible in words to do justice to this magnificent garden. Knut Egeröd said "One does not ask Svante whether he has a particular plant, but rather where he has it!" To see a foot wide *Pyxidanthera barbulata*, *Cassiope hypnoides* and *Diapensia lapponica* covered in flowers should be sufficient for anyone, but then to see them growing in close unprotected proximity with one of the largest collections of dwarf Opuntias and alongside a two-metre-wide patch of Pleione really does take some believing.

In addition Svante has a great eye for beauty and on the rare occasions he leaves this private "botanical garden" one of the things he enjoys most is to collect some of the exquisite native mosses which now so admirably set-off his collection of dwarf Conifers.

Before leaving this garden one must pay homage to what approaches a cabbage patch of *Cardiocrinum giganteum* – he says his aim is to have 100 spikes in flower at a time! To date he has only achieved 98! I am told that when in flower the scent from these can be smelt over a mile away – astonishing.

Moving on to the area of Huskvarna and near Lake Vätternen, where the weather was not quite so kind to us, we passed one of the largest areas of native-raised bog that is left. The wild flowers here, whilst not being perhaps the most spectacular, were most interesting and enabled one to see (as long as you didn't stand on one spot for too long) vast areas of *Betula nana*, *Myrica gale* (Bog Myrtle), *Andromeda polifolia* and many others. Whilst in the area we also saw that rare and beautiful little fern *Woodsia ilvensis* and an unbelievable patch of a large flowered form of *Viola tricolor*.

Those who saw that excellent film Dr Zhivago, may be able to picture the very beautiful house we stayed in for a night at Lekeryd with Dr and Mrs Zetterlund, Henrik's parents. Although I am far from squeamish about my food, I did wonder a little at dinner when Dr Zetterlund announced that the fungus we were eating was probably one of the most poisonous in Sweden! However, properly prepared it seems to have been not only harmless but quite delicious.

A bonus here was the opportunity to meet and develop a special relationship with a very delightful new girlfriend. This was Johanna – Henrik's little girl after whom he had named his own hybrid *Primula* 'Johanna'. This is a purpose-made cross between *Primula warshenewskiana* and *Primula clarkei*. Both the plant and my new girlfriend are very special!

This overnight stay was also exceptional, as was our next stop when we visited an amazing and not altogether young couple – Berta and Gösta Wildh. Berta had been a major prize winner at the Alpine Show and so it was a great privilege to see at first-hand the quality and range of plants she grows and the skills she demonstrates. Sadly during the previous night there had been a very dramatic hailstorm with walnut-sized hailstones. Naturally therefore Berta was distraught at the damage these had caused, but to her visitors I can tell you there seemed to be little amiss.

It really is frustrating and does make one feel very dissatisfied with one's own efforts when, for instance, one is told that there is a major weed problem in part of the garden; only to find out that this "problem" has been caused by an over-zealous *Physoplexis (Phyteuma) comosa* which had seeded freely and widely! Of the many plants of particular note one was a substantial patch of *Anemonella rosea fl pl*, together with some huge plants of *Paraquilegia grandiflora* and a six-inch-wide cushion of both the usual pink form and a very beautiful white form of *Petrocallis pyrenaica*.

Sadly the few days that we could spend in Sweden soon passed, our memories were filled to saturation point, the hospitality had been unbelievable and we all left this land of gardening surprises much chastened and a little wiser.

Do-it-yourself hybrids

MARGARET and HENRY TAYLOR

HYBRIDISATION is fascinating, easy and worthwhile as we hope to show in the following notes.

Hybrids often flower better in garden conditions than species and it is very exciting to see completely new plants of your own creation. Very little deliberate hybridisation has been done with alpines, so it is quite possible to make something new by combining the desirable characters of several parents. Admittedly many species are beautiful, but these have developed to fit a particular niche in the wild, not to fit the garden habitat or the gardener's vision of an attractive plant. Also as a gardener's conception of beauty of leaf or flower changes over the years, so hybridisation has to be a continuous process of breeding and reselection. Not only do the hybrids of a generation ago not fit current requirements, the old clonally propagated plants could well be virus-diseased shadows of their former selves.

Make a start now, every alpine enthusiast should try his hand at improving his favourite flowers. The techniques of crossing plants are quite simple. The first basic requirement is desirable parents with different characters which may be combined in the offspring. The female parent can be bought from a nurseryman or raised from the excellent seed lists of the various club exchanges. The male parent does not have to be your own plant, you can obtain a suitable flower from a friend's garden, or anthers can be sent in a small polythene bag through the post. Make sure the anthers are completely dry before sealing up the bag and posting, though be warned some pollen is very sensitive to desiccation and dies if dried out. Just hope the pollen you require is not of this type. Observant folk may have noticed that at the end of our SRGC flower shows there is often a huddle of keen exhibitors – marriages are being arranged.

The best hand-tool for pollination is a pair of forceps (tweezers), these are more easily cleaned than a brush. With the forceps, pick off an anther from a male parent and rub it on to the stigma of the female. It is advisable to tease open carefully a ready-to-open flower bud on the female parent, damaging the flower as little as possible. Then the undehisced anthers can be picked away carefully to avoid any chance of self-pollination. Practise this first on a plant with lots of buds, as it is

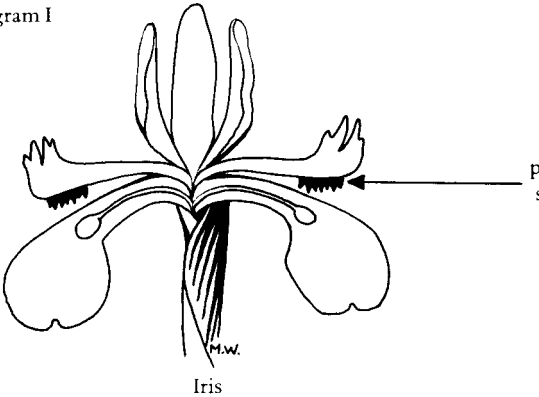
easy to pull off the stigma by accident at the first attempt. The anthers within the bud are usually not yet dehisced (they have not scattered any loose pollen). The next stage is to dip the forceps in methylated spirits to sterilise them, making certain that no mother pollen adheres. Dry the forceps, then pick an anther from an open mature flower of the desired male parent. When mature, loose pollen dust should be visible. Holding the anther in the forceps rub it gently on top of the stigma of the female parent and try to see some of the yellow pollen adhering to the stigma. Choose a warm dry day to pollinate, as warmth helps to burst anthers and make pollen available. Sometimes if none is visible, it is possible to tear open an anther to release the pollen.

Tie a label on the pollinated flower with the parentage and date written in pencil as this fades less than ink. The conventional system is to write the female parent first. At the same time make a note in a diary of each pollination, as sun and water can bleach part of the plant label.

It makes the job easier if the plants are kept out of the rain in a frame or alpine house. This also helps to avoid precious pods being nipped off by birds. If a group of similar plants is flowering anywhere in your garden, it is advisable to cover the pollinated flower to exclude wandering bees. A thin cotton, nylon or cellophane bag may be used, but avoid polythene as this holds moisture and tends to rot the flower. Actually any bag can cause rotting, so remove it after two weeks when any danger of stray pollination should have passed.

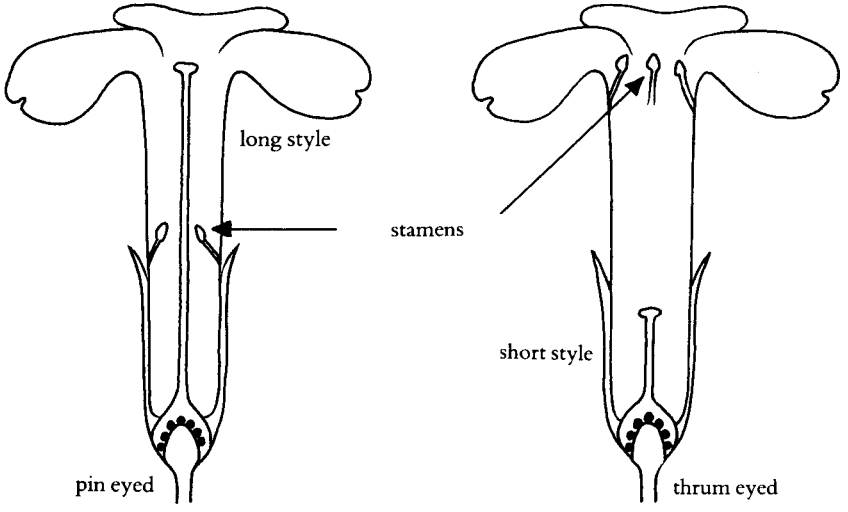
Sometimes there are problems in recognising the vital parts of a flower. Anthers are usually obvious and pollen is usually yellow though there are some exceptions such as the blue pollen of *Scilla rosenii* and *Erythronium dens-canis*. The receptive phase of a stigma can be more difficult to recognise, this is where a hand lens is a help. Once we tried putting pollen on to the pointed stigma of a gentian until we noticed a more mature flower with the tip of the pistil parted in a Y shape with the receptive area on the inner upper surface. A more difficult problem is locating the stigma in a peculiar flower like an iris where the stigmatic surface is behind an odd flap on the petal leading out to the fall (Diagram I).

Diagram I



Iris

Diagram II



Primula flowers are conveniently constructed for pollination, as they usually come in two types, pin and thrum (Diagram II). The easy way to pollinate is to take an anther from a thrum flower and rub it on to the top of the stigma of a pin, but do not be discouraged if the desired parents are pin with pin or thrum with thrum. It is quite possible to obtain good seed by hand pollinating similar types together even though some botany books state that there is incompatibility unless pin is crossed with thrum. Curiously, in the wild we have examined hundreds of pin *Primula halleri* and have been unable to find a single thrum, yet *P. halleri* sets seed in nature. Another strange fact about wild primulas is that whenever we have seen a white-flowered plant in the Alps it has been thrum eyed. Also with these flowers white is usually a recessive character. If the flower is white both alleles for the colour characteristic are white, therefore if two white plants are crossed all the progeny are white. This was the case when we crossed a white thrum *Primula pedemontana* with white thrum *P. hirsuta* and all the seedlings were white-flowered.

Primula breeding has been studied in some detail by auricula enthusiasts who reckon that the purple colour of *Primula hirsuta* is found in the cell sap of the epidermis whereas in *P. auricula* the yellow particles are distributed throughout the tissues of the corolla. When those two are combined in a hybrid, a thin purple layer overlies a yellow background, giving unusual velvet colours in the offspring. For further details see "The Auricula" by R. Biffin.

Fig 105 *Viola zoysii* (see page 182) Photo: L. McBride

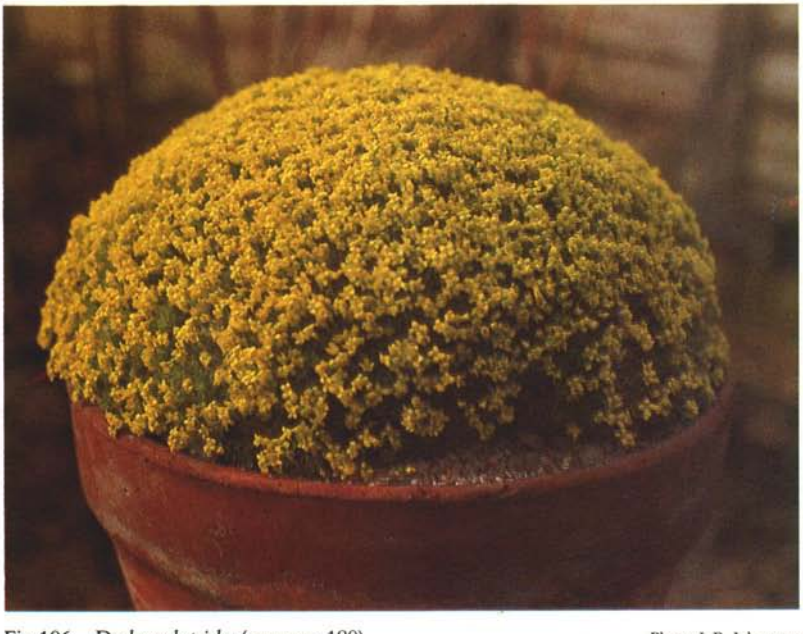


Fig 106 *Draba polytricha* (see page 180) Photo: J. R. Johnstone

If an old variety has been used as one of the parents of a new hybrid and the old plant has any symptoms of virus disease such as yellow mottling of the leaf, burn the plant after using its pollen. Virus diseases are not normally transferred to new plants in pollen but can be transferred by aphis or by organisms in the soil. Quickly dispose of any plant showing virus symptoms plus its soil and spray regularly with insecticide to avoid any build-up of aphis.

Primulas are easy for the beginner, simple to work with and quick to flower. Looking at our notes, a typical hybrid was made by pollinating on 8/4/82, the seed was ripe and ready to sow on 14/8/82, the first plants flowered in August 1983 and they all flowered in April 1984. By far our best hybrid so far is *Primula* 'Tantallon', written up in SRGC Journal No 74. An interesting failure was *Primula* 'Yuk', a hybrid between *P. marginata* and *P. auricula*. The flower colour was summed up by a discriminating friend in one word "Yuk". Fortunately, despite the comment of our friend we kept 'Yuk' and back-crossed to *Primula auricula*. When the progeny flowered there were some lovely colours and the leaves retained the silver jagged edge of *P. marginata*.

We have chatted to other folk hybridising European primulas and all agree that it is difficult to go wrong if *P. allionii* is used as one of the parents, it seems to guarantee large attractive flowers on a compact plant. We obtained our *Primula* 'Karen', which has rose-coloured flowers with a cream eye, as one of the offspring from crossing *Primula* 'Linda Pope' with *P. allionii*. Another promising hybrid is derived from crossing *Primula aureata* with the more recent introduction *P. aureata fimbriata*. The former has larger flowers and the latter more vigorous healthy growth. The first of our seedlings to flower appears to combine large flowers with a strong plant but time will tell whether it is a useful improvement on the parents.

In comparison with primulas, the breeding of irises is rather a slow process. Imagine our mounting anticipation as we waited four years for our first iris hybrid to flower. Actually anticipation is one of the best parts of hybridisation. It is very exciting to gloat over a pod swelling even though the dashed thing sometimes swells with never a viable seed inside it. Unfortunately our iris is even more of an acquired taste than *Iris* 'Katharine Hodgkin' which it resembles. We crossed *Iris winogradowii* with *I. histrioides major* and the yellow mixed with blue produced an offbeat colour which we must admit is not a patch on either parent. This iris so closely resembles 'Katharine Hodgkin' that we suspect that the latter is derived from *Iris winogradowii* crossed with a slightly different form of *I. histrioides* and that it is not a hybrid of *I. danfordiae* as originally described.

Another washed-out blue-grey flower in our garden is the result of crossing the blue Tibetan *Paraquilegia grandiflora* with the more recent dwarf white introduction from Kashmir. So far only one seedling has flowered. Maybe some of the sister seedlings will be a better colour and grow more vigorously than the parents which tend to perish over winter. Strangely we also obtained a delicate wishy-washy colour as a result of crossing *Meconopsis betonicifolia* with the lilac *M. quintuplinervia*. We had hoped to combine the good blue of the female with the dwarf running habit of the male. In the hope of strengthening the blue colour, we have tried to back-cross the hybrid to *M. betonicifolia*, but we have been unable to get viable seed. When two distinctly different species are crossed quite often the progeny are sterile. You can never be certain that you will get viable seed by crossing two species within a genus but it is always worth a trial. Sometimes even plants of different genera can be crossed as has happened with *Phylliopsis* and *Phyllothamnus*.

One of our dreams of the future is to recreate a plant we saw once in the Spanish Pyrenees, this appeared to be a hybrid of *Ranunculus parnassifolius* and *R. glacialis*. We have pollinated our *R. parnassifolius* with a friend's *R. glacialis* but no viable seed was set, maybe next year.

The opportunity of naming a new plant is a pleasant conclusion to plant breeding, and a very necessary procedure. If you have made an outstanding hybrid which you consider worthy of widespread cultivation, the next stage is to propagate it vegetatively. Keep it carefully separated from inferior siblings which really should be thrown away, though the beginner may be reluctant to do this. Your selected plant needs a name which preferably should be a single easily-spelled word. A latinised name is no longer allowed for a hybrid as it might be confused with a botanical species. The final and most difficult requirement is to choose a name that has not been used previously for a similar plant. You can check this by referring to books and catalogues or, of course, choose such an outlandish name that it stands a good chance of being unique.

Our excuse for mixing up the species is that while gorgeous in the wild, the pure species can be reluctant to flower in the garden. Take *Primula minima*, fine on an Alpine peak but rarely flourishing in gardens, whereas its hybrid with *P. hirsuta* called *P. steinii* 'Bilekii' is a popular first-class garden plant. To be honest, hybridising is good fun and sometimes works, even if some species just cannot be improved upon. We saw a hillside in northern Italy this summer with millions of *Primula spectabilis* in full flower looking showier than the florist's *P. obconica*, varying in flower colour and shape, each plant finer than its neighbour, a breathtaking sight – on the other hand, a hybrid just might flower more easily in cultivation.

Herbicides for the garden

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ONE OF THE most important changes which has occurred in management of vegetation in the last thirty years is the introduction of chemicals for selective or non-selective control of weeds. The impact of these materials on agriculture has been tremendous, the most spectacular manifestation being in the culture of cereals where it has become possible to grow these in the same fields indefinitely with a progressive decrease in weed problems. In the culture of soft fruit the use of herbicides has eliminated hand weeding and interrow cultivation so that field scale production is now widespread and "pick your own" a commonplace roadside sign.

In the ornamental garden the use of herbicides can reduce the physical labour of weed control and offers a solution to some previously recalcitrant problems. There are, of course, some people to whom the use of chemicals in the garden is abhorrent mainly because of understandable fears of adverse side effects, others may enjoy the physical exercise of hand-hoeing. However, the majority are always looking for easier ways to control weeds and are prepared to accept the very slight risks involved in the use of chemicals. If the properties of herbicides are understood and they are used wisely, there is absolutely no reason why they should not be used safely and effectively by gardeners.

Properties of herbicides

There are over eighty different active ingredients approved for weed control in Britain. Many of these are available under a variety of trade names. Proprietary products are sold in different formulations, eg water soluble granules (Weedol), wettable powders (Weedex), liquids (Tumbleweed), directly applied granules (Casoron G), oil emulsions (Brushwood Weedkiller). Products containing the same active ingredient can differ in concentration and therefore dose rate.

Agricultural formulations usually have a higher active ingredient content than amateur garden packs and are invariably much cheaper. However, they are sold in packages which are much too large and expensive for all but the very large garden users. At present, the sale and use of pesticides in Britain is regulated voluntarily and it is not illegal to purchase and use agricultural products in the garden except for paraquat

which comes under the Poisons Rules and can only be sold in its liquid form to bona-fide growers and farmers. In spite of the savings which can be achieved by acquiring herbicides from friendly farmers, it is potentially a dangerous practice leading to disasters in overdosing and incorrect treatment when chemicals are extracted from their original container and put into inadequately labelled bottles and tins. It is also worth bearing in mind that if you ask a friendly farmer for a "couple of pints of Roundup" you are soliciting a gift worth about £15!

So far as mammalian toxicity and environmental side effects are concerned, users of herbicides are protected at present under the voluntary Pesticides Safety Precautions Scheme whereby manufacturers have agreed not to market products until usage recommendations have been devised which ensure no risk to the user, the consumer of produce, and to wild life. Most herbicides have very low mammalian toxicity and present no hazard to the user provided manufacturers' recommendations are followed. Herbicides are, of course, by nature harmful to plants and can cause serious damage to desired plants if they are misused or accidentally sprayed off target. Spray drift is a serious risk which can be minimised by using large sprayer droplets, dribble bars or gel placement methods. Vapour drift occurs when hot weather after treatment volatilizes herbicides and can be very serious in enclosed gardens. It is unwise to use volatile ester formulations under such circumstances. Ester products are generally sold as oil emulsions and can be recognised by their oily appearance and the milky emulsion that they produce when mixed with water.

Another way in which herbicides can cause damage is by movement in soil water. This was a problem with sodium chlorate; however, the much superior herbicides now available are generally held quite strongly by soil particles and will not move away from their placement site.

Contact herbicides

These are materials which have a quick-acting scorching effect on plant foliage. They do not translocate within plant tissues and therefore only give a temporary check to the aerial parts of the weeds. The most outstandingly useful material in this group is paraquat (Weedol). Because of its lack of soil activity or persistence, it is ideal for the destruction of surface vegetation prior to sowing or planting. Another use is for clearing annual weeds from sand or gravel paths. For this purpose its lack of effect on mosses, liverworts and parsley piert is a drawback. Paraquat is often mistakenly used in an attempt to kill perennial weed vegetation. It will certainly kill most grasses, although

having limited effect on couch grass, but is ineffective against nettles and dockens so that these become even more troublesome. Diquat (Reglone) is a similar contact material to paraquat which is recommended for aquatic weed control. Another contact material still in use in the garden is ferric (iron) sulphate. This is the active ingredient in lawn sand for moss control in lawns. Persistent mercury compounds were often included in lawn sand to prevent rapid moss reinfestation but this practice has been discontinued due to the risk of chronic mercury poisoning. A safer alternative material, chloroxuron, is now usually incorporated in proprietary products, eg Tumblemoss.

Ioxynil (Actrilawn) is a contact herbicide for control of seedlings of broad-leaved weeds in newly-sown lawns before the grass seedlings are strong enough to withstand hormone herbicides. Usually mowing removes the aerial parts of such weeds and herbicide treatment is seldom necessary.

Translocated herbicides

There are many chemicals in this category; all have in common the ability to move freely within plant tissue so that they can affect parts of plants distant from the site of application. This gives them the ability to kill perennial weeds with deep underground perennating organs which are otherwise immune to attack. Most are applied to the foliage and translocated along with food materials into underground food storage organs. For effective action they require the presence of actively photosynthesising leaves and disappointing results often follow application to senescent foliage. Another factor affecting the performance of foliar-applied translocated herbicides is the degree of waxiness of the cuticle of the weed foliage. Herbicides may be slow to enter inherently waxy leaves, older leaves, or those on plants growing slowly in dry conditions. Slow entry means increased susceptibility to wash off by rain and reduced effectiveness. This problem can be overcome to some extent by higher doseage or the use of wetting agents and oil additives. In general, manufacturers try to formulate products so as to overcome these difficulties and there is little scope for users to improve performance.

The application of herbicides in gels is an attempt to increase the amount of chemical getting into the target weed by maintaining a relatively waterproof high-herbicide concentration on a sensitive part of the weed, eg the "crown" of rosette habit perennials. Gels also, of course, minimise the risk of movement of herbicide into neighbouring sensitive ornamentals and permit highly selective treatment. There are some soil-applied translocated herbicides which enter plants by their

roots but these are best considered in the later section on residual herbicides.

Of the translocated herbicides available to the gardener, glyphosate (Tumbleweed) is an outstandingly useful material. This is a chemical with extremely low mammalian toxicity which is translocated for long distances in most perennial weeds and therefore makes it possible to control many of the most troublesome weeds in the garden including couch grass, docks, thistles, convolvulus, perennial sowthistle, bishop weed and willowherb. Results on horsetail have been poor possibly due to the limited target area of the aerial parts and their extreme waxiness. Wiping of individual shoots with a strong solution of glyphosate or painting with a gel formulation is worth trying.

A feature of glyphosate which frequently accounts for poor results is its slow penetration of plant cuticle, indeed without the wetting agents added by the manufacturer it is practically ineffective. It is also very water soluble so that it is very susceptible to wash off by rain. At least six hours and probably twenty-four hours of dry weather is needed after application to permit entry of glyphosate into weed foliage. When glyphosate reaches the soil it is inactivated almost immediately by adsorption on to soil particles, subsequently it is rapidly decomposed by soil micro-organisms. There is no risk of adverse long-term effects on soil fertility and seed sowing and planting-out can follow soon after overall treatments. Soil cultivation after glyphosate treatment should be delayed for about a week to permit herbicide translocation from treated foliage into the extremities of the underground parts.

Aminotriazole (Weedazol – TL) is an older material with properties similar to glyphosate. It is less effective on couch grass and certain perennial broad-leaved weeds and has short, soil resistance. Alloxydim sodium (Weedout) is an interesting foliage applied translocated herbicide which is effective against grasses including couch but has no effect on broad-leaved plants. It can be applied as an overall treatment for couch grass control in herbaceous borders and shrubberies.

There are many selective herbicides in the growth regulator (hormone) category. These are slow acting and produce severe growth distortion leading to death in sensitive species. They are widely used for weed control in cereals and gardens in rural areas frequently suffer damage from spray drift. Products containing 2, 4-D are available for control of daisies, dandelions, buttercups, plantains, etc in lawns. Mecoprop (CMPP) based products are useful for control of clover, mouse-ear chickweed and pearlwort. For large lawns and sports turf, a considerable saving in cost is possible by using agricultural formulation of these materials.

For the control of brambles, whins, broom and woody weeds the hormone herbicide 2, 4, 5-T (Brushwood Weedkiller) is still available. This is cleared under the British Pesticide Safety Precautions Scheme and approved under the Agricultural Chemicals Approvals Scheme and, in spite of the adverse publicity surrounding this chemical, there seems to be no reason to discontinue its use. An alternative material called triclopyr (Garlon 2) is available for similar agricultural purposes. It is marketed in one litre bottles which is sufficient for 0.25ha. So far this chemical which is closely related to 2, 4, 5-T has not attracted the attention of the environmentalist lobby.

Woody weeds are often more easily and safely treated in winter by basal bark or stump treatment with herbicides diluted in paraffin or diesel oil. Overall treatment in summer can cause severe damage to desirable plants by vapour drift.

For the large garden or estate with a bracken problem the translocated herbicide asulam (Asulox) provides excellent control. This herbicide, if applied at full frond expansion (usually end of July), produces no apparent effect in the year of treatment; however, it is translocated into the rhizome and accumulates in the buds where it completely inhibits frond development in subsequent years. It is a very safe herbicide and can be applied by hand sprayer to small patches of bracken without destruction of the underlying vegetation.

Asulam is reported to have some activity against horsetail and could be tried as an overall treatment in grass or for spot treatment in other situations.

Residual herbicides

Chemicals in this category are applied to the soil where they persist for varying periods dependent on the nature of the chemical, the dose applied, soil temperature, moisture, texture and organic matter content. Sometimes they require incorporation into the soil to prevent loss by volatalisation or photochemical breakdown or to place them near to their weed target. Those which are used in gardens are generally surface applied and depend on rain for incorporation into the surface of the soil. They are therefore ineffective in dry weather. At low dose some residuals can be used selectively amongst shrubs and herbaceous perennials while the same materials at higher dosage can give long term suppression of plant growth on pathways. Where gross overdoses are applied, only time or physical removal of soil can overcome their effects. Incorporation of large quantities of peat might be tried as an alternative.

A residual herbicide which is well known to most gardeners is simazine (Weedex). This is a very persistent material which suppresses

annual weeds by killing germinating seeds in the surface soil. Unfortunately, knotgrass is resistant to its effects. Deep rooting perennials are also unaffected as it is strongly held in the surface layers of the soil.

Simazine is useful at high doses to maintain weed-free conditions on paths and at lower doses for selective weed control in rosebeds and shrubberies. There are a number of shrubs which are sensitive to this herbicide. For clearance of existing weed growth followed by suppression of reinfestation simazine is sold mixed with the contact herbicide diquat as Pathclear or with aminotriazole for kill of deep-rooted perennials in Super Weedex.

Dichlobenil (Casoron G) is a persistent soil acting material which is effective against both annuals and most perennial weeds but can be used selectively amongst roses, shrubs and soft fruit. It is sold in granular form for direct application. There are recommendations (not given on domestic packs) for the use of this material for aquatic weed control in still water or slow moving streams.

Short-term annual weed control with a high degree of selectivity in herbaceous borders is provided by propachlor (Covershield). Again this is sold in granular form for direct application.

Special herbicides

For temporary control of algae in ornamental ponds a granular formulation of terbutryne (Clarosan) is available. Long term control of algae is impossible in water enriched by plant nutrients and intermittent water bloom has to be tolerated.

Green slime (algae) on greenhouse glass can be removed by brushing with a solution of alkyldimethylbenzyl ammonium chloride.

Lichens are regarded by many as adding to the appearance of stonework and roofs but can sometimes be regarded as a serious weed as on the Aberdeen University running track at the Balgownie playing fields where they have almost covered the track surface. Treatment is difficult as the copper sulphate or tar oil winter wash advised for their control are themselves disfiguring.

Plants of the Arctic: An ancient and specialised flora

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THE CIRCUM-POLAR FLORA of both the Old and the New World contains many species with a distribution that extends from the high Arctic to mountain ranges many thousands of miles south of the Arctic Circle. Mountain sorrel (*Oxyria digyna*) can be found to the north of Greenland in Peary Land at 83°39'N as well as in the mountains of North America as far south as 34°N and in the Himalayas at a mere 24°N (Billings, 1974). Although there are similarities between alpine and arctic habitats in the type of vegetation they support, the two areas are climatically very different. The temperature regime in the mountain habitat runs a diurnal gamut from hot day temperatures to nightly frosts. In the Arctic such daily fluctuations are much less, while in the high Arctic (above 75°N), the day-night temperature differences may almost vanish during mid-summer. Even although the same species may be found in both alpine and arctic habitats it should not be expected that the populations will be similar either in the manner of their growth or their reactions to climatic conditions. For the rock gardener, plants of alpine regions, at least in Europe, are more amenable to cultivation as they are able to withstand the warm mid-day temperatures of lowland gardens. Arctic species, or plants from arctic populations of wide-ranging arctic-alpine species do not thrive in warm summers and apparently prefer colder conditions. In a study of *Oxyria digyna* it was found that the southern populations from North America lacked any development of rhizomes whereas all the arctic populations from Alaska had well-developed rhizomes (Mooney and Billings, 1961). A rhizome as a storage reserve is essential for the arctic populations as they frequently have to survive growing seasons that are so poor that no net gain in food reserves is possible. The alpine plants responded more to higher light intensities than those from the Arctic while the latter reached their maximum photosynthetic rate at lower temperatures than the plants from the south. This close correspondence of plant form and function with environmental conditions may appear on the surface as an obvious consequence of evolution. However, it also illustrates a

fundamental and puzzling aspect of ecology, namely the high degree of habitat specialisation that exists in nature.

It would seemingly be advantageous to any plant to be able to survive cold, short growing seasons and yet retain the ability to profit from extra warmth when and where it was available. Such a physiological plasticity would appear to be a potential advantage to any individual. Examination of the actual situation in the field, however, shows that such occasions are rare. Plants are very exacting in their temperature requirements and when a species has a wide geographical range it is invariably made up of a large number of different populations. The biotypes, ie groups of genetically-related individuals, which are capable of surviving in the colder northern regions are at a disadvantage in warmer alpine habitats. The narrowness of physiological tolerance and high degree of habitat specialisation is one of the most intriguing aspects of plant science. It not only accounts for the large number of species that have evolved, but also precludes the evolution of one or two dominant "super species" able to occupy a wide range of habitats. Such "super plants" with unlimited tolerance of varying environmental conditions and able to spread across the face of the earth are fortunately still confined to the realms of science fiction. From a practical point of view this specialisation for optimum success in any habitat also means that in crop plants, varieties need to be used that are matched to the climate and cultivation methods of the area in which they are being grown.

Why some plants "like it cold" and can survive even in the high Arctic may seem an aspect of scientific enquiry that lacks practical application when we consider that most of our crop plants require a greater degree of warmth than can ever be found inside the Arctic Circle. For all plant life however the earth as a whole is a cold environment and evolution has largely been concerned with finding ways of speeding-up the chemistry of life so that it can function adequately at the temperatures that exist on earth today. (For a fuller discussion of the earth as a cold habitat see previous article in this Journal – Crawford, 1979). The Arctic represents an extreme end-point in what is possible in terms of low-temperature survival. In looking at polar vegetation we have a clear example of highly-specialised adaptation to a well-defined set of environmental conditions. Arctic plants can therefore help us to understand the enigma of how adaptation to one particular set of conditions inevitably leads to a disadvantage should conditions change. This lack of plasticity is a limitation to survival that lies at the root of why species become extinct. The disappearance of species or their reduction in numbers and distribution range so that

they become rare is not usually due to any change in the species themselves. Examination of rare species in cultivation rarely reveals any signs of lack of vitality or breeding capability. Instead their disappearance is due to the removal or disappearance of their habitat. The species does not run out of vigour; it simply runs out of suitable places where it can grow.

The antiquity of the arctic flora

The diminutive size and small number of plant species which inhabit the Arctic can create the impression that the polar regions are a refuge for a small group of plants that migrated there at the end of the ice-age and thus saved themselves from extermination under the shade of the advancing coniferous forests. Although it is true that many polar species once had a much wider range, it is incorrect to imagine that they have moved recently into the Arctic with the retreat of the Pleistocene ice. Recent research has shown that the Arctic was probably not very different climatically during the ice-age from what it is at present. Examination of the floor of the Arctic Ocean has revealed the presence of boulders that were deposited there during the last ice-age. These boulders must have been transported there by ice-bergs and were deposited on the ocean floor when the ice-bergs melted. This ice-berg activity implies that there must have been open water from time to time in the Arctic Ocean during the Pleistocene period and that it would be incorrect to imagine the Arctic Ocean covered by a thick ice-cap of 1,000m or more (Clark, 1982). Radio carbon dating of timber flotsam found around the shores of Spitzbergen shows that there was free water circulation around the archipelago about 10,000 years ago (Hyvärinen, 1972). Therefore as the ice-age ended farther south in Europe and North America there was clearly no need to wait thousands of years for mountains of polar ice to melt. The nunatak and coastal habitats that exist in Greenland and Spitzbergen today (Fig 112) with their colonies of diverse species were very probably also available as plant habitats throughout the Pleistocene period.

An examination of the varying biotypes of species that are found at present in the Arctic with biotypes of the same species further south shows that in North America and Europe the arctic and alpine races are genetically quite distinct. Cultivation of arctic species outside their natural environment can present problems as not all species survive transplantation to warmer regions. With the construction of the refrigerated arctic glasshouse in the Copenhagen Botanic Garden it became possible to cultivate a range of biotypes under comparable conditions. The species studied included *Ranunculus glacialis, Juncus*

trifidus, Saxifraga paniculata and *Arabis alpina* (Böcher, 1972). The populations originating from southern regions such as the Alps were invariably richer in biotypes than those from the Arctic. The differences in the genetic types of the north and the south appear to be so great that there is little likelihood that there has been any significant immigration into the Arctic since the end of the ice-age. The enormous gaps in distribution that are found between many arctic and alpine populations of the same species confirms the view of the arctic flora having a long-established and separate identity and that it survived the ice-age in the polar region. In the alpine meadow foxtail (*Alopecurus alpinus*) there are arctic stations in Greenland and Spitzbergen while the next southern locality is found in the Southern Uplands of Scotland. *Eriophorum scheuchzeri* occurs in Greenland and Spitzbergen and again many thousands of kilometres to the south in Switzerland. The arctic populations are clearly far-removed from any contact with southern populations and thus screened from any means of new genes arriving in the Arctic. In a survey of many circum-polar species, Hadac (1960) concluded that they had lived in this region for a very long time, which for some species means more than two million years. The great antiquity of the polar flora means that it has had a long period for adaptation to this most extreme of all terrestrial habitats and it should be expected to show a large number of adaptations that specifically fit species to arctic as opposed to alpine habitats.

Limits to southern distribution

Although some species are wide-ranging with arctic and alpine forms there are many species which are not found outside the Arctic. The spider plant *Saxifraga flagellaris*, although it has close relatives in the Himalayas, is not found south of 75°N in either Greenland or Spitzbergen. In both these areas there are habitats immediately to the south where it might be expected to be found. This species grows in open shingle sites and there are no grounds for believing that it is competition or lack of opportunities for dispersal that limits its southern extension. When looking at this plant in its native habitat it is difficult to imagine what there might be in more southern latitudes that deters it from extending its range. *Saxifraga flagellaris* is not unique in its inability to extend its range south even when contiguous open sites are available. There are a number of species which reach from the shores of the Arctic Ocean to those of the British Isles where they find one limit to their southern distribution (Table 1).

Table 1 Arctic species which reach a southern limit to their distribution in the British Isles; their habitat and distribution.

Species	Habitat	Distribution and Notes
Liqusticum scoticum L.	Rocks, cliffs (sand)	Circumpolar – Iceland, Greenland, North America *L. scoticum* ssp *hulteni* in Alaska and Siberia. Europe from Denmark to north-west Russia.
Mertensia maritima (L.) S. F. Gray	Shingle (sand)	Circumpolar – Iceland, Greenland, North America to Alaska. In UK – Lancashire and Aberdeenshire northwards decreasing in southern range.
Juncus balticus Willd	Dune slacks	Europe from Pyrenees to Faroe and Iceland; Scandinavia and north-west Russia, North and South America, Japan, New Caledonia, UK – Lancashire and Fife northwards.
Blysmus rufus (Huds) Link	Salt marsh	Circumpolar – South Wales and Lincolnshire northwards, south-west and east Ireland.
Carex maritima Gunn	Damp hollows on fixed dunes	East and north Scotland, Orkney and Shetland. Also inland in Europe in the Alps. *Carex maritima* sl is circumpolar.
Elymus arenarius L	Active sand dunes	Circumpolar – to 71°N in Europe from the north France and Belgium. Iceland, Greenland, North America and Siberia. Local in the south of England, more frequent in the north-east. Widely planted for dune stabilisation.

As can be seen from Table 1 most of these species are of coastal distribution. Such species lend themselves readily to the study of the effects of climate on distribution as they have open routes for migration and can be expected to be limited in their distribution-range by climate. These species with definite southern limits to their distribution have high respiration rates which allow rapid growth and extension of foliage in spring. However, it also means that when conditions become too warm, then the high respiration rate will use up their carbohydrate reserves more rapidly than they can be produced. A more detailed discussion of this aspect of specialisation in arctic vegetation can be found in Crawford (1979, 1982).

Specialisation within the arctic environment and the success of dioecious species

The antiquity of the arctic flora which causes its distinctive nature as compared with alpine plants from the south might be expected to have led also to the development of a high degree of habitat specialisation within the Arctic itself. Alternatively the minimal conditions for plant growth in terms of length of growing season, nutrient availability and shelter could be anticipated as providing such poor opportunities for plant growth that the flora would be monotonous in its composition and distribution. However, as anyone who has visited the Arctic can testify, the plants in this part of the world are just as habitat specific and diverse in their distribution as in any other region. What is generally not realised, however, is that even within individual species in the Arctic there is a high degree of variation which can be related to relatively small differences in habitat.

One of the readiest examples of micro-habitat specialisation that can be observed in the Arctic is to be found in the dioecious species. Dioecious plants have male and female flowers on different individuals. This distinction of male and female plants is a specialisation that is not very common in plants. In Britain only two per cent of our native species are dioecious while in the world flora as a whole the figure is a mere four per cent (Bawa, 1980). On a species basis the percentage of dioecious species in the Arctic is also small in the region of 4–5 per cent. However, in relation to their relative contribution to vegetation cover, dioecious species are conspicuous in the Arctic. In the high Arctic, willows can be a dominant feature of the vegetation. The polar willow (*Salix polaris*) can be found in dense swards on the northern coast of Spitzbergen at Biskayerhuken (79°50′N see Fig 111). Other species of willow can be equally dominant in other arctic habitats eg *S. arctica* in north-east Greenland and in northern Canada. Apart from the willows there are conspicuous examples of successful dioecious species that are prominent in arctic habitats, eg *Oxyria digyna, Rubus chamaemorus* and *Sedum arcticum*.

In addition to normal dioecism there is a further type of sexual dimorphism in which some individuals are hermaphrodite and others are unisexual. Where the unisexual individuals are female this is referred to as gynodioecism. A notable arctic and alpine example of this phenomenon is the dwarf campion *Silene acaulis*. An examination of the proportion of the female to the hermaphrodite form reveals a cline with the proportion of females increasing progressively on moving to higher latitudes (see Table 2).

Table 2 Proportion of female to hermaphrodite plants of *Silene acaulis* in relation to latitude of origin (unpublished data of Balfour and Crawford).

Location	Latitude N	No Observed	Female/ Hermaphrodite
Spitzbergen	79°	644	0.98
North-east Greenland	73°	1,747	0.77
Norway (Tromso)	69°	47	0.62
Scotland (Ben Lawers)	56°	160	0.65

The existence of separate sexes within populations of any particular species makes it possible to investigate how minor differences in the genetic constitution of individuals can alter their fitness and therefore survival in any particular environment. In dioecious species individuals of the two sexes will be competing with each other for places to grow. Even in the Arctic there is competition for space. The exposed ridges and other barren sites may be devoid of plants but in more favoured places such as in the grooves between stone polygons where shelter and water are more readily available there is usually a high density of plant cover and competition for space will exist. Much can be learnt about the relative fitness of different forms of plants by observing how males and females fare in colonising such sites and in their ability to grow once established. Male and female plants by virtue of being distinct sexually will also have other differences in their genetic inheritance. As they perform different tasks they will not be exposed in the same way to environmental stress. For the male plants, flowering is over quickly and can be expected to make smaller demands on mineral and carbohydrate resources compared with the female which has to bear catkins throughout the growing season until the seeds mature. The ecologist can therefore exploit "the war between the sexes" in order to determine the environmental factors which affect the growth of the different forms.

In an attempt to determine the controlling factors in the distribution of the polar willow (*Salix polaris*) Crawford and Balfour (1983) studied the distribution of male and female plants at fourteen different sites in Spitzbergen and sexed over 1,300 individual plants (Fig 111). Over the entire survey the female plants outnumbered the male plants in the proportion 60:40 (Table 3). There was some variation between sites but in all but two small isolated island locations the females were predominant. Similar observations made in Iceland on the least willow (*Salix herbacea*) found a similar proportion of female to male plants. Studies currently in progress on *S. arctica* from north-east Greenland

have found the same proportion of sixty females to forty males. Similar studies in northern Sweden (Danell, et al 1984) and on Denver Island (NWT Canada – Dawson, pers com) have also found a similar predominance of female willows over male plants. Table 3 summarises the observations so far reported for the proportions of male and female willows in the Arctic.

Table 3 Percentage of female willows recorded by various researchers in populations of northern willows of different species.

Species	Location	Latitude	Percent Females	Reference
S. polaris	Spitzbergen	79°N	59.1	Crawford and Balfour, 1983
S. herbacea	Iceland	67°N	59.3	Crawford and Balfour, 1983
S. arctica	Denver Island NWT Canada	75°N	60.5	Dawson (pers com)
S. arctica	North-east Greenland	73°N	57.8	Balfour, Crawford and Davies (in prep)
S. myrsinifolia x *S. phylicifolia*	Umea, North Sweden	63°N	62.3	Danell, et al 1985

The remarkable coincidence of these 60:40 female to male sex ratios now noted in four different species of willows over a widely-scattered range of sites in different regions prompts speculation as to the selective forces which could conceivably achieve this degree of equilibrium between male and female plants. There are no grounds to suggest that the sex ratio of the seedling in willows differs from the 1:1 male to female ratio. In a study of the distribution of male and female plants of creeping willow (*Salix repens*) on an accreting dune and slack system on the National Nature Reserve at Tentsmuir (Fife) it was found that the youngest populations of creeping willow which were found on land that had accreted from the sea in the last forty years all had female to male ratios that did not depart significantly from 1:1. In the older regions of the reserve the females gradually approached the same degree of predominance as was found in arctic willows.

These observations would agree with the view that individual selection will favour equality of sexes at least in seeds (Fisher, 1930).

Fig 107 *Trillium erectum* (see page 123) Photo: E. Dusek

Fig 108 *Trillium recurvatum* (see page 124) Photo: E. Dusek

Fig 109 *Cornus unalaschensis* (see page 124) Photo: E. Dusek

Fig 110 *Anemonella thalictroides* (see page 125) Photo: E. Dusek

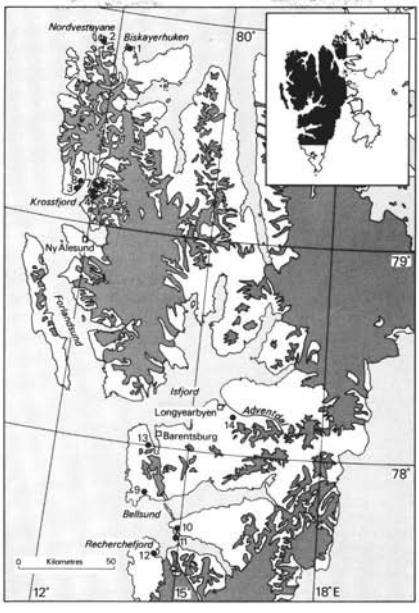
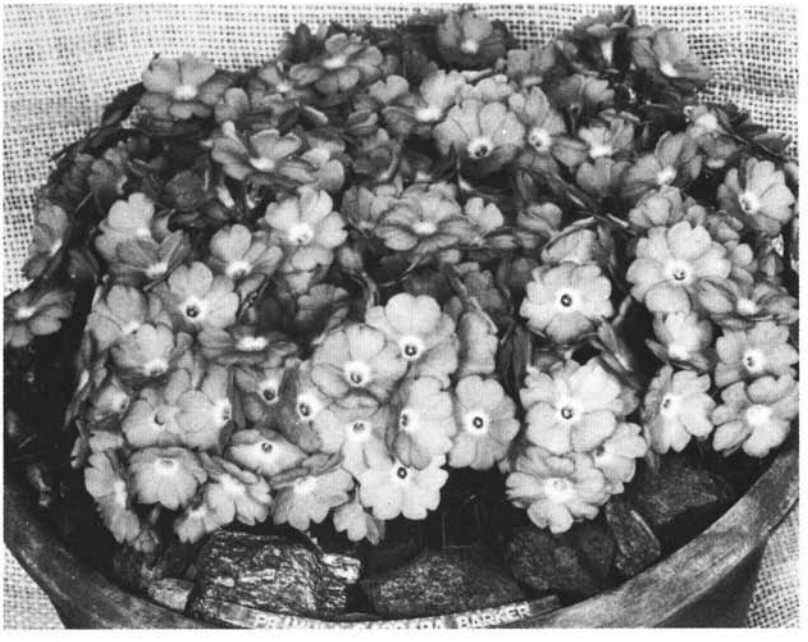


Fig 111 Distribution of *Salix polaris* populations (see page 167)

Fig 112 Nunatak and coastal habitats of Greenland (see page 163) Photo: R. M. Crawford

Fig 113 *Aciphylla monroi* (see page 197) Photo: A. Stevens

Fig 114 *Primula* 'Barbara Barker' (see page 183) Photo: R. Bezzant



Differential mortality between male and female plants could subsequently modify this ratio and would have the greatest opportunity to do so in long-lived species such as dwarf willows. Fitter female plants will live longer and thus account for the general predominance of their number over male plants. There could also be a selective advantage for an individual in belonging to a population that has a greater predominance of female plants. In the Arctic, regeneration by seedlings can be expected to take place by cohorts when conditions are favourable either for seed production or seedling establishment. Such conditions can also arise from sudden perturbations in the environment as when land-slip or frost-heave produces new sites for colonisation. Under such conditions populations that have a greater quantity of seed to disperse are more likely to establish themselves than those of lower fecundity. Some balance appears therefore to have been struck in all these arctic willows which maximises the fitness of the individuals when the sex ratio approximates to 60:40, female to male. The exact mechanisms by which this is achieved is not clear. However, it is possible that differential mortality in the different sexes may play a role.

In a study of *Salix polaris* in Spitzbergen (Crawford and Balfour, 1983) it was also noted that leaf resistivity differed between male and female plants. Leaf resistance is a measure of how easily gases move in and out of leaves. The gases that are of particular interest are carbon dioxide and water vapour. Whenever the stomata are open low leaf resistivity values are recorded and these are taken to indicate that the plant is in a condition to take up carbon dioxide and convert it to sugar by photosynthesis. When leaf resistivity values rise due to the closing of the stomata usually in response to some environmental stress then the photosynthetic activity of the plants will be diminished. Paired observations of male and female leaves frequently showed that female leaves had resistance values that changed more rapidly than those of male plants. This suggested that the female plants were more responsive to changes in environmental stress, closing their stomata promptly under adverse conditions and opening them again quickly when the period of stress had passed. As water deficits are frequent in the skeletal soils of the Arctic this could be a factor which might allow female plants to predominate.

In a comparison of male and female plants of *Salix arctica* in north-east Greenland it was found that the female plants regularly had larger leaves than the males. In dry sites the females also grew faster than the males as judged from a microscope study of the annual growth rings in the stems. In wet sites the growth rate of the two sexes was similar. As with the study of *S. polaris* in Spitzbergen the female plants appear to be able

to out-perform the male when there is a likelihood of a water shortage. Whether or not this out-performance leads to a greater longevity in the females and thus accounts for their superiority in numbers as well as in growth, is open to conjecture. It may be that in populations where the number of males is reduced there will be a greater production of seed. Sexual reproduction in the Arctic is a risky process and only in favourable years, which may be far apart, will there be any likelihood of success in establishing new populations from seed. Those populations that have the greatest number of females may therefore be better-placed to occupy any vacant sites when the chance arises.

There will nevertheless be a limit to the number of male plants that can be dispensed with before a shortage of pollen donors reduces fertilisation of the female catkins. In the Arctic there will be a minimal hindrance to the dispersal of pollen by vegetation. In some dioecious species of woodland habitats the excess of male over female plants has been attributed to the need for an ample pollen supply due to much being lost on the foliage of surrounding vegetation. This hazard is not met with in the Arctic and it may be that the 60:40 ratio of females to males is one that confers the greatest fitness on a population and ensures its collective survival.

There are other reasons why male and female arctic willows may differ in their survival. In northern Sweden it has been found that the male willows of the hybrid *S. myrsinifolia* x *S. phylicifolia* are more frequently attacked by bark-eating voles (Dannell, et al 1984). It would seem that the bark of the male willows is tastier than that of the females. This is possibly due to the higher sugar content as sugars, carbohydrates and minerals are more likely to be depleted from the bark in females with the greater demands of flowering and catkin production. This willow hybrid also shows the typical 60:40 female to male sex ratio (Table 3).

Conclusions

This discussion has attempted to highlight the antiquity and high degree of specialisation that is to be found in the arctic flora. As an example of this specialisation, the differences in growth and numbers of male and female willows have been discussed in detail. This example of sexual differences having an effect on the ecology of the individuals was chosen to show how relatively minor changes in genetic constitution can have a profound influence on the success and survival of an individual. It is by observing these relatively minor differences within male and female plants of the same species that we have an opportunity to determine what particular differences lead to success or failure in a

given environment. This paper suggests that the female willow, in spite of the additional burden of bearing catkins, is a fitter plant than the male. The reasons for this greater fitness are only partially understood. A greater degree of stomatal responsiveness to environmental changes is found in female plants of *S. polaris*. Higher growth rates which may be due to this greater efficiency in controlling water loss are also seen in *S. arctica*. The advantages of more females in areas where pollen is not lost on lush vegetation may be due to greater seed production. When the gynodioecious species *Silene acaulis* is examined, more females are found relative to hermaphrodites in the most northern habitats. This again underlines the high degree of specialisation that can be found in arctic plants. These different examples underline the unique nature of the arctic flora and the high degree of specialisation that has evolved to ensure success in this most testing of all habitats for the survival of plants.

REFERENCES

Bawa, K. S. (1980). Evolution of dioecy in flowering plants. *Annual Review of Ecology and Systematics*, 11, 15-39.

Billings, W. D. (1974). Arctic and alpine vegetation: plant adaptation to cold climates. *Arctic and Alpine Environments*, Eds – Ives, J. D. and Barry, R. G. Methuen, 403-443.

Böcher, T. W. (1972). Evolutionary problems in the arctic flora. *Taxonomy, Phytogeography and Evolution*, Ed. Valentine, D. H. Academic Press, London, 101-113.

Clark, D. L. (1982). Origin, nature and world climate effect of Arctic Ocean ice-cover. *Nature*, 300, 321-325.

Crawford, R. M. M. (1979). Survival strategies in arctic vegetation. *Journal of the Scottish Rock Garden Club*, 16, 249-260.

Crawford, R. M. M. (1982). Habitat specialisation in plants of cold climates. *Transactions Botanical Society of Edinburgh*, 44, 1-12.

Crawford, R. M. M. and Balfour, J. (1983). Female predominant sex ratios and physiological differentiation in arctic willows. *Journal of Ecology*, 71, 149-160.

Danell, K. Elmqvist, T., Ericson, L. and Salomonson, A. Preference by bark-eating voles – defense or not? *Oikos* (in press).

Fisher, R. A. (1930). *The Genetic Theory of Natural Selection*. Oxford Univ, Oxford.

Hyvärinen, H. (1971). Pollen analytic evidence for Flandrian climatic change in Svalbard. *Climatic Changes in Arctic Areas During The Last Ten Thousand Years*. Eds – Vasari, Y., Hyvärinen, H. and Hicks, S. *Acta Universitatis Oulunsis* Series A, 3, 225-237.

Mooney, H. A. and Billings, W. D. (1961). Comparative physiological ecology of arctic and alpine populations of *Oxyria digyna*. *Ecological Monographs*, 31, 1-29.

Towards Kanchenjunga

BARRY STARLING

DUE TO ITS considerable significance in relation to the success or failure of an expedition it is tempting, in an account such as this, to give a blow by blow exposition of two years planning and problems which preceded the actual launching of the expedition. From this I intend to spare fellow rock gardeners and commence my account as our first team of four left behind the jeeps which had brought us from Darjeeling to Yoksum and set out into the forests of Sikkim at 2,000m.

We four were: Chris Brickell, Director of RHS Gardens, Wisley; Brian Mathew, Botanist at Kew and well-known author; Michael Upward, Secretary of the AGS and myself, whose job it was to remember where the best plants grew and guide our second team, the seed collectors, back to those locations in September. Guiding us and organising our Sherpas and porters was Daku Tenzing, small, sprightly and eminently-skilled in mountain-craft, as one might expect of the wife of Everest conquerer Tenzing Norgay.

As we ascended then dropped, ascended then dropped again and again to cross the numerous rivulets that had carved their way into the hillsides, we despaired of ever gaining height. Much of the flora was strange to us though gesneriads and begonias were conspicuous on the mossy banks alongside the path. *Begonia cathcartii* was one which flopped large clusters of 2.5cm wide, white, pink-flushed flowers on fleshy stems from brittle-leaved rosettes plastered on the vertical-faced, dripping wet rocks. However, it was not until we reached Bakhim, a rest-hut at nearly 3,000m, that we saw plants from a genus more usually encompassed by the interest of alpine gardeners. High on the bole of a tree large clusters of khaki-green blobs sprouted slender leaves with here and there an exotic white, yellow-throated orchid bloom. This was our first encounter with *Pleione hookeriana* in the wild so that, for the moment at least, we became oblivious to the athletic, slender black leeches that sought to grow fat on our blood.

As we gained height more familiar, temperate-region trees and shrubs came into view. One of these, *Viburnum cordifolium,* sported upward-facing corymbs of pure-white flowers which by autumn had given way to bronze-orange berries. Beneath the shrub canopy sturdy arisaemas pushed up sometimes graceful, sometimes grotesque spathes.

The slender green spathe of *A. tortuosum* was as beautiful as a forest nymph; the muddy, jaundiced tongue that *A. speciosum* var *mirabile* put out as we went by did little to endear it to us while the great black and white, striped and blotched, half-furled flag that *A. griffithianum* flew was positively sinister.

At 3,800m a crimson carpet at the foot of a high cliff introduced us to our first rhododendron in flower, *R. cinnabarinum*. It overhung the top of the cliff and glowed in the murky greyness of the sky above, dropping its spent flowers to form the carpet at our feet. Soon the dense forest broke into clearings and thickets with a predominance of primrose yellow *Rhododendron lanatum* amidst tall, stately firs. Now, as ground cover, *Cassiope fastigiata* vied with *Gaultheria pyrolloides* for space and we doubted Daku when she assured us that higher we would see "many, many of the little white flower". Later we were to walk over it where it clothed the ground like heather on a Scottish moor. The gaultheria's contribution was ample clusters of rose pink, spherical corollas over a dark-green mat barely 5cm high.

Clumps of interesting-looking shoots bearing rich-green, pleated leaves had us guessing until we found the first large, yellow trumpets, green chequered in the throat, which identified this as *Gentiana stylophora,* probably the largest of the gentians. Claret-coloured heads of *Bergenia purpurascens* gave colour to the black, shadowy areas beneath the canopy of shrubs. We were to see this bergenia again high on the shaded side of the ridges up to altitudes of 4,500m. Here the tough, leathery leaves had to withstand much more severe conditions.

At last, at nearly 4,000m, the open areas of alpine meadow predominated, the short turf being spiked by 10cm-high stems bearing the yellow bells of *Lloydia flavonutans,* or studded with a little buff pink Aletris together with pale to deep violet pom-poms of *Primula glabra*. In a shallow stream we found a diminutive Marsh Marigold, *Caltha palustris* var *himalensis,* while commonly in the pastures a single 15cm stem topped by a trifoliate, bronzy-green leaf would mark the spot where the emerging brown-black, striped greeny-white cowls of *Arisaema propinquum* were to be found.

Two larger primulas had appeared by now; *P. calderiana* with velvety wine-red flowers, each with a black disc at its centre and *P. obliqua,* usually with nodding heads of large cream corollas but now and again exciting us with an exquisite pastel rose coloured form.

We reached Dzongri on our third day of trekking – a journey of frequent delays as we dived on hands and knees into the undergrowth to record on film yet another new floral find. Dzongri, at 4,000m, was our base camp – an idyllic spot, despite the constant monsoon rain,

surrounded by a wealth of fabulous alpine plants. Great cushions of *Androsace lehmanii* studded with tiny white stars grew exclusively in grassland. On wet, weeping, peatty banks the Petiolarid Primula, *P. deuteronana,* had just finished flowering though we did find just one or two lavender-pink, white-eyed corollas to admire. Dwarf rhododendrons, *R. setosum* in purple, pink and crimson-claret and *R. anthopogon,* blush white, formed protective thickets here. It was interesting to note that a little lower down we had encountered *R. anthopogon* in a variety of pastel colours including a dusky rose-pink, yellow, shades of cream, apricot and peach, some with heavily-silvered leaves. From Dzongri upwards to nearly 5,000m *R. anthopogon* was invariably the white form though becoming very much smaller in stature at the higher altitude.

Prolific at Dzongri, on peaty mounds and banks, the elfin *Primula primulina (pusilla)* displayed a similar colour range to *P. glabra* with flowers of deep violet through to pale lavender and even a white occasionally. *Sedum himalense* – more correctly *Rhodiola himalense* – grew as a sub-shrub of half a metre in height and 60cm breadth, countless scarlet buds opening to orange-gold stars which finally gave way to bright-red seed capsules. The vivid-green, black-centred flowers of the Himalayan Mandrake, *Mandragora caulescens,* were difficult to find though we did eventually track down a few tucked safely beneath the twiggy growth of the dwarf rhododendrons, safe from four-legged foragers.

On high ridges of glacial grit, fine plants of mauve-pink *Anemone demissa* flourished bearing 4cm-diameter flowers. Lower down, but in the same hungry grit, thistly-leaved *Morina betonicoides* grew prostrate with heads of 3cm long, tubular, purplish pink corollas, while against a grey boulder the glistening gold chalices of *Ranunculas lobatus* cheered the misty scene. Sprinkled in the turf of a flat meadow the tiny, 1cm diameter, palest pink flowers of an Anemone could easily have been missed. Should we grow this little gem in the garden, however, its label large enough to bear the words "*Anemone rupestris* ssp *gelida* var *wallichii*" would surely prevent it from being overlooked. Close to camp an interesting form of *Viola biflora* scrambled amongst Juniper branches. Its yellow, black-lined face was not remarkable but the rusty-red backing to the flower set it apart from known forms of the species. Before pressing northwards one more treasure came to light. This was the creamy yellow flowered form of *Lilium nanum,* the variety *flavidum,* which at 20cm high was a taller and much more robust plant than the type *L. nanum* that we were soon to encounter.

After a few days at Dzongri we headed north towards the 7,000m Mount Pandim and much higher Kanchenjunga. A solitary plant of

glorious-blue *Meconopsis grandis* caught our eye before we dropped down into the valley of the Prek-chu, a river we were to cross and recross. Here we were in forest again where huge birches and rowans shaded tree-like Rhododendrons. Here it was that we found the clear, deep crimson form of *R. hodgsonii* and were later able to collect plenty of hand-pollinated seed. In the jumbled rubble of rocks alongside the torrent, a tamarisk relation, *Myricaria rosea* scrambled about sending up pink, fluffy spikes above blue green, fine foliage.

At Thangshing, our next camp, bright-yellow spikes of *Corydalis juncea* were plentiful in the wet meadow. Just north of the camp where the rhododendron scrub began, an exquisite little androsace of the Sarmentosa group studded several square metres with heads of pink, red-eyed flowers on 5cm scapes. This was *A. hookeriana,* a plant which later proved impossible to relocate due to the non-persistence of its rosette. Nearby *Cotoneaster microphylla* carpeted a gully with rich dark-green small oval leaves spangled with many white blossoms which in September had been replaced by scarlet berries interspersed with the brilliant blue fruits of *Gaultheria tricophylla.*

Our next day's trek took us to our highest camp and to a barren-looking landscape which still held some surprises. The cushion saxifrages, *S. imbricata* and *S. ramulosa,* both white-flowered, differed only in the longer scape and several-flowered head of the latter species. Woolly *Tanacetum gossypinum* made tight little hummocks of silver-grey – bright enough to stand out against the grey-white glacial grit in which it grew. Another silvery-leaved plant which made larger cushions or mats on gritty banks was the astragulus-like *Chesneya nubigena* which bore large pea flowers of purplish-pink with deeper reddish keels. In other areas of the Himalayas a form of this plant is known with yellow flowers.

Thwarted by recent snow on the high Goecha Pass we returned to Dzongri and then climbed over a pass to the west into the Bikbari Valley. It was almost exactly at the top of the pass that we came across our most exciting primula find, *P. sapphirina*, with flowers reminiscent of a tiny, deep lavender soldanella. Sharing this lofty environment were the woolly spheres of *Saussurea trydactyla* anchored into rock crevices by enormously long, stout tap-roots.

An unlikely alpine in this environment, had, at 30cm diameter, the appearance of a large, pink-tinged, green cabbage. This was the emerging bud of *Rheum nobile* which by autumn had produced metre-high spikes clad in white, scallop-shaped bracts to protect the flowers.

Dropping down into the valley three species of geranium came to light, the most conspicuous and desirable as a rock plant being the

compact, 10cm-high *G. nakoanum* which had just begun to display bright rose, 3cm-diameter flowers. Although we had already seen plants of the tall, slender *Fritillaria cirrhosa,* we were impressed by the fact that those we were now seeing were, in many instances, twin-flowered. Almost always the plant sought the protection of shrubs, the tendril-like growths at the top of the scape helping to guide the budded stem through a tangle of branches, the buds opening as greenish-yellow, long, inverted cups above the obstructing twigs.

As we followed the river, heading north-north-west, Daku drew our attention to a carpet of deep violet. Indeed the flowers had the appearance of violets but on closer inspection proved to be those of a member of the pea family with a particularly ugly name for so beautiful a plant. For this was *Gueldenstaedtia himalaica,* an uncommon alpine in Sikkim but less rare in Nepal.

The almost level table of turf on which our tents were pitched at Bikbari provided a habitat for two more fine plants. Deep violet purple *Primula capitata* bore its cluster heads on strong, straight, 40cm stems while the slender, much shorter stems of *Lilium nanum* hooked at the top to suspend pale rose, cone-shaped corollas with the segment ribs picked out in deep purple rose. We had seen many full-budded plants of *Rhododendron lepidotum* in varying forms of habit and leaf but, as yet, very few in flower. Here amongst the boulders the tiny yellow-flowered form was opening rotate corollas to show olive-green markings towards the base of its upper lobes. Another Ericaceous plant tumbled down the steep north-west slope displaying a generous sprinkling of small, bell-shaped, salmon-red corollas, whitening towards the reflexed lobes. This was *Gaultheria tricophylla* which thrilled us even more in the autumn with its large conspicuous blue fruits. From blue fruits to one of the most brilliant of blue flowers – *Corydalis ecristata.* This azure gem tucked away small tubers well down beneath the slabs of rock, sending its fragile stems through the sharp, stony medium to compete with tough tussocks of grass and emerge bearing lacy, blue-green leaves and flowers like minute blue-birds on the wing.

Away in the hanging valley to the west of camp, huge, moss-covered boulders provided a home for just a few of the intriguing plant which we later found to be *Oreosolon wattii.* Excited speculation that this was perhaps a new primula or ruggedly hardy gesneriad was quelled when we later discovered it to be a member of the foxglove family, Scrophulariaceae. Just three or four, 3cm long, cream, tubular flowers emerged from the centre of a 5cm diameter flattened rosette of deep green, rugose leaves.

Our time in the Bikbari Valley had passed all too quickly and now it was back to Dzongri to prepare for our downward trek. Back into the forest and even now we were to find another spectacular plant enlivening the shade of a small clearing. Here *Roscoea auriculata* held its flamboyant, cyclamen-pink inflorescences above the pale green leaves like a multitude of ladies at a ball, all wearing the same gown.

Our descent was rapid. Jeeps met us at Yoksum, made a brief detour to allow us a view of the splendid monastery at Pemayangtse and then trundled us back to Darjeeling, from there to Bagdogra Airport for the start of an erratic and traumatic journey home due to the fact that it is impossible to confirm flights from 4,000m or so in the Himalayas.

The two months between expeditions soon passed and after a technical hitch over permits to travel in Sikkim we once again found ourselves trudging the trail from Yoksum to the alpine regions. This time I was accompanied by John Main from Wisley; Peter Cunnington, Ness; Stuart Macpherson, RBG, Edinburgh; David Haselgrove, AGS Publications Manager; and David Mason, Longstock Gardens. Our guide was Toupchen, adopted son of the Tenzings and a Tibetan by birth, while Passan, our cook from the previous visit, was again to ensure that we did not go hungry.

By now the begonias of the lower regions had given way to a handsome yellow hedychium species and as we reached the alpine fields the place of cassiope and dwarf rhododendrons was taken by a riot of colourful blue and white *Cyananthus lobatus* and numerous yellow Saxifraga species. The latter varied from little, hairy dwarfs of 5cm to 30cm high, red-budded, golden-flowered plants.

Tired limbs and flagging spirits were instantly revived when looking down a steep escarpment of unstable gravel we spotted at first one, then many of the most delicately-poised, nodding, rose-pink heads. These were the delightful flowers of *Cremanthodium palmatum* ssp *benthami,* borne above small, palmate leaves, rich wine-red on their undersurfaces. Raindrops glistened from tiny cobwebs stretched between stem and leaf enhancing still more this charming little alpine.

We had not expected to find primulas still in flower but one species, *P. crispa,* had only just commenced to open deep violet buds. It formed a capitate head held at right angles to the long scape and unlike *P. capitata,* all of the buds forming the head opened together to form 5cm diameter hemispheres. Sharing the boggy meadows and seeping banks with the primula were two pedicularis species. The first, with large, hooded flowers of cyclamen-rose, is as yet unidentified while the second, *P. longiflora* var *tubiformis,* produced from amidst deep green, ferny leaves, very long-tubed, yellow flowers. Unlike many

pedicularis there was no evidence that either of these species was parasitising surrounding vegetation.

At Dzongri, not far from camp, handsome *Cyananthus pedunculatus* bore large, blue-violet flowers singly on 10cm stems amongst the turf. Towards the pass between Dzongri and Bikbari the relatively large, mid blue flowers of a small monkshood, *Aconitum hookeri,* dotted the turf, its tiny, dissected leaves emanating from a small, black, knobbly tuber underground. Though the overall height of the plants was barely 10cm, the hooded flowers were almost 5cm long by 2.5cm wide.

On reaching camp at Bikbari we set about bagging-up the day's seed crop, hanging the bags, along with socks, boots and other clothing, on lines rigged up in the work tent above a small kerosene stove. The most we could hope to do was to dry off some of the surplus moisture and frequent inspection of the seed was necessary to ensure that no rotting or deterioration was taking place.

Towards the glacier more choice little Saxifragas were found, all yellow in flower, though some with crimson buds or orange-gold backs to the petals. Also in this area *Arenaria glanduligera* made conspicuous patches of massed rose-pink stars over hairy mats.

The Bikbari Valley had been fruitful but we now returned to Dzongri, then pressed northwards, finally achieving our goal of the 5,100m Goecha Pass. Approaching the pass, *Meconopsis horridula* was in flower and in seed allowing us to enjoy its exquisite blueness and rewarding us with a harvest that promised flowers to come in cultivation. *Potentilla arbuscula,* with the most enormous yellow flowers I have ever seen, was, as a shrub, compacted to pancake-like proportions by the rigours of this high altitude and spartan diet while, even higher, 15cm high *Delphinium glaciale* nodded disproportionately large, down-covered, blue hoods. In a hanging valley towards Mount Pandim *Potentilla eriocarpa* var *dissecta* draped curtains of ferny foliage set with many pale moons over the high, south-facing cliffs. This is an excellent form, superior in both flower and foliage to the type plant.

Streamsides lower down were colourful with epilobiums and the curious *Silene nigrescens* with white, striped almost black, inflated calyces. The beautiful blue-green, filigree foliage of *Corydalis meifolia* var *sikkimensis* trailed from the banks into the water, enlivened by many tiny, yellow and black flowers. Two plants of smaller stature were at home in the boulders alongside the stream. The first was an umbellifer, *Pleurospermum govenianum,* with each stiffly-erect stem bearing a pincushion of blue flowers surrounded by a green ruff of pointed bracts. The second, *Saussurea obvallata,* had large, elliptic leaves around a stout

stem which ballooned, at its apex, into a sphere of large white bracts protecting the composite head of blue flowers.

By now breaking camp was a large-scale operation. Two beasts of burden had been enlisted to aid the porters in transporting our considerable weight of equipment, burgeoning plant presses and bulky seed haul. We had seen many plants in flower but the ones we had really expected to find colouring the autumn landscape were the gentians. They were there in plenty but in the absence of sunshine had stubbornly refused to open their flowers. "At last!" as we were about to leave the alpine meadows to plunge back into the dark forest, a few minutes of sunshine did the trick. Shyly the trumpets of *Gentiana prolata* spread their lobes, appearing to reflect and intensify the rare blueness of the sky above.

Back in Yoksum the jeeps arrived to take us back into a land of harsh reality made just a little more palatable by the prospect of dry clothes and a glass or two of beer.

Jubilee Photographic Competition

The above competition has now been judged by a panel consisting of Professor F. W. Robertson, Dr A. M. Paton and Mrs H. Salzen.

The first prize of £25 has been awarded to Mr A. Stevens of Dunblane for an entry of *Ranunculus parnassifolius, Tulipa batalinii* and *Erythronium* 'Pagoda'.

Two additional prizes of £5 each for outstanding individual prints were awarded to Mr H. Esslemont for a print of *Primula aureata* and to Miss M. Hodgman for a print of *Hosta* 'Tokudama'.

The judges commented on the outstanding quality of the prints and had a difficult job in selecting the winners. They were looking for artistic merit but also for prints that would reproduce well in "The Rock Garden" and showed the true character of the plants. Many entries had one or two outstanding prints but were not so good as a group.

There were twenty-two entries which was a most gratifying response. This will mean a total of sixty-six quality black and white prints for publication.

Plant portraits

Draba polytricha

Ray Johnstone

Draba polytricha (Fig 106) is an attractive and popular plant of the family Cruciferae which can be relied upon to give a good display of flowers in March and April. It forms a hemispherical cushion of closely-packed hairy rosettes and blooms so profusely that the cushion is almost hidden by its yellow flowers.

It is a native of the west and south Caucasus, Turkish Armenia and Kurdistan where it grows at altitudes of 1,500–3,100m on rocks, taluses and in crevices.

Draba polytricha is similar to *Draba mollissima,* from the western Caucasus.

The main differences between the two species are given below:

D. polytricha

Rosettes: 4–8mm diameter densely covered with white/silvery or translucent hairs up to 1 mm long. Cushion firm.

Flower stalks: Densely-covered with white hairs all way up the stem. Flowering from cushion level then elongating up to 50mm when in seed.

Flowers: In untidy but tight racemes of about 4–15 (generally 6–8) individual flowers, golden yellow, sweetly scented. About 5–7mm across petals, anthers short and stumpy, only projecting 1mm maximum from the face of the flower. Late March to mid-April.

D. mollissima

Rosettes: 5–7mm diameter flattish covered with white hairs up to ¼mm long. Cushion soft.

Flower stalks: No hairs on upper part of stem. Flowering at 30–40mm from cushion, sparsely distributed over cushion.

Flowers: Neat racemes of about 6–8 individual flowers, bright yellow, not so pleasantly scented. 7–9mm across petals, anthers long and slender, projecting 3–4mm from face of flower, early to late-April.

Draba polytricha is hardy but its hairy rosettes indicate that protection from winter wet is required in climates such as that of Great Britain. It grows satisfactorily in clay pots plunged in a frame or alpine house, shaded from April to September and given enough moisture to prevent the cushions 'cracking'. This cracking is an indication of drought, cracks open up between the rosettes as the cushion loses its turgidity. When this happens the plant should be stood in water until the compost has had a good soak.

Propagation is easy from cuttings and seed germinates readily enough. Drabas should be given a gritty compost with very good drainage especially at the neck of the plant. I use 3mm Shap granite chippings but other growers use small stones, tufa or rock fragments to place under the cushion. An important part of cultivation is that the cushion should be examined regularly all year round for dead rosettes; these should be removed otherwise they can cause larger areas of cushion to die-off. All dead and mouldy rosettes with as much stem as possible should be removed with a pair of tweezers. This operation will often cause detachment of a living rosette – this provides material for cuttings. Removal of rosettes results in holes in the cushion; it is important that neighbouring rosettes are teased into these holes otherwise the cushion will develop an unsightly depression. Damage caused by birds, finger-poking children or wandering domestic animals will also result in a depression unless the cushion is restored immediately. When these holes have been filled the plant will seem loose and more top-dressing should be added under the cushion to chock it up and make it firm again. It is best to place drabas low in the pot when repotting as the process of adding grit to the neck causes the cushion to eventually rise up to rim level. The pot should be turned regularly to ensure evenness of flowering.

After flowering the flower stems should be removed from as near the rosette as possible. If seed is required, leave on enough stems for your requirements but leave them spaced-out so they are not crowded on to one part of the cushion. Undeveloped or mis-shaped flowers may be found jammed in between the rosettes. These should be removed with a pair of tweezers otherwise rot may set in.

The plants can be repotted when the cushion fills the pot and roots come out of the drainage hole; this is best done after flowering. Small plants are easily enough repotted; bigger plants should be repotted by the method advocated by Eric Watson for androsaces (Journal No 64, pages 168-169). The pot should be watered a day or two before repotting and a thin-bladed knife run around the inside of the pot to detach the fine roots that cling to the pot sides.

Once the plant has exceeded a 15cm (6in) pot, repotting becomes more difficult and there is good reason once it exceeds a 20cm (8in) pot to give the plant away to let someone else have this problem. My plant in a 20cm pot weighs 16.8kg, a heavy weight to lift out of a frame or to carry to shows. This weight could be lessened by replacing the heavy grit with modern compost additives such as Perlite or Perlag but as yet I have not used this material on drabas.

Draba polytricha was given an Award of Merit in 1979 when exhibited by Miss J. Halley of Dundee.

Sources of Plants: Specialised alpine plant nurseries; Seedlists of Botanical Gardens, SRGC, AGS and other Societies. Growers and exhibitors may have rooted cuttings to spare; plants sometimes appear at local group plant sales.

Viola zoysii

L. A. McBride

I consider this native of the Julian Alps to be one of the choice members of the family Violaceae. While recently on offer from some Scottish alpine nurseries it is still not widely grown in cultivation.

The bright-yellow flowers (Fig 105) stand 5cm above the dark-green mat of foliage and when grown in a pot or pan can often form a cushion completely covered with flowers in April and May.

I have grown *Viola zoysii* in several garden situations and found it is quite hardy out of doors with no winter protection, spreading rapidly in a rich scree. However, I have found it will under these conditions only produce a few sparse blooms and unless precautions are taken it suffers greatly from slug predation.

This year I have grown a seedling in a raised bed, providing winter cover and at this stage (late February) it is covered with flower buds.

I feel, however, that to achieve perfection with this plant it should be grown in a long-tom type pot, in a well-drained leafy compost and given the protection of a cold frame or alpine house.

A plant treated as above filled a 25cm pot and had a green dome covered with over eighty flowers, gaining a Certificate of Merit at the 1983 AGS Western Show – despite having been in bloom for four weeks!

Viola zoysii is easily propagated by division (in May or September) and in some years sets seed which when sown fresh germinates rapidly.

Primula 'Barbara Barker'

Lyn Bezzant

Primula 'Barbara Barker' (Fig 114) was raised by Clarence Elliott, and was derived by crossing *P.* 'Linda Pope' with *P.* x *pubescens* 'Zuleika Dobson'. It carries large violet-pink flowers, several to a stem, and has smooth, green, white-margined leaves. It makes an excellent subject for the show bench, and is easy and rewarding for the beginner to exhibiting. It flowers in April.

A good stock can be built up reasonably quickly by careful division every year when repotting. A good general compost for easy-going European primulas and their hybrids is as follows: one part loam, one part peat and/or leafmould, and one part sharp grit. Mix a little bone meal and soil pesticide with the compost. Sprinkle the drainage crocks at the bottom of the pot with Rootguard or something similar. This helps to take care of root aphis and vine weevil.

When dividing up last year's plants, peel off the large outer leaves and then cut off the stout central tap root as high up near the crown as possible. At the same time shorten the rest so that you are left with the appearance of a worn-out shaving brush stump of roots. To make up your exhibition plant, three-quarters fill a wide pan (not too shallow) and space your plant stumps out on top of the compost, evenly and comfortably, just not touching each other. Fill up in-between, firming well as you go, lifting up the pan and knocking the rim all round with the heel of your hand to help the compost settle. Make sure all pieces of plant are at the same level. Finally top-dress with a suitable grit or small stones. Grey is a favourite colour here, blending well with most flower shades and being quietly unobtrusive. One final good firming, then give a gentle overhead spray with water to clean any loose compost out of the rosettes and off the leaves. Plunge to the rim in damp sand in a cold frame. Give light shade, and shelter from drying winds for a week or two.

Once you have enough plant material to pot up in this way, the whole panful can be repotted into a bigger container the following year without disturbing the roots. The spring after that you should have a solid mass of flowers on a rounded dome of healthy leaves. After three years of repotting in this manner, it is advisable to take the plant apart and begin again as described above. The same method can be used for *P.* x *pubescens* 'Mrs J. H. Wilson' another lovely and floriferous plant, and for all the delightful forms of *P. marginata.*

Give plenty of water in the growing season with the occasional liquid feed. Protect from overhead moisture during winter. *P. marginata*

forms need keeping dry overhead to preserve farina up till flowering time. Guard against pests at all times. Remove any rotting rosettes. Yellowing and dead leaves should be peeled off with a downwards and sideways tweak, carefully. A pair of long-handled tweezers is a useful tool for this. These primulas can take all the sunlight available in a normal west of Scotland summer.

Primula wigramiana

M. Constable

This beautiful member of the section Soldanelloides (Fig 118) was discovered and introduced to British gardens in 1931 from the high mountains of Nepal, where it is found growing at an elevation of some 5,700m. When first exhibited in 1934 before the Royal Horticultural Society it caused quite a stir and was duly awarded an Award of Merit. For many years the only plants to survive in Britain were at Bodnant Gardens in north Wales. Unfortunately, it has been some years since this species has been in general cultivation. Recently, seed was distributed by the Munich Botanical Garden and raised by Mr Jermyn of Edrom Nurseries in 1980.

I was fortunate to acquire a plant which flowered in May 1982. Grown in a mixture of rough shredded peat (from blocks) and sharp sand (50% each by volume), the young plant quickly grew into a six-inch pan. I followed Mr Roy Green's advice in his excellent book "Asiatic Primulas" for members of Soldanellae; that is – water was withheld from October until active growth was observed in spring.

An old window frame formed the only frost protection and subsequently the pot was frozen hard on a number of occasions. (This is definitely not recommended but at the time I was not in a position to give the plant any further protection).

A spreading rosette of soft hairy leaves formed early in the year, with the six white bell-shaped flowers forming a head on a 150mm scape coming in mid-April. This is two or three months earlier than in its native habitat. It has an exquisite scent which is similar to *P. reidii* but seems to be even stronger.

After flowering, the main rosette dies away leaving a number of auxiliary rosettes. Unfortunately, although these grew, new roots were not formed, an experience shared by other members of the Club, I believe.

I can only echo the thoughts of Mr R. Green – "Is it too much to hope for its reintroduction?"

Fig 115 *Stellera chamaejasme* (see page 187) Photo: R. McBeath

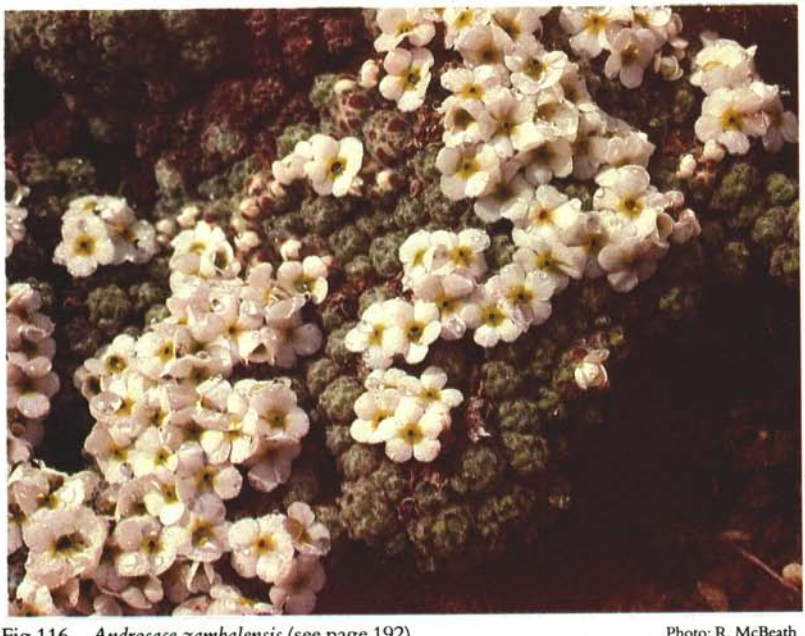


Fig 116 *Androsace zambalensis* (see page 192) Photo: R. McBeath

The Marsyandi Valley, Central Nepal

RONALD McBEATH

Royal Botanic Garden, Edinburgh

IN 1950 Colonel Donald Lowndes had the enviable opportunity of opening up new botanical ground when he joined a mountaineering expedition to the headwaters of the Marsyandi River, just to the north of the Annapurna Himal in Central Nepal. This was only the second botanical expedition by a western collector to the Nepal Himalaya in recent times and Lowndes found many new and exciting plants, including two new species which commemorate his name, *Rhododendron lowndesii* and *Saxifraga lowndesii*. The superb form of *Polygonum affine* 'Donald Lowndes', which is such a popular garden plant today, was also a result of his collections that summer.

The Marsyandi headwaters remained more or less closed to western travellers until 1977, when the Nepalese Government opened up much of this area to trekkers. This is now a popular route, especially in the autumn, when many people make the 400 kilometres trek around the sprawling Annapurna Himal. Few of the trekkers have time to wander far from the main path and the large side valleys remain virtually unexplored. It was to explore those side valleys and to try to introduce some of the very exciting plants from this region – *Stellera chamaejasme* (Fig 115), *Primula wigramiana* (Fig 118) and *Meconopsis bella* (Fig 117) to whet the readers appetite with three – that I spent a month in late July-early August 1983, based at Manang, one of the higher villages near the head of the valley.

The seven-day walk to reach the hardy plants starts at Dumre (460m), a small village five hours by bus from Kathmandu on the road to Pokhara. Within a hundred metres of leaving our bus we encountered the first of the many obstacles on the trail, a large river swollen by the monsoon barring our route and the only way forward was to ford it. Our Sherpa guide leading the way immediately slipped on a stone hidden in the murky waters and with an almighty splash disappeared out of sight – probably not the best way to impress us with his ability to act as our guide.

The first four days were spent in oppressive heat and humidity, walking along near the Marsyandi in a northerly direction. The path

passes through newly-planted rice-paddy or fields of sweet-corn which was almost ripe. On the rougher slopes and cliffs where cultivation was impossible, a sub-tropical forest abounds with epiphytic orchids, ferns, gingers, aroids and clubmosses.

At the village of Syange (1,060m) we entered the long and deep gorge cut through the mountains by the Marsyandi and it was not until we had walked many miles and for three days, that we reached the open countryside again at the village of Brathang (2,900m). Towering to the north and east rises the Manaslu Himal (8,080m) and to the south and west the Lamjung Himal of Annapurna (6,900m).

In the lower part of the gorge many interesting plants occur including the tree fern *Cyathea spinulosa* and the palm *Trachycarpus martianus,* nearby amongst grass in full sun grew the tender *Lilium wallichianum,* with stout spikes 1.2m tall; unfortunately the very large white, sweetly-scented flowers were still in the bud stage. A bulb lifted in this condition of growth had its stem cut back to 7cm and was then carried around the mountains for six weeks before we returned to Edinburgh. Back home it was potted up and kept in a cool glasshouse. After this rough treatment when in full growth, it subsequently grew up and produced one flower on a stem 90cm tall the following year. Also in the gorge *Lilium nepalense* formed large drifts on moist grassy banks between 1,500m and 2,900m. This is a stoloniferous species with large, nodding, yellowish green trumpets, liver purple inside the tube. In cultivation some forms can be tender but if a hardy clone is obtained it can be an unusual and eyecatching plant for the woodland garden or large rock garden.

As we slowly ascended the gorge, conifers gradually dominated the vegetation until the path meandered through a forest of *Pinus wallichiana, Picea smithiana, Tsuga dumosa* and *Taxus wallichiana.* In openings and on rock outcrops many familiar herbaceous plants start to appear at about 1,830m including *Bergenia ciliata, Anemone rivularis,* Potentilla, Geranium, Euphorbia, Thalictrum, Astilbe, Aster and Anaphalis. Gradually they become more frequent until around 2,900m all tender plants are left behind.

The valley floor above Brathang now opened out and there was a feeling of spaciousness; the surrounding high white mountains reaching up to 7,600m could be appreciated, as we were clear of the forest and gorge. This region on the north side of Annapurna is very arid especially the wide valley floor, due to the rain shadow effect. In Nepal the hot humid winds in the summer blow in from the south. As they strike the southern flanks of the mountains they are forced to rise, cool and deposit vast amounts of rain, so encouraging the rhododendron

forests for which the Himalayas are so famous. After crossing the high tops all the excess water has been shed and little rain falls in summer in the high inner valleys. Thus in the upper Marsyandi Valley we are in an arid zone where the chief shrubs are *Potentilla arbuscula, Rosa sericea, Clematis vernayi, Juniperus indica, J. squamata,* Spiraea, Berberis, Lonicera and Caragana, the rhododendrons being quite absent, except for a few alpine heath-like species at higher altitudes.

The wide flat valley floor stretches for many miles with villages situated wherever there is suitable land for cultivation. The availability of irrigation water is the most likely deciding factor, as all crops must be watered by diverting streams to flood the fields regularly throughout the growing season.

The principal crops are potato, cereals and buckwheat (a species of Fagopyrum). The fields are small and no mechanical aids are used.

The flat land and lower slopes which are not cultivated often have sparse vegetation, with 50% to 75% of the ground devoid of plants of any sort, pines and juniper are frequent except near the villages where they are cut for fuel; regeneration is good except on heavily-grazed grass slopes.

After those discouraging words about the conditions on the valley floor and lower slopes you may feel that they must be very dull, but this is not the case. One of the aims of the expedition was to find and introduce *Stellera chamaejasme,* a herbaceous plant related to Daphne. Here it turned out to be in great abundance in the open forest, dry grassy slopes, heavily-grazed meadows and to a lesser extent on the bare open stony places, in fact anywhere where it was well-drained. The grazing animals left it well alone which may account for its prolific numbers, as any plant unpalatable to the animals is at a great advantage. From an enormous thick tap-root great clumps of simple stems arise up to 60cm tall, capped with a dense head of very sweetly-scented Daphne-like flowers, red in the bud opening to white. Occasionally plants with yellow buds could be found. The seeds were set, ripened and shed almost before the flowers had withered. Seedlings of all sizes were in great abundance and a few dug up on the day before I left the valley travelled well when wrapped in a little moss. They were subsequently established in pots before planting out in the open garden ten months after lifting.

Under similar conditions *Androsace muscoidea* forma *longiscapa* was also frequent. Forming cushions up to 30cm across, of tight inrolled rosettes, it was now well past flowering at this altitude. Alongside but less frequent, was *Oxytropis mollis* with fine silver foliage and small deep purple flowers in dense heads. The little yellow poppy,

Dicranostigma lactucoides, was common especially in the hottest dry places and a novelty to me was *Ajuga lupulina*, with upright stems 9-30cm high; the small white flowers were almost hidden by its main attraction, the quite large yellowish white bracts which clothed the flowering stem. Let us hope this will prove to be an easy rock garden plant. Two familiar garden plants which were common were *Anemone rivularis* and *Androsace strigillosa* but the androsace was never as attractive as it can be in cultivation. The rough *Gentiana straminea* favoured open woodlands where its large dark green leaves lay on the pine needles, while the white flowers were held on erect or decumbent stems up to 45cm long.

In the few moist meadows, *Primula tibetica* was often abundant; although a member of the Farinosae section, it has little or no farina on the leaves and flower spike. The upright flowers are rose red with a yellow centre, held on stems 5-8cm high. At the other extreme was *Primula sikkimensis*. This well-known species formed stout clumps amongst the rough vegetation at the sides of streams and irrigation ditches, the flower stems reached 60cm high and each held many pendant yellow flowers.

Much to my surprise, *Rhododendron lowndesii* was found growing at the pathside at 2,980m on some moist banks and mossy rocks in the semi-shade of *Pinus wallichiana*. This is a very low altitude for this species which is normally found on north-facing cliffs between 3,950m and 4,270m. It had not flowered freely and only one or two yellow flowers remained, which enabled me to spot it amongst the other vegetation. It grew with *Rhododendron lepidotum*, a deciduous species which has purple flowers in this region, although in some parts of its range the flowers are yellow. This species is also much more common at higher altitudes where it can become a prominent component of the mountain flora. Another familiar garden shrub in this habitat was the evergreen *Daphne retusa* which seldom exceeded 45cm in height in the wild.

Three irises were common but not in the moist places as one might expect. The most unusual in habit of growth was *Iris goniocarpa*, which was only found growing amongst spreading juniper bushes, presumably for protection from grazing animals. The leaves were narrow and held upright, whereas the flower stems radiated quite clear of the foliage. The flowers were not large, lilac, with a yellow beard. *Iris kemaonensis* was the most frequent species, growing almost exclusively in grass meadows. Although it was often seen, the solitary flowers were seldom produced; this too has a purple flower with a conspicuous yellow beard, held on a short stem, 2-8cm high. *Iris decora* on the other hand was only

found on one occasion; this was on bare dry soil in full sun, the plants spaced-out about 30–45cm apart as if they had been planted. This species flowers freely, with several pale purple flowers held on stems 22–30cm tall.

One other plant which I had hoped to find down on the valley floor was a kabschia saxifrage which Lowndes found in 1950. Later it was described as a new species, *Saxifraga cinerea*. At the site where it was originally found there was the plant still forming cushions, which resembled the European *Saxifraga cochlearis*. *Saxifraga cinerea* has white flowers on long branched stems and due to this very distinct growth form was readily distinguished from the other white-flowered kabschia saxifrages which are so common in the Himalayas.

The richest diversity of good alpines is concentrated in a broad band along the upper edge of the alpine meadows and the base of the extensive screes, somewhere between 3,950 and 4,270m. Here there are often springs and wet flushes fed by the melting snow high above and the frequent mists on the mountain tops. It is impossible to describe the excitement felt when you are labouring your way steadily upwards and come across first one *Primula wigramiana* in perfect flower, then a few, followed by a hillside dominated by this most beautiful species. It is a member of the Soldanelloides section, resembling *Primula reidii* having large white, widely bell-shaped, sweet-scented flowers. The chief character which separates the two species is that the leaves are stalked in *Primula reidii* and stalkless in *Primula wigramiana*. This Primula preferred a moist but not very wet, heavy brown soil, either amongst grass or in such dwarf shrubs as *Potentilla arbuscula, Rhododendron lepidotum* and Spiraea. Although in full flower in late July, the previous year's seed capsules still retained a seed or two, which was collected and has since germinated freely.

Nearby in the stable scree, just overlapping with the upper end of the range of *Primula wigramiana,* was its close ally, *Primula buryana*. This species also has white flowers but is smaller in all its parts, seldom exceeding 12cm high. The flowers are again wide open and are held horizontally rather than pendant. Nearby other primulas could be found including *Primula involucrata, P. macrophylla, P. sharmae* and the diminutive *Primula stirtoniana*.

Several species of androsace were conspicuous, especially *Androsace lehmannii* and *A. nortonii*; both preferred the heavy brown soil or a moist black humus-rich soil to open gritty scree. *Androsace lehmannii* formed dense cushions up to 90cm across, the small dark-green linear leaves showing to advantage the stemless white flowers. When the buds open at first the centre of the flower is green, but turns to red when pollinated.

This species was the most abundant, growing on both flat or sloping sites. *Androsace nortonii* was common though not abundant. It grew into loose cushions up to 30cm across, the rose pink flowers being held in a loose head on a stem 2-5cm high. Again some of the previous year's seed was still on the plants and has since germinated freely. This species is proving one of the more difficult to satisfy in cultivation.

Androsace tapete, A. muscoidea and *A. muscoidea* forma *longiscapa* were found under similar conditions. *Androsace tapete* was rare and was well past flowering, only one plant was found of the mauve-flowered *A. muscoidea* and of *A. muscoidea* forma *longiscapa* more later.

One of the quests of the expedition was to find the legendary *Meconopsis bella* which turned out to be locally common, especially in places where the rock was just breaking through the surface. The soil was a moist, heavy brown loam with only a little humus, often colonised by *Rhododendron lepidotum, R. anthopogon* var *hypenanthum, Primula wigramiana, P. buryana* and *P. involucrata*. The blue flowers were borne singly on 10-15cm stems, many on one plant, but were nowhere near as rich a blue as I had expected and could never match the much-despised *Meconopsis horridula,* which has such fine blue flowers in its natural environment. The leaves are green, simple or with two to three pairs of lobes. No seed was available, but two plants lifted with great care, as there is a deep tap-root, have been established in pots.

In the short turf a little pea with the dreadful name *Gueldenstaedtia himalaica* was often prominent, the rich violet purple pea flowers appeared to be scattered amongst the grass as the small leaves were green and unobtrusive. This is a plant with a swollen tap-root which appears to be a delicacy for mice! It should make a superb trough plant if it retains its compact habit in cultivation. Often growing alongside the Gueldenstaedtia was *Potentilla microphylla*, its rich golden-yellow flowers making a fine contrast.

Other noteworthy plants in this zone were *Aster diplostephioides, Cremanthodium arnicoides, Cyananthus incanus, Fritillaria cirrhosa, Geranium donianum, Geum elatum, Gypsophila cerastioides, Lilium nanum, Nardostachys grandiflora, Polygonum affine, Potentilla cuneata, P. eriocarpa, Saussurea graminifolia* and several species of Saxifraga with yellow flowers.

Saxifraga lowndesii is a kabschia reputed to have flowers the size and colour of our own native purple saxifrage, *Saxifraga oppositifolia* – few could deny the desirability of such a plant. Its natural distribution in Central Nepal is very limited and Lowndes found it in only one site in the Sabsche Khola. Naturally I made a special point of visiting this side valley and a very distinctive-looking kabschia was found out of flower

but with many bursting seed capsules. This plant formed very lax cushions with open spreading green leaves, quite unlike any other kabschia I have seen. It was confined to moist rocks, often with a trickle of water running through the plants, which could be in full sun or shade. Time will tell if it turns out to be *Saxifraga lowndesii* or just another white-flowered kabschia. Other plants at this site at 4,000-4,250m included *Pinguicula alpina, Pycnoplinthopsis bhutanica* which is a member of the Cruciferae, forming a flat rosette of light green leaves with white flowers on short stalks, *Primula buryana, Meconopsis bella, Saussurea graminifolia* and *Rhododendron lowndesii.*

Rhododendron lowndesii was found on many rock outcrops especially those which were moist with a northerly exposure. The best site I found was on the north side of Annapurna III, high above the Gangapurna Glacier, where it was abundant above 4,000m on the moist rock ledges. It crept around forming a rug, 1-3cm high, and was just past the peak of flowering in the first week in August. One or two buds and flowers remained, the petals with a touch of red on the outside when in bud, before opening to reveal its flat yellow face with little green spots.

Extensive screes are a feature of the higher slopes of the Marsyandi Valley. On slopes with a southerly aspect, especially on the mountains Chulu and Pisang, the screes are very dry in summer as most of the snow melts early in the season, with the result that almost no plants grow there. On the mountain slopes with north, east or west aspects, the snow remains in patches all summer on and above the screes. This melting snow supplies ample irrigation water and the screes are rich in beautiful alpines with fascinating adaptations to survive in this exacting environment, where the growing season is short, the winds strong and frequent and the light intensity so high due to the thin atmosphere at this high altitude.

Plants are most frequent where the scree is not too deep and the plants can root into the stable soil below, or in semi-stable islands which are protected from too much movement by protruding outcrops of bedrock. The highest point which I reached was the top of the Thorong La, a pass at 5,200m. Here plants were still quite frequent including two Scottish natives, the mountain sorrel, *Oxyria digyna,* and the ubiquitous grass *Festuca ovina.*

One of the most beautiful genera inhabiting the screes are the cremanthodiums, members of the Compositae, but alas one of the most difficult genera to grow, with few if any success stories for the high alpine species. Five species were found, *Cremanthodium oblongatum* and *C. purpureifolium* on loose moist scree where the roots could reach firm soil below. Both have nodding, large yellow sunflowers up to 5cm

across, on stems only 2½-8cm high. The leaves lie flat on the stony ground, a rich purple below and sometimes with purple blotches above. *Cremanthodium nepalensis* and *C. decaisnei* preferred more stable habitats and the company of other plants and mosses. *Cremanthodium nepalensis* is similar in size to the preceding two but this species has green leaves. *Cremanthodium decaisnei* is finer in all its parts with the nodding yellow flowers produced in much greater abundance; the well-developed calyx of brown overlapping sepals forms a cone at the back of the flower. The final species *Cremanthodium nanum* is quite different from all the others in that the orange yellow flowers are held upright. This species as the name implies is a small plant, 2-5cm high, with very furry grey leaves and stems, and is most frequent about 5,200m amongst large stable stones.

Contrasting nicely with the cremanthodiums was the little blue *Aster flaccidus* with upright flowers held on 5cm stems, the most distinctive feature of this plant are the leaves with wavy undulating edges.

Two species of Corydalis were eye-catching and desirable garden plants. The most frequent, especially in semi-stable scree islands, was the yellow-flowered *Corydalis juncea* which produces 5cm high upright spikes above finely-cut leaves. Even more attractive was a species with flowers a fine ice blue and only 3cm high, the dissected leaves had substance and could have been made from blue brown metal, which merged away into the similarly-coloured shale. The specific name is still in doubt although it is allied to *Corydalis latifolia* and *C. gerdae*.

Androsace zambalensis (Fig 116) was outstanding, forming cushions about 30cm across; the tiny grey, inrolled leaves were often completely hidden by almost stemless white flowers. This again is a species where the colour of the centre of the flower changes as it ages, starting green, then changing to yellow or pink. *Androsace zambalensis* was only common high up and was frequent at 5,270m. Another superb cushion plant at the higher altitudes was *Saxifraga hypostoma,* its iron-hard buns being almost hidden by the stemless white flowers. Many other kabschia saxifrages were seen but none could compete with this species. The Himalayan kabschias are not very difficult to grow in Scotland if supplied with plenty water in the summer and protected from late-spring frosts, but I have yet to see one in cultivation which compares favourably with the average plant of *Saxifraga hypostoma* in the wild.

By far the most unusual and fascinating plants were two very hairy species. Little can be compared with *Saussurea tridactyla*. This member of the Compositae forms round to oval white woolly balls, 15-30cm high, the individual flower-heads resemble the heads of a knapweed,

Centaurea nigra, but those heads are not seen unless the woolly head is split open, as they are completely hidden in the wool. The blunt leaves are also covered with short white hairs and when the plant flowers only the tips protrude beyond the flower ball. This Saussurea is quite common above 4,900m, in moist semi-stable scree, with its roots into the soil below, or amongst rocks where it was often difficult to spot if the rocks are grey white. The second very hairy plant *Eriophyton wallichianum* resembled a white deadnettle, *Lamium album,* in its general appearance, except that the leaves and stems have a dense fur of white hair, which more or less hides the pink flowers. A very mobile, moist scree was its chosen habitat, into which radiated its wide-spreading rootstock.

Without much doubt, the most outstanding display of flower colour was provided in one gentle sloping stable scree with an easterly aspect, where at 4,500m acre after acre was dominated by *Androsace muscoidea* forma *longiscapa,* which in full flower coloured the ground a rich rose purple. So dominant was the androsace in this one valley, that the colour of its flowers could be seen from some distance, almost like heather on a Scottish moor. This Androsace formed quite small rosettes of hairy inrolled leaves, very much smaller than in cultivation. The relatively large flowers were held in an umbel, on a stem no more than two centimetres high. No variation of flower colour could be discerned, each plant a prizewinner if it could be reproduced in cultivation. The soil amongst the stones in which it thrived was moist but not wet, heavy, dark reddish brown in colour and almost devoid of humus. The only other plants competing with the Androsace and then not very successfully were *Primula wigramiana,* a Rheum, *Saussurea simpsoniana, Meconopsis horridula* and *Saxifraga flagellaris.*

On any expedition such as this a lot of homework must be done before one departs for the mountains, with the result that most of the outstanding plants found can be identified in the field. One such eye-catching plant was a superb form of the widespread *Anemone demissa.* In general appearance it resembled a large-flowered form of *Anemone narcissiflora,* but with bright rose-pink petals, each petal with a pale pink central band. The flowers were held in clusters on branched stems 60cm high. This superb plant was found only in one small area in the Kone Khola at 4,110m. Without a doubt, of all the plants seen in the Marsyandi Valley, this form of *Anemone demissa* would make the greatest impact in our gardens if its introduction proves to be successful.

I would like to record my thanks to Dr G. F. Smith, Bramhall, Manchester, who instigated the expedition and contributed so much to its organisation and to Mr G. Kirkpatrick, Royal Botanic Garden, Edinburgh, who participated with me in the expedition.

The Joint Rock Garden Plant Committee

(Recommendations made at Scottish Rock Garden Club Shows)

STIRLING – 31 MARCH 1984

Award to Plant

Award of Merit

To *Fritillaria gibbosa* as a hardy plant for flower in the alpine house. Exhibited by Mr H. Esslemont, 9 Forest Road, Aberdeen.

Awards to Exhibitors

Certificate of Cultural Commendation

To Mr H. Esslemont, 9 Forest Road, Aberdeen, for a well-grown pan of *Fritillaria gibbosa*.

To Mr W. Kirby, 7 Orders Lane, Kirkham, Preston, for a well-grown pan of *Synthyris pinnatifida* var *lanuginosa*.

GLASGOW – 5 MAY 1984

Awards to Plants

First Class Certificate

To X *Phylliopsis hillieri* 'Pinocchio' as a hardy plant for flower on the rock garden. Exhibited by Dr P. Semple, 103 Southbrae Drive, Glasgow.

Award of Merit

To *Ranunculus insignis* as a hardy plant for flower in the rock garden or in the alpine house. Exhibited by Dr P. Semple, 103 Southbrae Drive, Glasgow.

Certificate of Preliminary Commendation

To *Oreopolus* (*Cruckshankia*) *glacialis*, as a plant for flower in the alpine house.

To *Ourisia ruelloides* (*O. racemosa*), as a hardy plant for flower in the rock garden or in the alpine house.

The above two plants exhibited by Lt Col J. D. C. Anderson, Wester Balruddery, Invergowrie, Dundee.

To *Lychnis alpina*, as a hardy plant for flower in the rock garden or in the alpine house. Exhibited by Mr and Mrs H. Taylor, Tantallon, Morris Place, Invergowrie, Dundee.

Awards to Exhibitors

Certificate of Cultural Commendation
To Lt Col J. D. C. Anderson, Wester Balruddery, Invergowrie, Dundee, for a well-flowered plant of *Oreopolus glacialis*.

To Mrs L. Bezzant, 24 North Grange Road, Bearsden, Glasgow, for a well grown plant of *Cassiope stelleriana*.

ST ANDREWS – 29 SEPTEMBER 1984

Award to Plant

Certificate of Preliminary Commendation
To *Pinus sylvestris* 'Rannoch', as a hardy plant for foliage in the rock garden. Exhibited by Mr and Mrs H. Taylor, Tantallon, Morris Place, Invergowrie, Dundee.

Jubilee Salver

The Jubilee Salver awarded annually to an individual who has given outstanding service to the Club has been awarded in 1984 to Miss J. M. Halley for her work with the Seed Exchange.

Show Reports 1984

Newcastle-upon-Tyne – 7 April

The cold spring must have caused considerable problems amongst would-be exhibitors as to whether certain plants would be ready for the show date. On the other hand it did contribute to a very varied overall entry with certain plant families and genera being particularly well represented. These included Dionysia of which there were a total of six species shown together with more than usually large numbers of Fritillaria, Saxifraga and European Primulas. Some of the forty-eight exhibitors had travelled considerable distances, even from Northern Ireland, and a near-record 304 entries were staged.

The Forrest Medal went to a magnificently-flowered plant of *Saxifraga oppositifolia* 'Splendens' shown by local group convener A. Furness.

It was most heartening to see this top award go to an 'every-day' alpine plant and must give encouragement to less experienced growers.

The AGS Medal for Class 1 was awarded to E. G. Watson with an entry of *Primula aureata forma* (now correctly *P. aureata fimbriata*) *P. allionii* 'Apple Blossom', *Draba dedeana* and *Dionysia aretioides* 'Paul Furse', *Saxifraga* x 'Myra' and *Saxifraga burseriana* 'Mangart', a particularly large-flowered form. He was also the winner of the R. B. Cooke Plate for the highest aggregate points in Section 1.

In Class 25 the AGS Medal went to R. A. Hodgson for a fine entry of *Dionysia aretioides* 'Paul Furse', *Draba longisiliqua, D. rosularia, Primula marginata* x *allionii, P. allionii* and *Degenia velebitica.*

This year, the first presentation of the E. G. Watson Trophy for the best plant in Class 41 (new or rare in flower) was awarded to E. G. Watson for *Dionysia viscidula.* There were many other plants of note in Section A and included amongst these were *Crocus scardicus, Fritillaria michailovskyi* and a delightful pale-blue specimen of *Iris nusairiensis* all of which gained first prizes for D. F. Mowle. As one of a winning three-pan entry D. B. Lowe showed his skill as a cultivator by presenting a pan of *Saxifraga oppositifolia* x *biflora,* a natural hybrid from the European Alps. This plant certainly drew attention with its tight foliage, rich reddish-purple flowers with pale-yellow centres. W. Kirby won with *Synthyris pinnatifida* var *lanuginosa,* a native of the

Fig 117 *Meconopsis bella* (see page 190) Photo: R. McBeath

Fig 118 *Primula wigramiana* (see page 184 and 189) Photo: R. McBeath

Olympic Mountains of north-west America, and the rare *Primula drummondiana* from Nepal was shown by Dr A. J. Richards.

In Section B the Gordon Harrison Cup was awarded to J. J. Eden. Local group member R. Fairbairn gained many individual first prizes including a win with the rare *Ewartia nubigena*. This member of the Compositae forms a silvery-grey mat of neat rosettes and originates from Mount Kosciusko in south-east Australia. Other noteworthy plants in this section included a well-flowered *Saxifraga retusa* shown by A. Davison (Jnr) and from Mrs S. Frost the infrequently-seen *Celmisia dalli* "grown from seed".

As always Section C produced a large number of entries and the Cyril Barnes Trophy together with the SRGC Bronze Medal were awarded to W. Carr. His winning exhibits included *Primula gracilipes, Androsace carnea* x *pyrenaica* and *Saxifraga* x 'Myra'. Amongst the many fine plants shown in this section were *Orphanidesia (Epigaea) gaultherioides* from Dr D. McArthur, *Aciphylla monroi* (Fig 113) grown by D. King and *Celmisia argentea* shown by Miss H. Furness, the youngest local group member to compete. In the class for new or rare in cultivation two plants were awarded equal-first. These were *Primula tosaensis,* from the islands of Japan shown by Mrs Tyler, and *Gamochaetae nivalis* shown for the first time at Newcastle by A. Davis. This is a dwarf shrubby plant with silvery-grey leaves, introduced fairly recently from the Andes of Patagonia.

The Judges were Lyn Bezzant, Kath Dryden, Alf Evans, Denis Graham, Tony Hodgson and David Mowle.

Four trade stands offered for sale a wide selection of alpine plants and clay pots and there was a beautiful non-competitive display of Fritillaria by courtesy of the Regius Keeper of the Royal Botanic Gardens, Edinburgh.

A. J. DAVIS

Perth Show – 21 April

Perhaps due to a cold spring and the Show being held during the Easter weekend, entries were down on last year but the quality of the exhibits provided an outstanding display to be judged and later admired.

Mr and Mrs R. J. Bezzant were awarded the Alexander Caird Trophy for the Six Pan Class, their exhibit consisting of *Androsace muscoidea, Androsace carnea laggeri, Cassiope stelleriana, Pleione forrestii, Primula biflora* and *Primula* 'Barbara Barker'. To complete a satisfactory day, the same exhibitors won the L. C. Middleton Challenge Trophy for gaining the most points in Section 1. With ten entries in the Three Pan Class, competition was keen with the Dundas Quaich being awarded to

Mr Fred Hunt. From his entry, the single, but multi-flowered *Fritillaria michailovskyi* attracted much interest and won not only a Certificate of Merit but also the Murray-Lyon Trophy for the Best Plant in the Show exhibited by a member resident in Tayside Region. Mr and Mrs V. Chambers displayed once more their expertise in the cultivation of Rhododendron, their *Rhododendron* 'Dora Amateis' winning for them the E. H. M. Cox Trophy.

After much deliberation, the judges considered that the Forrest Medal for the Most Meritorious Plant in the Show be awarded to *Cassiope stelleriana,* which was shown by Mr and Mrs R. J. Bezzant. Certificates of Merit were awarded to a well-flowered pan of *Pleione forrestii,* shown by Mr and Mrs R. J. Bezzant and to two plants, *Androsace vandellii* and *Lewisia brachycalyx,* exhibited by Mrs J. Wyllie.

As in previous years competition in Section 2 was keen with some local members having stiff competition from exhibitors from south of the Border, the latter being welcome contributors to the Show. Mr M. Constable emerged as winner of the Bronze Medal and of the Perth Trophy, which was awarded to the member of the Perthshire Group recording most points in the Show.

Non-competitive Certificates of Merit were awarded to Dr Almond for his splendid photographic display of mountain flowers and to Mr L. Greenwood's much admired display of watercolours. Mr R. Russell of Gardencare and Landscapes staged an attractive stand of rock plants, which won a Trade Gold Medal.

J. GAULD

Aberdeen Show – 28 April

A welcome feature at the Aberdeen Show was the large number of exhibitors from farther south. They showed many plants not normally seen in Aberdeen and were rewarded with a good selection of prizes.

In winning the Six Pan Class Mrs J. Wyllie exhibited a huge plant of *Lewisia brachycalyx* with at least forty fully-open flowers, raised from seed sown in 1981. There was a feeling amongst some people that this plant was "not in character" being much too luxurious but most of us felt we would have been proud to have achieved such an end-product. Mrs Wyllie also showed a 20cm cushion of *Androsace vandellii* completely covered in bloom for which she was awarded a Certificate of Merit. In the same class Mr H. Esslemont showed a superbly grown plant of *Cassiope wardii* which received the Forrest Medal. His *Kalmiopsis leachiana* completely covered in pink blossom was awarded a Certificate of Merit.

Plants to catch the eye in Class 2 were *Pleione* x *confusa,* deep yellow with twenty flowers, *Primula minima alba* and *Pleione* 'Clare' with pure

white flowers – one of the best of the Pleione hybrids. Mrs L. Bezzant showed a well-flowered pan of the difficult *Rhodothamnus chamaecistus* while Mrs E. Stevens had a lovely deep purple-blue form of the difficult *Gentiana pyrenaica*.

There were many interesting plants in "raised from seed" classes. Mr H. Esslemont showed a 10cm pan of the woolly *Haastia pulvinaris* and a 12cm pan of *Primula aureata* sown in 1980. Mrs J. Wyllie showed a chocolate brown-green *Fritillaria lanceolata*, 10cm tall, and Mr Esslemont a deep chocolate brown-yellow *Fritillaria reuteri*, 40cm tall. Mrs L. Bezzant showed lovely neat cushions of *Gentiana terglouensis*.

There were several beautiful plants of the easy-to-grow *Pulsatilla vulgaris* which would hopefully encourage more people to grow them. In the class for Compositae, Mr A. Leven had a grand plant of *Leucanthemum hosmariense* with lovely grey leaves and large white daisies. Second in this class was Mrs E. Stevens with a pan of *Erigeron aureus*, covered in bright canary yellow flowers on 8cm stems.

An unusual plant in the class for Cruciferae was *Draba longisiliqua* with a tight cushion of grey leaves and yellow flowers on 7cm stems.

This was obviously a good season for Ericaceous plants with excellent Cassiopes and Rhododendrons. Mrs E. Craig, who won the Portlethen Cup for the Most Points in Section 1, had a lovely plant of *Rhododendron pemakoense*, 10cm tall covered in white blush pink flowers.

Of interest in the classes for Pleione was the opportunity to compare *P.* x *confusa* (formerly *P. forrestii*) with the true *P. forrestii* (SBEC 0206) which was a much deeper yellow. Another orchid of interest was *Dactylorhiza majalis* ssp *alpestris*, 20cm tall with spotted leaves and pure rich purple flowers.

In the Primula classes, Mr H. Milne showed a deep, almost purple form of *Primula petiolaris* (LS 19856) and a *P. kisoana alba* with white flowers over soft green leaves. Mr T. Sprunt showed a mauve form of *P. saxatilis* with pale green fern-like leaves.

There was a good collection of Androsaces and Lewisias in what was a good year for exhibitors.

There were fewer entries in Section 2 than usual. Mr R. Maxwell won the Special Prize for the Best Two Pan Entry with *Cassiope* 'Muirhead' and *Primula marginata* while Miss Howlett won the Aberdeen Quaich for the Best Plant in the Section with *Daphne petraea*. Other plants of note were *Narcissus* 'Hawera', a jonquil with lemon-yellow flowers shown by Mr Bull and *Primula integrifolia* with deep green leaves and dissected petals shown by Miss Howlett.

Mr A. Anderson had a splendid non-competitive exhibit of Rhododendrons in which noteworthy plants were *R. tephropeplum* (R 18413) a very hardy regular-flowering plant, *R. charitopes* 'Apple Blossom', also hardy but with flowers susceptible to frost, and *R. anthopogon* 'Betty Graham' named after Major Sherriff's wife.

In its usual immaculate stand the Cruickshank Botanic Gardens showed a neat plant of *Convolvulus cneorum* with grey leaves and white flowers flushed with pink.

A. McKELVIE

Glasgow Show – 5 May

Entries were very much the same as for last year, those of Section 1 being slightly down and for Section 2 slightly up. On the other hand entries for Section 5 were considerably up. This was undoubtedly due to this section being run by the Scottish Branch of the American Rhododendron Society, resulting in more and better exhibits.

The Dr William Buchanan Memorial Rose Bowl was won by Fred Hunt with *Erigeron* 'Canary Bird' *Lithospermum oleifolium, Arisaema sikokianum, Sarcocapnos crassifolia, Armeria caespitosa* and *Shortia soldanelloides ilicifolia*. Other very good plants were Mr and Mrs Bezzant's *Rhododendron* 'Yaku Fairy' and *Phylliopsis* 'Pinocchio' and Mrs Wyllie's *Phlox* 'Chatahoochee' and *Androsace sarmentosa*.

The class for the William C. Buchanan Challenge Cup was won by Dr P. Semple with *Primula auriculata, Ourisia alpina* and *Ranunculus insignis*.

Class 4 was won by the Chambers of Killearn with *Rhododendron* 'Curlew', 'Razorbill' and 'Carmen'. This also took the Edward Darling Memorial Trophy and 'Curlew' also received a Certificate of Merit.

Class 5 was won by Lt Col Anderson with *Oreopolus (Cruckshankia) glacialis*. This unusual plant also took the Forrest Medal for the Best Plant in the Show. Also shown was *Pancratium illyricum* by Dr Stead.

The Ian Donald Memorial Trophy was won by Mrs Stevens of Dunblane with a splendid plant of *Phyllodoce caerulea* which also received a Certificate of Merit.

The Primula Two Pan Class was won by Mr H. Milne with *Primula petiolaris* and *P. kisoana alba*, and the Single Pan Class by Mr A. Leven, with *Primula forrestii*.

Mrs Jean Wyllie took the Androsace Class with *Androsace vandellii*, and *A. jacquemontii*. Mr Leven won the Compositae Class with a fine specimen of *Leucanthemum hosmariense*.

The Gentian Class was won by Mr A. Leven, with *G. verna*. The Chambers took second with *G. acaulis* and Mr and Mrs Bezzant third with *G. brachyphylla*.

In a well-represented Lewisia Class Mrs Wyllie won with *L. brachycalyx rosea*. Mr H. Milne won Class 53 with a well-flowered *Daphne petraea grandiflora,* and Mrs Stevens won the Viola Class with *Viola pedata*.

Mrs J. Stead won the Orchid Class with a well-flowered *Cypripedium parviflorum*. This also received a Certificate of Merit.

Two Certificates of Merit were also awarded respectively to Mr and Mrs Taylor for a fine display of Spanish plants and to Mr and Mrs Bezzant for a display of photographs of alpine plants.

The Crawford Silver Challenge Cup for Most Points in Section 1 was awarded to Mr A. Leven and the James A. Wilson Trophy in Section 2 to Mrs Ogg.

In Section 5 the Urie Trophy was awarded to Mr E. Wright, the Rhododendron Challenge Trophy jointly to Mrs N. Rutherford and Mr Peter Cox and the Sir John Stirling Maxwell Trophy for the Best Individual Spray to Mr E. Wright.

Thanks are due to the judges Mrs Maule, Mrs Stead, Mr Foley, Mr Duff, Mr Taylor, Dr Paton and Dr Chamberlain.

CHARLES SIMPSON

Letters to the Editor

Tighnafraoch Farmhouse, Fairburn, Urray,
Muir of Ord, Ross-shire, Scotland IV6 7UT

DYMO labelling

Dear Sir,

I was interested in Mr A. McKelvie's article in the Journal Part 1, No 74 on permanent labels. I did not see the June 1983 issue to which he refers as I was not at that time a member of the Club; my husband and I feel, however, that we have the solution to the readability problem under discussion.

Mention is made of DYMO labelling. This is the method we adopt but with the DYMO Wheel which prints vertically. It has obvious advantages. The DYMO apparatus mentioned is: DYMO Tapewriter No 1755; DYMO Wheel No 300186.

The total cost is around £15 and these can be purchased from James Dow, 62 Harbour Road, Inverness.

Yours sincerely,
Mrs H. J. Gawlik.

2 Kensington Drive, Giffnock

Crepis incana

Dear Sir,

Gardening books tell us that this plant should be propagated from seed while writers in the Journal have described propagation from root cuttings. This year I decided to try leaf cuttings at the end of May and am happy to report that, of a batch of cuttings, every one has rooted and is making new growth.

Perhaps the unusually warm season has had some effect as three batches of cuttings of small Rhododendrons are also growing well with few losses.

Yours sincerely,
Angus C. Small.

Cross-trees, The Plains,
Wetheral, near Carlisle CA4 8LA

Dear Sir,

There must be very many tyros like me who have difficulty in

finding the information necessary to grow the various members of the tantalisingly attractive Lewisia genus successfully. The AGS publication by R. C. Elliot is an interesting reference work, but weak on cultural advice; what we could do with is a page of instruction in abbreviated tabulated form going through all the species and varieties in groups, telling us which are deciduous, which evergreen, which to bake-out like *L. rediviva* and which to water sparingly or copiously, and when.

Most writers emphasise that the *caudex* is the Lewisian 'Achilles heel' and should be kept dry with up to an inch of gravel, but I have yet to buy a plant from a nurseryman which has been cosseted in this way. They seem able to grow them up to their necks in soggy compost in plunge beds in their hundreds and water them from above with a fire hose, and they grow like cabbages!

So may I ask you if you could persuade an expert grower to contribute a comprehensive but concise article to the Journal which would clarify, more or less in tabular form, the best way for a beginner to keep his half-dozen mixed plants alive for more than one season in the alpine house! Externally, of course, I have good success with some in vertical crevices in the wall.

May I just add a word of praise for the Journal in its now 'not so new' guise. Every issue is keenly anticipated.

Yours sincerely,
Arthur V. Millard.

Obituaries

MRS BETTY CORMACK who died on 15 May was brought up in a family of keen gardeners and from an early age she was interested in growing plants.

She joined the Scottish Rock Garden Club soon after the war and became involved in the activities of the Edinburgh Group and in the wider affairs of the Club.

In 1960 she took over the Seed Distribution from Mrs Connie Davidson, a post she held with distinction until 1964. During this period she organised an excellent system for dealing with the seeds, a system which continues in use, with some modifications, to the present day.

In the Group she became the Joint Show Secretary with her friend Sheila Maule and they took over the organisation of sales of plants, both at the Shows and at Group Meetings. She became an acknowledged expert whose wide experience enabled her to place and price plants accurately. This contributed greatly to the funds of the Group which was then enabled to invite well-known plantsmen from the South to speak at Group Meetings, a scheme which led in due course to the present system of inviting a Travelling Speaker.

Betty's garden contained a wide range of plants, her main interest being in peat lovers. She was always most hospitable to the Groups and individual members of the Club who came to visit it and she also opened it for a number of years to the public in aid of Scotland's Gardens Scheme.

She had a considerable knowledge of Scottish wild flowers, particularly in the Ben Lawers-Tarmachan area where she had a holiday base. She also widened her knowledge of Alpines by travelling in the Julian Alps, and the Dolomites. Her influence was extended by attending the Seattle-Vancouver Conference, where she proved herself a welcome ambassador for Scotland.

The sympathy of all her friends in the Club is extended to her husband and family.

K.S.H.

Mr W. Bruce Robertson

The Seed Exchange has lost a very great friend. The sudden death of Mr W. Bruce Robertson of Penicuik in July is a very great loss to the Exchange as his untiring enthusiasm for alpines and rock plants enabled him to contribute large quantities of seed for the benefit of others. Our records go back to 1960 and his average contribution over the last twenty years has been in the region of 300 items per year. All those who contribute to the Exchange will appreciate the tremendous effort required to collect and clean such huge quantities of seed. Over many years he opened his garden for organised visits but his greatest contribution to rock gardening was to the Exchange hoping, no doubt, to enlist and encourage beginners to become equally enthusiastic lovers of alpines. He will be missed.

J.H.

Book Reviews

The Bulbous Plants of Turkey
by B. MATHEW and T. BAYTOP
Batsford ISBN 07134 45173, 132 pp, £17.50, 1984

Yet another book has come from the pen of Brian Mathew who is well known for his authoritative writings in "The Iris", "The Crocus", "Dwarf Bulbs" and "The Larger Bulbs". Professor T. Baytop is also a well-known authority on Turkish bulbous plants.

In this book the term 'bulbous' has been interpreted generously to include any monocotyledonous plant with a swollen storage organ enabling it to survive adverse climatic conditions.

The genera covered are in the families of the Amaryllidaceae, Iridaceae and Liliaceae (including Alliaceae). Some 500 species and subspecies native to Turkey are covered. Of necessity, because of the large number of plants covered, the descriptions of the plants are thumbnail sketches of the essential features pertaining to each.

Under each species and subspecies are included any synonyms or Turkish names for the plants and the source reference for each one is given, making the book a very much more valuable reference book than its physical size would suggest. There are also potted biographies of twenty-seven plant hunters to the area many of whom are well-known names.

One-hundred-and-twenty plates are placed together in the middle of the text along with eighteen black and white plates of plant hunters. One-hundred-and-sixteen of the colour plates are plant portraits and are well up to the standards expected in modern colour printing in most instances and are most helpful in identification. There is also, as one might expect, a very extensive bibliography at the end and a comprehensive index including the synonyms which makes reference to the text very easy.

A chapter on the Economic Importance of Turkish Bulbous Plants gives alarming figures of the numbers of bulbs in the wild which are dug-up and exported. In 1978 it was nearly 300 tonnes, although cultivation is apparently also progressing apace.

This book will undoubtedly prove a useful addition to the bulb enthusiast's library. The introductory offer price is on the Book List. T.G.S.

Primulas of Europe and America
by G. F. SMITH, B. BURROW and D. B. LOWE
The Alpine Garden Society, 251 pp, £19, 1984

This book provides a complete guide to the huge number of Primula species and hybrids found in the wild in Europe and in America.

It includes an up-to-date classification of European and American species, their geographical distribution and a full description of each species. The complex problem of identification of species and their natural hybrids is tackled well as is that of horticultural cultivars and hybrids. Finally the book deals with cultivation, propagation and pest and disease control.

This is likely to remain as the definitive book on European and American Primulas for years to come. The presentation, design and photographs are of the highest order.

P.J.

The European Garden Flora Volume II – Monocotyledons (Part II)
Cambridge University Press, 318 pp, £25, 1984

This volume, covering the families Juncaceae to Orchidaceae, is the first to be published in a six-volume series aimed at providing a scientifically accurate and up-to-date means for the identification of plants cultivated for amenity in Europe. It is designed to meet the needs of the informed amateur gardener as well as the professional plant taxonomist.

This first volume to be published does not include many plants of great interest to the rock gardener with more than half the book taken up by the Orchidaceae. Of some interest is the account of the genus Pleione which is disappointing both in terms of cultural instruction and taxonomy. No description is given of the true *P. forrestii* although it is mentioned in the text.

On the other hand it proved relatively easy to identify species of the rather confusing genus Roscoea using the key and descriptions provided. Readers are likely to find that some plants of which they have special knowledge are inaccurately treated particularly in terms of cultivation. Equally it is fatal to remark, as is done in the book, that only the green form of *Carex comans* seems to be in cultivation in Europe. Growers of the brown form in Scotland are likely to take issue.

These criticisms apart, this is a splendid reference work for the keen gardener, much more accurate than the RHS "Dictionary of Gardening" and likely to be the ultimate arbiter in many an argument on garden plant identification. S.B.

Plant Pathogens and their Control in Horticulture
by G. R. DIXON
MacMillan Publishers Ltd, 253 pp, £7.95, 1984

This book, written by a Club member, describes the application of plant pathology to horticulture. While primarily aimed at horticultural crop production, it will prove to be a useful book for all gardeners interested in the scientific background to plant disease. It does not give remedies for specific diseases but concentrates on the nature of pathogens and the principles of chemical, cultural and biological control. For example there are seven pages on the biology and control of grey moulds (Botrytis) which will be of value to gardeners who face perpetual problems from such moulds.

The book deals with Pathogens and Diseases, Fungi, Viruses, Bacteria, Host Resistance, Chemical Control, Spray Application, Plant Health Regulations, Cultural and Biological Control, and Post-Harvest Pathogens. It is easy to read, yet scientifically exact, and it will be an excellent reference book to remind gardeners of the principles behind the preventive measures they use. A.M.

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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. United Kingdom members may now pay in Sterling cheques. In practice it would probably be best to consult one's Bank, which could supply advice and the appropriate forms.

The annual subscription is £12, and the Secretary, who will send further particulars, is:

Norman Singer, Norfolk Road, South Sandisfield, MA 01255, U.S.A.

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