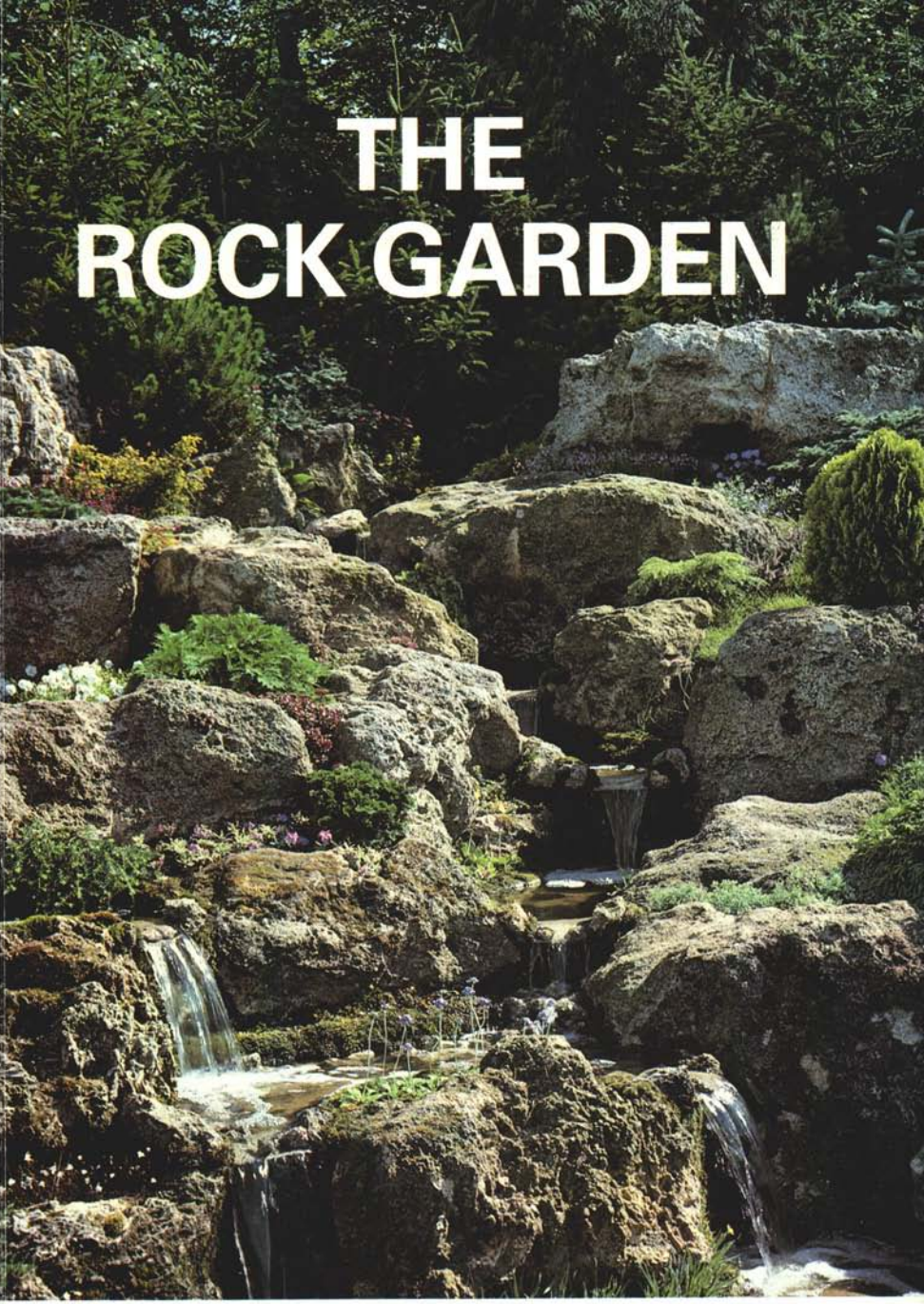
THE ROCK GARDEN



THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XX Part 4 Number 81

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The Rock Garden

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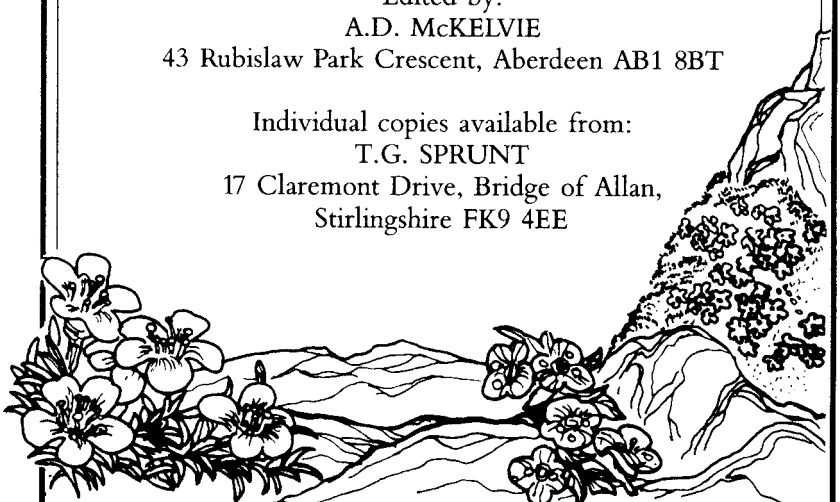
Volume XX Part 4 Number 81

January 1988

ISSN 0265-5500

Edited by:
A.D. McKELVIE
43 Rubislaw Park Crescent, Aberdeen AB1 8BT

Individual copies available from:
T.G. SPRUNT
17 Claremont Drive, Bridge of Allan,
Stirlingshire FK9 4EE



Front cover:
Tufa cliff (See p. 446)
Photograph by Peter Cunnington

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Editorial

ONE OF MY most cherished views, to which I have doubtless referred on several occasions, is that the real experts in the world achieve their success in spite of what they do rather than because they know all the proper answers. This is as true in rock gardening as in anything else. The old controversies about crocking pots and about feeding alpines seem to have faded away to be replaced by other sacred shibboleths of which the extreme importance of peat, of perfect drainage and the dire consequencies of overhead watering stand paramount.

The recent influx of Himalayan plants has led us to realise that they need constant monsoon conditions all summer and absolute drought in the winter. Perfect drainage and avoidance of overhead watering seem to be of no importance.

Two articles in this issue, by Bob Mitchell and by Jim Cobb, would, however, cast doubt on the universal efficacy of "peat with everything". It would seem that top-dressing with peat simply chokes a lot of plants and ties up nutrients needed by all plants for good growth. Jim advocates the use of leaf mould whenever possible rather than peat. I suspect that growers of primulas have known for years that peat is a bad thing and that leaf mould is the answer. I think of the splendid *Primula sonchifolia* growing outside in almost pure leaf mould at Cluny House, Aberfeldy—great masses of vigorous plants that seemed to come unscathed through the worst winters.

In a different context, Bob Mitchell points out that constant mulching with peat keeps up the organic matter and helps to give structure to light soils; in heavy soils, however, the results can be catastrophic. He advocates a mulch of chippings rather than peat and directs our attention to the wonderful troughs created by Alec Duiguid at Ballater using almost pure sphagnum as the growing medium. Is sphagnum the next magic ingredient?

What is the moral of all this? I suppose simply that we should take nothing for granted and that we should experiment with all that we grow, by planting out our seedlings and rooted cuttings in a wide range of different places, some of them most unlikely.

What ancient "myths" are due for reconsidering, I wonder? How about abolishing pricking-out as an exercise? I suggest that more plants are killed by this process than by anything else we do. I except from this remark those expert and dedicated seed-raisers we all know of (but see my remarks above about experts).

ALASTAIR McKELVIE

President's Review

IT IS MOST encouraging to be able to report, once again, a steady increase in membership which now stands at 4726. Our Secretary, Kirsteen Gibb, has started the process of amalgamating a number of local Scottish groups which have become inactive, with active ones, with the result that members of the former will be able to enjoy the benefits of belonging to an active group and administration will be more efficient.

To some of us, myself included, financial matters seem a long way removed from growing plants. But all organisations, no matter how small, must operate on a sound financial basis and our Club is no exception. Regrettably, inflation has caught up with us and this year, for the first time in 7 years, we have suffered an operating loss of £2800. This is mainly attributable to a marked rise in the costs of printing and paper. In this context we are grateful to the efforts of Glasford Sprunt, our Publications Manager, who has been able to make a very worthwhile contribution of £1000 to Club funds.

Fortunately, we have substantial reserves, which have amounted to £20,700 over the past 6 years. This healthy state of affairs is due, almost entirely, to the advice, expertise and guidance, freely given, by our two financial experts—Lewis Bilton and Fraser Elgin. Considering that the Club was insolvent in 1977 we are obviously greatly indebted to these two members.

It is, of course, undesirable to deplete our reserves and therefore it is essential that the subscription for membership be raised. This has been increased from £5.00 to £7.00 for ordinary membership, as from 1st October 1988. The last time the subscription was raised was in 1981. Considering the inflationary climate of recent years we have been very fortunate indeed to have held the subscription so low for so long.

To mark our appreciation, and in recognition of his outstanding services to the Club, as Treasurer, over the last eleven years, it is pleasing to report that, very deservedly, this year the Golden Jubilee Salver has been awarded to Lewis Bilton.

Thanks to our hard-working Editor, Alastair McKelvie, and to the contributors, we have been able to enjoy two very good issues of The Rock Garden. At the last Editorial Committee meeting the subject of colour plates was fully discussed and it was decided to appoint an Illustrations Manager. Michael Almond has agreed to accept this

responsibility and it is with pleasure that we welcome him on to the editorial team.

Our Shows continue to be well supported both by exhibitors and the public. Harold Esslemont has generously donated six sterling silver Forrest Medals and these will be presented as follows:—

"Any member winning a total of ten Forrest Medals at our Shows shall be presented with a Silver Forrest Medal to mark the achievement. Thereafter, members winning subsequent Forrest medals will receive an award card only."

Three immediate recipients of this medal are Harold Esslemont of Aberdeen, Jack Crosland of Torphins and Jack Drake's Nursery.

The Glasgow Show in 1988 will be held in May in conjunction with the Glasgow Garden Festival. This is a special event and it is hoped that as many members as possible will support this venture.

It is pleasing to congratulate Henry and Margaret Taylor on being awarded the AGS Salver for gaining the highest aggregate of first prize points in section one of our Shows in the past year.

Eight applications for travel grants from the Exploration Fund were received and three grants were awarded: Julia Corden, who has gone to New Zealand to work in an alpine nursery, Peter Cook, who spent three weeks in July working in the Trento Botanic Alpine Garden and George Kirkpatrick, who revisited part of North West India.

Throughout the year the Club has been fortunate in receiving gifts and donations. Mrs A. Bremner presented a table slide viewer for the use of the Curator of the Davidson Slide Library, Mr Shimizu presented a folio of very fine drawings of Japanese plants, the Bearsden Discussion Week-end made a contribution of £100 towards the purchase of a Club projector and screen, the North East England Group donated £50 to the Colour Page Appeal and the Edinburgh Group donated £100 to the Club's Library to buy protective book covers. On behalf of the Club I would like to take this opportunity to say "Thank-you".

Once again the Discussion Week-end was most enjoyable and very successful. The excellent programme covered a wide range of interesting topics expertly presented by very competent speakers. The Week-end was again organised by Lyn and Ron Bezzant and those of us who attended are very grateful to them for their efforts on our behalf.

The Ayrshire Group are to be commended and thanked for staging a most attractive and interesting rock garden display at the three day Ayr Flower Show.

I am very happy to be able to report and congratulate Sheila Maule of Balerno on being awarded the Scottish Horticultural Medal. This

award, consisting of a gold medal and an illuminated scroll of honour, is given by the Royal Caledonian Horticultural Society and the number of holders, at any one time, is restricted to fifty. The purpose of the award is to enable the Royal Caledonian Society to confer honour on anyone, anywhere in the world, who has rendered outstanding service to Scottish horticulture.

Sheila has been a member of the Club for many, many years, and during that time has served on Council, held the office of Overseas Liaison Secretary for 10 years, was chairman of the standing committee of show secretaries, is a show judge, lecturer, and a member of the Joint Rock Garden Plant Committee.

Grateful thanks are due to Angus Small, Curator of the Davidson Slide Library, who has recently completed the mammoth task of sorting out the accumulation of slides which have been donated to the Club over the years and has produced an up-to-date Catalogue covering approximately 4500 slides.

At our Council Meeting in April, Joyce Halley reported the completion of another successful year and gracefully retired from the office of Seed Exchange Manager, a position she held for 17 years. Joyce is already a Vice-President of the Club and has also been awarded the Club's Golden Jubilee Salver. These two honours have been bestowed as a mark of gratitude for the exceptional services rendered to the Club. Furthermore, because of her contribution to horticulture, through her work with the Club, she was awarded a Scottish Horticultural Medal in 1984.

To mark her retirement, and to say "Thank-you" once again, it was agreed at the AGM in October, that Joyce should become an Honorary Life Member. This is the highest accolade that we can bestow on any member.

Jean Wyllie has succeeded Joyce as the Manager of the, now, Stirling Seed Exchange, and I would like to wish Jean and her helpers every success for the future.

Looking back over the last year I feel I can say that we have enjoyed a happy and successful year. All officials, both on Council and at local level, have had a busy year and have worked tirelessly for the benefit of the Club and its members. It has been a privilege to be part of this team and I would like to express my sincere thanks for the support and kindness shown to me.

I extend my kindest regards to you all and wish you happy and trouble-free gardening in 1988.

E.G.W.

The Stone Column

MANY WRITERS have described how difficult they find the actual act of committing words onto paper, and how much self-discipline it requires. Cliché it may be, but true none-the-less. On a dry day I can always escape outside into the garden; but, even when it is raining, and I am at my desk confronted with a blank sheet of paper, my mind wanders to possible excuses. There are always plants to be entered up in the accession file, seed records to be updated, slides to be catalogued, labels engraved, or lecture notes to prepare. If it were not for Poll, who frequently acts as my conscience, one or other of the above would almost certainly prevail. Getting started is all the more difficult if, as now, nothing really dramatic has happened at Askival since the last column. The north of Scotland escaped the hurricanes and floods which beset the south of England and Wales during the Autumn. From the gardener's point of view, it is the time it will take to restore the lost plantings which constitutes the real tragedy. As we have discovered, a devastated section of alpine garden can be re-constructed, replanted, and be its old self in a few years: not so a landscape whose prime glory lies in its mature trees. Such trees shelter us on either side, both up and down the glen, so we have no real need of their presence within our garden itself. In our cool humid climate, lack of shade is not usually a problem. The enforced removal of a number of large forest trees early in 1984, however traumatic at the time, has proved to have been beneficial in the long run. Freed from root competition, nearby plants have grown more vigorously, and the increased light available has improved both flowering and ripening of wood to withstand winters. Our lost trees were only ordinary European larches, planted during the inter-war years by local nuns, and not by King George III.

The past summer weather has been virtually a repeat of 1986: the usual maritime mixture. Mown areas are now so mossy it's almost like walking on a deep pile carpet, and on our troughs we have a real long-term problem in the making. One of our earliest cultivation writings back in 1979 concerned our disenchantment with peat-walls built up of blocks cut from a local moorland. After very few years, the hair-mosses, *Polytrichum sp.*, were 30 cm high, encouraged by the fertilizer and regular summer waterings the beds required. The retaining walls were rebuilt using split boulders from an old ruined dyke and, with regular

yearly plucking, the problem is containable. Now we are faced with a similar situation on some of our troughs and will have to adopt a similar solution: reconstruction.

Our troughs are planted as miniature outcrops using a wide variety of rock types, mostly collected during our travels in Grendel; but there are exceptions as we described in our last column. Many books suggest that porous sandstones and limestones are more convivial towards alpines than the hard igneous rocks such as granite and the beautiful local mica schist. We have found the exact opposite to be true, because of the rapid smothering growth of moss on the former types. The only sedimentary rocks we intend to retain in use here are various slates and hard limestones or marbles. In addition we have taken to placing a 2-3 cm layer of non-porous 3 mm (⅛ inch) chippings immediately below the final top-dressing of fragments matching the trough outcrop. Such measures do not eliminate the moss, but retard its growth to a manageable rate.

There are two sides to every coin, and the wet spring and summer greatly aided the re-establishment of our conifers, which were finally concentrated into their own bed early in May. Almost 60 in number, they ranged in size up to an *Abies balsamea hudsonia* over one metre across. This plant is one of our "original twenty", a score of plants bought from Jack Drake in the autumn of 1971. It had had one previous move, in April 1978, to the corner of a raised bed. This time we dismantled the whole corner and excavated the roots very carefully. Some root loss was inevitable, and to hinder transpiration we used the S600 spray sold for Christmas trees. An additional safeguard would have been pruning to reduce the top-growth in proportion with the roots; but it would have spoilt the bunshape of this fir. An equally large, but looser-growing *Cryptomeria japonica* 'Elegans Compacta' was pruned quite severely, and has responded very well. In the case of *Picea pungens* 'Montgomery (globosa)' we removed the largest bottom tier of branches entirely, and replanted a little deeper in a saucer, thus retaining the shape. The various chamaecyparis came up with good root balls and required no pruning; pines were gently "tipped" back. As well as removals, we added a number of bought-in containerised plants to the bed, especially further pines which don't generally move well. When planting any containerised shrub, except ericaceae and other dense fibrous rooters, we allow the compost in the pot to dry somewhat prior to planting, and then shake and tease the roots out so they can be spread (Fig. A). This is once again at variance with standard practice which tells one to soak the rootball before planting. We feel that the disturbance is worth the very slight risk. Leaving a plant with its roots coiled round

and round is storing up trouble for the future. If the roots are spread out it will either, on the odd occasion, die straight away, or if treated carefully enough, take off and thrive mightily.

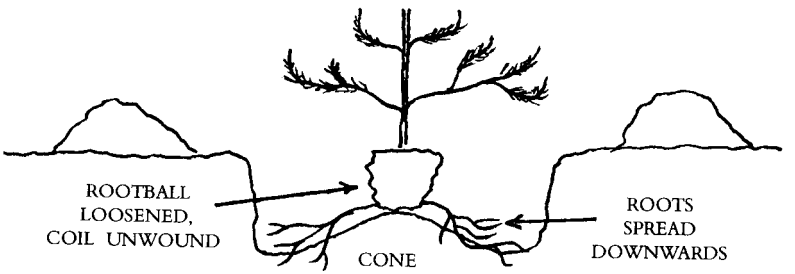

FIG. A

The raised bed between our drive and the front boundary wall, which had contained the aforementioned abies along with several other conifers, was rejuvenated as a "rich scree". The original infill had been loam from a turf-stack: to this we now added some peat and a larger quantity of our 3 mm chippings. When forking together, we had to carefully work around a large *Salix x boydii,* now over 1m tall, and a semi-bonzai *Acer palmatum* 'Dissectum Atropurpureum' draping another corner. The bed was replanted with a wide selection of plants supposedly prefering a variety of soil types. They ranged from *Salix reticulata, Polygonum millettii* and *Gentiana x caroli* through *Dodecatheon alpinum* to *Geum reptans* and *Dougasia nivalis.* It will be interesting to see how they fare. To replace the conifers as winter background we added a dozen species of aciphylla, and the whole was given a good top-dressing of the chippings.

Another area which has seen substantial improvements is the west slope of the upper garden facing the front gate. One more of our piles of winter-gathered stones (see Stone Column in Journal 78 page 5) has been converted into terracing, this time for rhododendrons. The work commenced in late August as the post-holiday weeding load tailed off, and was well under way by the time Reggie and Jeremy Kaye came visiting after the SRGC Autumn Discussion Weekend. We were rather surprised when Reggie announced that he actually liked this new construction, since he has often expressed his preference for a more natural approach to rock gardening. (e.g. In Defence of Rocks, SRGC Journal, April 1968, Vol XI, p.36).

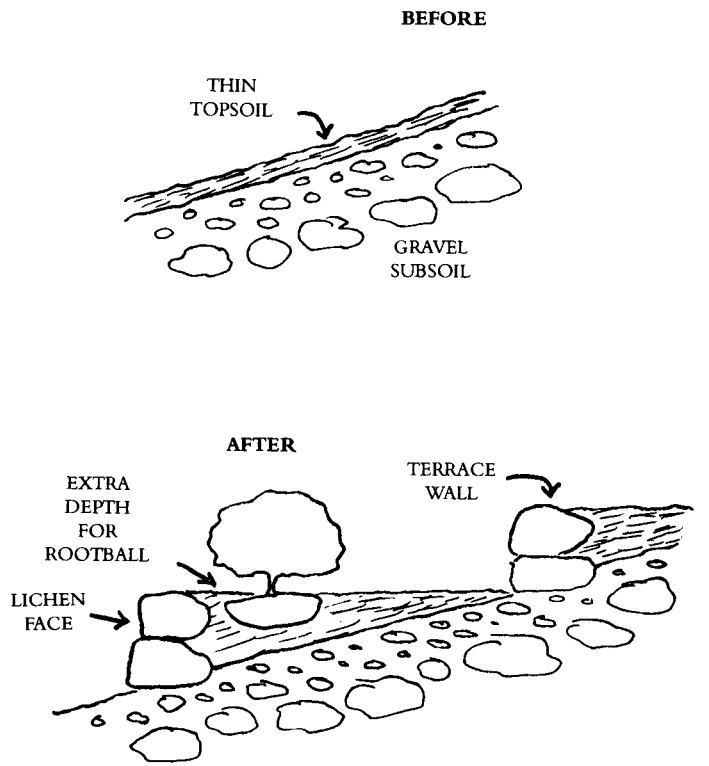

FIG B

Ours is a functional solution to the problems of a fairly steep slope, aimed at reducing surface run-off and soil erosion, at the same time creating deeper soil for planting (Fig. B). When one looks across at the "hill" from our front gate, only the risers are visible, linking together into what one visitor called a "Wall of Jericho". The same effect can be seen in any area of broken crag. Looking down the mountain only the grass shelves are visible, tempting the unwary to descend; looking up, the rocks appear more continuous than they actually are. As the rhododendrons grow, of course, the terracing will rapidly lose its monolithic appearance, until eventually only the odd stone peeps through the greenery.

Rhododendrons can be moved up here at virtually any time. We chose to plant as soon as the bed was ready, in late October. The soil is not yet really cold, and the winter rains will settle them in well before the annual growth flush next season. We would have liked to have done the same with our conifers last autumn, but were prevented by the weather. This time fortune smiled (law of averages?) and we had a mild dry spell into early November. It was not only work which benefitted; the autumn gentians were the best ever, sheets of blue opening in the hazy sun. Comparative judgements are perhaps unnecessary, within the sino-ornata group, all the blues are delightful; it is really a matter of personal taste. We do feel that there are possibly too many "fancy names", and not enough really distinct plants.

One plant at which the above charge could never be fairly levelled is *Gentiana scabra* var *saxatilis*. We have a very good form of this species, raised originally from wild Korean seed. A mature plant may have partially decumbent stems arising to 20 cm above thick thong-like roots. There is no basal rosette. With a considerable number of axillary flowers, in addition to the normal terminal one, making up close clusters, flowering lasts for many weeks. As the autumn advances the foliage reddens and blends beautifully with the reddish-purple bands which alternate with deep blue on the outside of the corolla. Viewed in the slanting rays of a setting sun, their heightened colours and emphasised shadows provided a fitting finale to our gardening year. The Highland winter tightens its grip, and the pen must replace the trowel.

A SECOND ALPINE HOLIDAY

We cannot say that we weren't warned. "Go once" they said, "and you'll be back!" And they were right; we were, the very next year. To see some different plants this time, particularly primulas, we journeyed further east, covering an area from the Arlberg pass in Western Austria down to the mountains around Lake Garda. Our travel arrangements repeated the pattern of the previous year, we drove to the Alps in our old Land Rover, Grendel, booking only the ferries in advance. The old lady was coaxed up many a pass, in the pursuit of high camp-sites. The weather was not quite as kind as in the French Alps last year and we had to make a little more use of hotels. We experienced no difficulty in finding accommodation, even quite late in a rain-lashed evening. We had one narrow escape: following local advice, we drove south out of the Bormio area only twenty-four hours ahead of disastrous floods and landslides. We stayed for a few days with a German friend near Lake Garda, interspersing mountain walks with more conventional tourist

attractions such as the Opera at Verona. Staged in the open air, inside an old Roman arena seating over 20,000 people, it is a magnificent spectacle well worth a visit if one is anywhere nearby. The performance of Aida lasted for five hours and, in spite of taking our own cushions, the stone seating became very hard! Walking around to stretch during the scene changing, I found half a dozen flowers growing in the ancient stones, even though it was dark.

We had two magnificent and memorable days out with our host in the mountains to the west of the Lake. Some of the unmade roads were pretty "hairy", and Poll still expresses a feeling of vertigo when looking at her slides. Noticing her white knuckles and intake of breath, as we backed towards a drop, to negotiate a tight hairpin bend, our host remarked: "This is only the overture, the opera comes later." And so it did, with *Daphne petraea* as the Prima Donna. Under his expert guidance, we saw far more in a short time than would have been possible on our own.

While the worst of the rainstorms were falling further north we were on Monte Baldo in intermittent mist and drizzle. One of Farrer's more purple passages concerns the expanses of *Geranium argenteum* to be found on parts of this ridge. As we saw it, the silver foliage and pale pink flowers bedecked with myriad of tiny water droplets, it certainly was one of the "loveliest things in nature", an etherial sight retreating into the surrounding mists.

Away from Garda, most of our other notable experiences feature primulas. On reaching the Arlberg Pass on July 10th a short climb above the road took us rapidly to the snow line at around 2000m. It had evidently been a very late season, a stroke of good luck for us, tied as we are to school holidays. The first primula we saw was the oxlip: *P. elatior*, long since over at home; here flowering in an open position facing west. A little higher, *P. auricula* was still in full bloom on broken limestone rocks, a sight we had expected to be denied.

A couple of days later, near the Stelvio Pass in Northern Italy (forty numbered hairpin bends going up, we did not bother to count them going down the other side), *Primula daonensis* was the star. There was considerable variation in flower colour; we found a beautiful pale rose pink form, quite different from the usual colouring of the erythrodrose group. Even more distinct was one plant with taller scapes and rather one-sided umbels of veinous-purple flowers. They were also lacking the usual white eye of *P. hirsuta* and its allies. These floral characteristics immediately suggested a hybrid with *P. latifolia*, but although we looked carefully in likely habitats, shady rock crevices, we could not find the latter. In the AGS Primula book, the authors report a similar

experience south of the Tonale Pass, not far away from where we were. At 2900m we might have been a little high for *P. latifolia*, although we did see it later right on the top of a 2800m ridge above Livigno. Here it grew in consolidated block scree, its intense violet and purple shades contrasting beautifully with the grey rocks, and with its white companions *Ranunculus glacialis* and *Leucanthemopsis alpina*.

For anyone interested in primula hybrids the fame of the Bernina Pass exerts an almost irresistible attraction. Our luck was holding, we hit upon a beautiful sunny day with the primulas still in full flower above the road. Much has been written about this area where three species, *Pp. hirsuta, integrifolia* and *latifolia*, can be found growing a few centimetres from one another. We spent a whole day wandering amongst them, searching for the three possible combinations. In his AGS book on "Mountain Flower Holidays in Europe" Dr. Bacon states that he found difficulty in attributing the plants he saw to any one of these named hybrids. We found that the easiest to spot was *P. x muretiana (latifolia x integrifolia)* (Fig. 80 p. 434), combining the vibrant purple eye-less flowers of the first named, with the smaller leaves of the second. The situation is more confusing with *P. x berninae (latifolia x hirsuta)* as, unlike *P. x muretiana*, it is fertile, giving rise to back crosses and a full range of variations. Those of *hirsuta*-like habit, but with *latifolia*-influenced flowers, were again quite easy to pick out.

It was quite a different story with the third possibility, *P. x heerii (hirsuta x integrifolia)*, the only one which we don't grow and so had no direct experience of what to look for. The various sources we consulted differed somewhat, but the general consensus was that it should inherit the toothed leaf-margins from *P. hirsuta* but have fewer, larger flowers with an indistinct eye on a scape of intermediate length. An Austrian correspondent had also told us that, whereas *P. integrifolia* preferred snow-melt hollows, the hybrid was generally found on the drier margins. We scanned dozens of such beds looking first for larger brighter flowers, then for the specified toothed leaves. We must have examined thousands, but the only variation we found were some plants with the brighter pink flowers and the prominent white eye of *hirsuta* above typical *P. integrifolia* entire leaves. This opposite combination is given the name *P. x thomasiana* by K.C. Corsar in his little book on primulas, but we can find no other reference to it. If any reader has a plant of known provenance fitting the traditional description of *P. x heerii* we should very much like to see it.

By the end of the day Poll said she didn't care if she never saw another *Primula integrifolia*. I'm sure she did not really mean it, especially the lovely palest pink form she found. We were not totally

obsessed with primulas either, I came across a long sought-after white form of *Soldanella alpina*. As it turned out, the next day the weather broke and, as described above, we escaped south to pastures and plants new.

After our last holiday account in the Stone Column a year ago, a number of people have told us they were encouraged to try our ad hoc approach to travelling. However one can be too casual, mountains are very unkind if liberties are taken. We do have one or two lessons we have learned in the hard school of our small experience that we think are worth passing on.

If you are contemplating camping, try out your arrangements and equipment at home first, to iron out any snags. Always carry plenty of drinking water in the vehicle, i.e. keep your containers well topped up. Good wild campsites are few and far between and may be dry.

When starting to explore in the morning, always carry lunch, even if you think you are not going very far. You never know what delights will tempt you onwards and upwards.

Try to avoid starting a walk up a mountain late in the day unless intending to spend the night at some high hut. The rapidly approaching darkness will force a retreat before proper use can be made of the effort expended in gaining height.

Not all mountains are equally interesting. One day we climbed 1000m up a steep valley headwall, to be rewarded with an acid moorland, which could have been in Scotland but for the *Rhododendron ferrugineum* and a large basking snake. Read all you can find on your proposed area, and talk to as many previous visitors as possible.

Good maps are expensive, but well worth it. We used 1:200000 for driving and 1:50000, the metric equivalent of the old "one inch to the mile", for walking. Driving on the Continent is not really difficult once you are there. If tyros like us, completely unused to city traffic and motorways, can manage it, anyone can.

CONSERVATION REVISITED

One of the advantages of writing a regular column is that a second bite of the cherry is always possible. Our item on plant collecting and conservation in the Rock Garden for January 1987 was written "off the cuff", long after our return from the Alps. On our second visit we decided we would take a more careful premeditated look at the situation, and do some further reading. Both have confirmed our previously expressed view that, with very few exceptions, mostly plants

Fig 66 *Raoulia grandiflora* (see p. 472)

M. & P. Stone

Fig 67 *Nomocharis farreri* (see p. 473) R. B. G. Edinburgh

Fig 68 *Lilium albanicum* (see p. 466) M. J. B. Almond

Fig 69 *Trollius laxus albiflorus* (see p. 390) H. Zetterlund

Fig 70 *Dissection of crocus* (see p. 384) B. Mathew

Fig 71 *Crocus tunics* (see p. 383)

B. Mathew

with low reproduction rates, responsible collecting by alpine gardeners has a negligible influence on plant populations.

Atmospheric pollution is a fashionable concern at the moment; we saw the resulting damage to trees for ourselves as we drove through southern Germany. The New Scientist has published an excellent layman's guide to "Acid Rain" in the form of a four page insert. It is available separately.* The title "Acid Rain" is in fact an umbrella term for a whole complex of atmospheric processes, some of them independent of rainfall, which are damaging ecosystems. Sulphur dioxide, produced by burning fossil fuels contaminated with sulphur, and from natural sources like volcanoes, was indicated early on as one of the culprits. It is now being suggested that the nitrogen oxides, also produced by combustion processes, are equally harmful. Some of these oxides are converted to nitric acid, and are deposited in rainfall along with the sulphuric acid. They have however another dirty trick up their sleeves: in the presence of sunlight, nitrogen oxides will react with any traces of hydrocarbons in the air to form ozone.

In the atmosphere, ozone, a highly reactive form of oxygen, O_3, plays a Jekyll and Hyde role. At high altitudes, around 25 km or three times the height of Mount Everest, it is beneficial, absorbing dangerous ultra-violet radiation. At lower altitudes, including all the mountain vegetation zones, ozone is definitely harmful. It perishes rubber, gives humans bronchitis, and attacks plant leaves directly. Recent American research has shown significant drops in crop yields because of ozone; and German foresters believe that it is crucially involved in the damage to trees, particularly on upper mountain slopes. This last fact is very worrying to those who love alpines. There may be no visible damage, but as all gardeners know, place a plant under stress and its reproductive potential is impaired.

Motor vehicle exhausts contain both unburnt hydrocarbons and nitrogen oxides; there is often sun in most mountain areas, and it is stronger high up. It could well be that the many cars passing over an alpine pass are doing far more long-term harm to the vegetation, via air pollution, than any digging by their occupants.

Alpine woods are also under threat from a different direction, ever more trees are being cut down to make way for skiing. Every village wants to get its share of the action, leading to many unsuitable and undesirable developments. Austria alone has over 6000 km of ski-runs. As in the Himalaya, the removal of tree cover leads to more rapid run-

*Available from New Science Publications, Commonwealth House, 1-19 New Oxford Street, London WC1A 2NG.

off and soil erosion. Torrential rain is then more likely to cause flooding and landslides, like those we narrowly escaped in Valtellina last summer. On our later return through the area we saw the extensive damage for ourselves. As individuals we felt quite helpless: skiing is such big business that only Governments can control it.

One sphere where sometimes preventive action has been taken lies in discouraging the picking of flowers. We have had second thoughts on this since we last wrote on the subject a year ago. Near Croce Domini, we were shown a slope just below the road, which had been covered in *Lilium bulbiferum* until the advent of mass tourism. Nearby, a similar fate had befallen *Cypripedium calceolus*, only those plants hidden behind or below bushes remain; anything visible from the road had long gone.

More tourists means more cars, and more cars increases the pressure for better roads. The road leading south from Croce Domini has recently been bulldozed to widen it so that two cars can pass. We were told this had destroyed countless thousands of *Primula glaucescens*. Such mass destruction was distressing to see and would be quite impossible to achieve with trowels, even if every alpine gardener turned up simultaneously. It need not be terminal however; given time and lack of further disturbance, the plants may well recolonise the scars.

Further south on the same route, we saw what is potentially a more serious long term degradation of a plant community. As our slides bear testimony, a high meadow containing the rare *Gentiana clusii undulatifolia* was being seriously overgrazed, trampled, and eroded. We found one plant completely out of the ground, unearthed by a cow that very morning. To plant it back, in mid summer, with root damage, and no subsequent watering, gives it slim chance of survival, even supposing it were not kicked out anew. Given intensive care, the patient is alive and well at Askival.

Just below, in a high but sheltered valley, lay an isolated farmstead, at whose cattle we had directed rather uncharitable thoughts. In the absence of subsidies from tax-payers, including ourselves through the EEC, those cattle probably would not be there, destroying the gentians. If all the grazing stopped, on the other hand many of the lower, flower-strewn meadows, so beloved of visitors, would return to scrub and woodland. Therein lies the essential dilemma confronting the alpine regions and those who care for them. Ways must be found to maintain the viability of local communities, without every village becoming a ski-resort, or needing to overgraze its pastures. Unstable hillsides threaten more than just our much loved plants. Catalytic converter anyone?

Crocus structure explained

BRIAN MATHEW

THE FAMILY Iridaceae to which the genus *Crocus* belongs is a rather neat one without any untidy edges like its larger cousin Liliaceae; in fact the latter is so fuzzy around the edges that it has now been divided into over twenty smaller families in order to get some degree of uniformity into the family unit. However, this does not concern the Iridaceae nor one of its most popular genera, *Crocus*.

It is interesting to sacrifice one or two plants of some common crocuses in the garden to dissect and compare their make-up. The various terms used by botanists in connection with crocuses cause confusion for there are different terms for the same parts, depending upon the writer. To identify species of crocus with any degree of certainty one really needs to look at not only the overall appearance of colour and shape but also less easily observed features such as corm tunics and internal structures. Fortunately two of the most commonly cultivated crocus species belong to the two different groups, or rather Sections, of the genus, namely Section Crocus and Section Nudiscapus. The first of these contains *C. vernus*, the common spring crocus, and its ally *C. tommasinianus;* most of us can spare one of these for chopping up! To see the features of Section Nudiscapus, any of the *C. chrysanthus* or *C. biflorus* varieties would do, or *C. sieberi*, so it is not necessary to cut up one's prize *C. michelsonii*, although this gorgeous rarity does belong to the same half of the genus.

Taking a complete *Crocus vernus* plant in flower and working from the bottom up we find that the *corm* is covered with papery or fibrous coats, or *tunics*. These vary widely from species to species and provide some of the most valuable characters in distinguishing between them (see Fig. 71 p. 380). They may be papery or rather smooth and eggshell-like, splitting vertically into strips or horizontally at the base into rings; others have fibrous tunics with a netted pattern, some coarsely netted, some very fine, while in one species *(C. fleischeri)* the fibres are actually interwoven. Peeling off these tunics we have a bald corm and it will be seen that there are several horizontal lines around it which are the equivalent of leaf scars on a stem, for a corm is basically a compressed stem. It is frequently possible to find small resting buds adjacent to these ring scars and these represent axillary buds which may or may not form

aerial shoots; sometimes they develop horizontally into stolons giving rise to young corms (*C. nudiflorus, C. gargaricus* and *C. scharojanii* do this). At the apex of the corm is the growing point and at flowering time it can usually be seen that, at the base of this aerial shoot, there is a slight swelling which will develop into a new corm, the old one shrivelling away by summer and the new one filling the space within the old tunics. New tunics form on the new corm each year and under normal circumstances the old ones do not rot away very rapidly so there tends to be a build-up of tunics; I remember peeling a large corm of *C. cancellatus* on one occasion and finding that 12 years of tunics had built up.

Next, the aerial shoot can be dismembered, starting at the base on the outside and working in. Firstly there are the 3 to 5 *sheathing leaves,* or *cataphylls,* which form a tube enclosing the proper leaves and flowers. These are usually white and sometimes slightly fleshy, but the part which extends above soil level is frequently more thinly papery and greenish-tinged. If these are carefully peeled away the next layer consists of the narrower *true leaves,* white at the base but immediately they break through to the light becoming green with a whitish stripe along the centre, a feature which is so characteristic of crocus (although *C. scardicus, C. pelistericus,* and to some extent *C. banaticus,* do not have this). The number of leaves per corm in *C. vernus* is usually 2 to 4 but this varies enormously from species to species so that *C. candidus* often has only one, while *C. korolkowii* has up to 20. The width of the leaves is also extremely variable and as a general rule if there is a small number they are usually rather wide (as in *C. candidus)* whereas if there are several leaves they are often very narrow, presumably the light-absorbing area being much the same in both cases.

If we now move on inwards from the leaves we find the flower itself, on a stalk, or *pedicel,* which is entirely below ground level until the fruiting stage when it rapidly elongates pushing the capsule aloft. The whole flowering shoot consists, from the bottom upwards, of this *pedicel,* the *ovary,* a long *perianth tube* and then the funnel-shaped flower with its 6 'petals' or *perianth segments.* There are also some other important structures to look out for since they concern the classification of crocus and are necessary for positive identification (Fig. 70 p. 379). Right at the base of the pedicel, immediately above the corm, there may or may not be a whitish or semi-transparent tubular sheath called a *prophyll:* the alternative name, used by some authors, is 'basal spathe'. *C. vernus, C. tommasinianus* and many other species have this prophyll and, as a result, belong to section Crocus whereas *C. biflorus, C. chrysanthus* and a lot of others do not have it and belong to Sect. Nudiscapus.

Moving up the pedicel we will see that there is a slight swelling denoting where the ovary is and just beneath the ovary there is always present another tubular white sheath known as the *bract;* other authors have referred to it as the 'Proper spathe' or 'Floral spathe'. Inside this bract there may or may not be another one, the *bracteole,* and this is often smaller than the bract. The bract is folded around the perianth tube and in most species the tip is visible above ground level so that it can be seen without digging up the plant. The bract is usually easy to see but it is sometimes difficult to find whether there is a bracteole or not, since it may be quite narrow and almost hidden within the bract. *C. vernus* and *C. tommasinianus* have no bracteole whereas *C. biflorus* and *C. chrysanthus* have both bract and bracteole quite clearly visible. *C. sieberi* is one of the easiest species in which to see the bract and bracteole for they are almost equal, one each side of the perianth tube like a pair of ears. So, to recap, for positive identification it will be necessary to know whether there is a prophyll or not and whether there is a bracteole present within the bract.

Leaving the ovary and bract behind (the ovary is below ground) we come to the *perianth tube* which serves as a stem to carry the flower above ground. This varies enormously in length and is of little value in the identification of species. One can make generalisations and say that, for example, *C. niveus* has an extremely long tube (I have measured one of 18 cm) while *C. cvijicii* usually has a rather short one (1.5-3.5 cm), but there are large overlaps between the various species and this cannot usefully be used as a point of distinction.

The expanded part of the flower is the most obvious part of the whole crocus plant and presents us with the most convenient features for identification purposes since the characters can be easily seen and it is not necessary to ruin the whole plant. Initially, the flowering time is important, that is whether the plant is autumn or spring blooming, and whether or not there are leaves visible at flowering time. Flower colour and markings are important and fairly obvious, as is absence or presence of a yellow zone in the throat. The three stamens may have yellow, creamy-white or blackish anthers. Less obvious, but sometimes important in distinguishing species, is the absence or presence of hairs in the throat of the flower; these hairs are carried in a ring just where the three stamens join on to the perianth and it may be necessary to split open the flower to see them. With eyesight such as mine (maturity is creeping on), it is essential to use a x10 hand lens to see them properly.

Finally we come to the *style* and *stigma* and the amount of branching of the style, and to a small extent the colour of those branches. The

simplest form of branching is into three divisions, or *style branches,* such as can be seen in *C. biflorus* and *C. chrysanthus;* in the case of these each branch is widened at its tip and is frilly like a miniature cauliflower. The amount of branching varies widely so that, for example, in *C. olivieri* each of the three branches is again divided to give six, while in *C. tournefortii* and *C. banaticus* there are a great many slender branches. The colour varies too and may be deep red, as in *C. sativus* (saffron is made by drying these style branches), white *(C. karduchorum),* lilac *(C. banaticus)* or some shade of yellow or orange (the majority of species). Apart from these characters there are measurements to be taken into account, giving the shape and size of the perianth segments, the fragrance or otherwise of the flower and, probably most of all, just the overall 'look' of the flower which with practice becomes the most efficient way of identifying crocuses, and anything else for that matter; it is called experience! In some ways the enormous amount of variation to be found within each species is infuriating. It makes classification tricky for the botanist and, as a result, identification is a problem for the gardener. If you are making a collection of crocuses it means that there is almost no end to the business, and, as with stamps, new variants keep appearing all the time. However, for the hard bitten enthusiast this is a tremendous bonus for it means that there is always something to search for and keep his or her interest alive.

From Arizona to Washington State, a Journey through the Western USA

HENRIK ZETTERLUND

The Harold Esslemont Lecture

LAST YEAR, in June and July, I had my first, and so far only opportunity to visit the United States of America. The main purpose was to participate in the Second Interim Rock Garden Plant Conference in Boulder.

Thanks to two old friends, Sonja Lowzow, a knowledgeable and lovely plantswoman from Lakeside Arizona, and Jim Fox, a young plantsman from Palmer Alaska, our plans were extended to include a three week collecting tour ranging from the White Mountains in Arizona to the Olympic Mountains of Washington State.

The conference in Boulder, Colorado lasted for five days and was very well organized and rewarding with lectures in the evenings and field- and garden-excursions during the day.

After the event, Jim Fox and I went on a tour in his car. First stop was the Vintah Mountains in northern Utah, then the Sawtooth Mountains in Idaho, the Beartooth Pass and the Big Horn mountains in northern Wyoming and, finally, the Olympic Mountains in Washington.

When I later checked with a world-map I was surprised to see how far south I had been travelling since Phoenix is on the same latitude as Casablanca, Denver the same as Athens and Seattle on the same latitude as Paris.

The USA is a vast country — almost as large as Europe. It is extremely rich in endemic plants of great horticultural potential. The most important areas for alpines are the Rockies, the Cascade range and the Coast range; these host a large amount of known, desirable and growable species. However, as our knowledge increases in the future, my belief is that our attention will be more and more directed towards the states of Utah, Nevada and California which are crowded with beautiful, rare and difficult endemics — the things that alpine gardeners normally go for.

An inaccurate but tempting parallel with European conditions would be to compare the former areas with the Alps and the Pyrenees and the latter with the mountains of Greece and Spain.

The conference in Boulder and the extraordinary book that was produced for the occasion, Rocky Mountain Alpines, will certainly draw the world's attention to Western American alpines and I wouldn't be surprised if these are to be the next fashion in our circles; they would certainly deserve it.

Arizona is an area of contrasts. As we left Phoenix heading east towards the White Mountains we drove through this fascinating succulent desert. Giant Saguanos *(Carnegia gigantea)*, Cholla *(Opuntia fulgida)* and drought-resistant leguminous shrubs made a picture that corresponded well with my preconceived idea of Arizona and the wild west.

As we gained altitude the landscape became less exotic. At approximately 2000m there were large forests of *Pinus ponderosa* and alligator-juniper, *Juniperus deppeana*. The latter can grow to a large tree and has a very ornamental, alligator-stain-like bark.

From these altitudes one can expect many plants to be hardy, so the forest floor and rocky outcrops were well worth a close examination. *Agave parryi* is a small-growing species that should be hardy in most of Britain.

During the last few years attention has been paid to the hardy hedgehog cacti, Americas foremost rock garden plants. They certainly have much more charm than the more familiar, horrid Opuntias. *Echinocereus triglochidiatus* is perhaps the most brilliant among the frost-hardy species.

On limestone cliffs the well-known *Petrophytum caespitosum* can be found. Among the three species of "Rock-Spireas" this has the widest distribution and the Arizona populations are the most southern. We met with this species later in Idaho and Wyoming and it was always growing in invisible crannies on limestone. Therefore, I am surprised that this plant is so easy to grow in northern rock-gardens.

Dry rocks — acid and calcareous — in western North America, are the sites preferred by dwarf ferns mainly from the genera *Cheilanthes, Pellaea* and *Notholaena* — delicate plants of great interest. During the dry season they are coiled up and seem completely desiccated.

Some dust-dry remnants were collected and sent home in a dry state where they were planted in moist sand. By the time I returned the dry leaves had revived and now, one year later, the most spectacular woolly-fronded cheilanthes — probably *C. lindheimeri* is growing well in the alpine house. The ferns of these three genera definitely deserve more attention since they are fascinating, small-growing plants of great charm.

On sparsely vegetated, rocky slopes the remains of many interesting plants could be seen. One plant, *Hedyotis rubra* was in full bloom. This

is a diminutive representative of a pretty genus, a choice plant that probably will prove very difficult to grow.

A close relative, *Hedyotis pygmaea* is also very interesting and may be more vigorous. At altitudes around 2500m all plants can be claimed to be hardy. On the pine-forest floor the flora wasn't particularly rich but two nice trailing plants were found.

The Arizona honeysuckle, *Lonicera arizonica* with brilliant orange-red flowers, attracted me as well as the humming-birds, not merely as vigorous as the well-known garden hybrids and possibly a plant for the rock-garden.

Growing nearby was a pale-pink form of *Clematis pseudo-alpina* which made no attempt to climb but was quite satisfied with trailing over the ground.

Since my preconceived idea of Arizona was heat, drought and cacti, I was really surprised to see the vegetation from 2500m and upwards. The ground in the spruce forests was moist and mossy and in the clearings *Aquilegia triternata* was found in abundance, one of the choicest in the red-flowered group and maybe the smallest. In deep shade, among moss or on decaying spruce-trunks I made my first acquaintance with a Swedish native, *Calypso bulbosa*, which is very rare in northern Sweden but frequently met with in the White Mountains between 2600 and 2800m.

The lush vegetation of the White Mountains is due to the monsoon rains that fall daily in July and August. The meadows were green and full of flowers, some very spectacular like *Wyethia arizonica* a medium-sized composite with large flowers. This genus and the similar *Balsamorhiza* should be tried more in rock gardens. They are easy from seed but initially a bit slow-growing.

Iris missouriensis was a common plant of the meadows. It is most variable so superior individuals can be selected from the populations.

In rich soil by small streams *Sidalcea neomexicana* and *Helenium hoopesii* were common. Both are well-known and useful plants for the herbaceous border.

The highest peak in the White mountains is Baldy Peak, a sacred place for the Apache tribe. Although it is almost 4000m high it can not be considered as truly alpine country. The flora near the summit is an interesting mixture of woodland, subalpine and alpine plants.

Rhodiola rhodantha is from the latter category, an odd looking member of the genus but similar to the Central Asian *Rhodiola semenovii.*

Another true alpine is *Hymenoxis brandegei,* endemic to the southern Rockies and Baldy Peak. This is one out of many, very choice

alpine composites that are to be found in western USA.

We left Arizona, travelling northwards through a fantastic country, deserts, semi deserts and red sandstone mountains that glowed in the sun.

In northern New Mexico the sage bush country began. You can travel for many hours through seemingly endless fields of *Artemisia tridentata,* without realising the floral wealth of this plant community. Everywhere among these aromatic shrubs interesting small perennials can be found.

Half an hour's drive took us from the dry sage bush community to a humid subalpine country. Spruce, aspen and the grassy meadows lend a Scandinavian look to the San Juan mountains of northern New Mexico.

Here in the moist meadows one of the charming dwarf larkspurs, probably *Delphinium alpestre* was abundant; despite its subalpine nature it has the same tuberous type growth cycle as the species from the dry lowlands, spring-flowering with a summer dormancy. It seems to stay small in cultivation which is a good thing.

I hope that in the near future the Americans will make the dwarf species of mertensia available to us Europeans. Every time I have seen a species in a seed list I have ordered it but have yet to receive any seed. Therefore I was very excited when I was able to collect *Mertensia lanceolata.* This is not the finest species but in my eyes one of the most delicate. As you can see this royal plant is surrounded by plebeian dandelions and fortunately it seems almost as easy to grow.

This is not the case with *Trollius laxus albiflorus* (Fig. 69 p. 379) the creamy-white globe flower of the Rockies. It is growable, but slow and a bit shy flowering. It is not nearly as vigorous as the eastern *Trollius laxus* with less attractive yellowish-green flowers.

Trollius laxus albiflorus is common by ice-cold streams and sloping bogs in the Rockies and certainly worth every effort in the garden.

By the roadside *Thermopsis montanus* was spreading its suckers over large areas. It was not more than 30 cm tall and I hope that it will stay this size in our rock garden and not, like most species, grow taller than myself.

We spent one day in the San Juan mountains and our next stop was Boulder, Colorado, the Conference site.

Many British people were there and have probably spread the word around about that fantastic event. I'm also sure that many of you have seen slides taken on the excursions, particularly from the glorious day on Mt. Evans. If you ever go to Colorado don't miss this place. It is easily accessible by car — you can almost drive to the summit at around

4750m altitude and step right out into the tundra.

But I shall start in the foothills at 2400m, where one of the loveliest of rock-ferns can be found, *Notholaena fendleri,* a blue-green lace in shady, dry crannies. It seems to be quite hardy since it has survived over a number of years in our rock garden.

In the montane zone at 3000m *Jamesia americana* was growing in rocky areas. It belongs to the saxifrage family and is a long lived slow growing shrub for a sunny spot.

An interesting conifer of the subalpine areas is *Pinus aristata* that can attain an age of about 2000 years. The gnarled trunks look as ancient as they are and are an impressive sight.

Cirsium scopulorum also has an ancient, weird look. It is very ornamental in its native haunts, much like *Cirsium spinosissimum* of the Alps, and it seems to have a preference for cars, reaching its optimum development on roadsides and parking lots.

In humus soil in the pine forest one could find *Polemonium delicatum,* most delicate indeed but not as striking as its alpine relative *Polemonium viscosum,* the sky-pilot of the tundra, one of the most memorable plants from the Rockies. It is sad that it is so difficult to grow well in gardens. The two species were frequently seen later on and showed a wide range of variation.

The rather wide distribution and variation would make it interesting to try *Polemonium viscosum* from different areas in search of an amenable form.

Another common tundra native was *Mertensia viridis* a comparatively vigorous, mat-forming species that grows well in captivity.

It grows along with *Hymenoxis acaulis* var. *caespitosa.* This forms perennial tufts or mats of silky, shiny leaves and its golden flowers are carried on short scapes. I do not yet know how it will behave in the garden; the plant I have is alive but somewhat lingering in growth.

The most conspicuous plant of the tundra was definitely *Hymenoxis grandiflora* with flower-heads almost 10 cm in diameter; unfortunately this is monocarpic and difficult to grow well. Seed germinates freely and young plants grow fast, but I have a feeling that the season is too long for it in the lowlands. The flower buds will start to grow in the autumn and very rarely develop well.

Erysimum nivale is also monocarpic but adaptable to lowland conditions. Once there it will seed itself around the rock garden. On the typical plant the flowers are yellow but on Mt. Evans a lilac form, *Erysimum amoenum* (Fig. 72 p.413), can be found among the former.

With my limited vocabulary I am running short of superlatives, and I should have saved "most conspicuous" for *Ranunculus adoneus* the

most exciting buttercup I've seen so far. It invariably grows by late snow-patches, very much like *Ranunculus glacialis.* Therefore I decided that it would be disappointing in cultivation, either refusing to grow at all, or else produce masses of leaves and tiny flowers on metre-long straggly stalks. However, my recent experience suggests that I might have been wrong.

In our alpine house plants are healthy but not too vigorous. The odd flowers produced in summer were fair sized, approximately 2.5 cm in diameter. There is hope that it will be capable of producing flowers nearly equalling its natural size, between 4 and 5 cm, during the vernal growth explosion.

Another superlative member of the Ranunculaceae is *Caltha leptosepala,* a common plant in the rockies often associated with *Trollius laxus albiflorus* but much easier in cultivation.

What a lovely oxytropis was my first thought as I spotted *Trifolium nanum,* a pulvinate clover. Unfortunately, this species won't stay dwarf in cultivation and the tiny, pale flowers are hidden in the foliage. At least this is my experience with some plants I raised a few years ago. These, I must say, did not originate from Mt. Evans. The species is variable and the Mt. Evans form was much superior to any of the other forms I saw later on.

Several pulvinate and mat-forming Leguminosae are native to the Rockies; some will keep their character in cultivation, others won't.

With some species, for instance *Astragalus purshyi,* I have found that different geographical races behave very differently, so don't give up if you are disappointed with the first try.

Trifolium dasyphyllum is another attractive clover from lower elevations.

In peaty turf on the tundra *Primula angustifolia* was common. It is the smallest species in the Parryi Section and not the easiest to grow. I have found it disappointing in cultivation, but am prepared to give it a last chance after seeing it on Mt. Evans.

It often grew in company with *Besseya alpina* which shares the fate of being the smallest within its group. *Besseya* is closely related to *Synthyris* and most species have a rather bizarre look. This species is quite pretty, however.

In crannies on the highest rocks and on bare sandy soil, the lewisia relative *Claytonia megarrhiza* had its place. It's an interesting plant but not nearly as charming as its relative from the cascades, *Claytonia nivalis,* which often is treated as a variety of *C. megarrhiza.* This I find strange since they look and behave very differently.

Saxifraga flagellaris is a high alpine with an interesting distribution occuring in Asia, the Arctic and in the Rockies. It's a pleasing rock

garden plant and will spread by means of offsets on thin red runners if provided with a well drained cool position.

Saxifraga serpyllifolia has a similar distribution. But if one prefers to call it *Saxifraga chrysantha* it is added to the group of Rocky mountain endemics. It has a reputation of being almost impossible in cultivation.

The mat-forming *Arenaria obtusiloba* should be possible to grow, a most attractive plant that I am going to try the next time I see it in a seed list.

Phlox condensata is one of the truely alpine phloxes. It varied much in floriferousness and petal colour, which ranged from white to sky-blue. So the best way to introduce it would be by means of cuttings selected in situ.

The American eritrichiums, whatever epithet you prefer to use, should not be expected to be any easier than their European equivalent. If I call this one *Eritrichium nanum* var. *elongatum* I should not be too wrong. It is common at high altitudes and rather variable. One form I later saw in the Vintah mountains was not even worth growing. The Mt. Evans form was nice and albinos were frequent.

The intense and rewarding Conference came to an end and it was time for Jim Fox and I to start our own post-conference tour. Jim was going to drive back to his home in Alaska and this was very convenient for me as it gave me the most splendid opportunity to see a large part of the Rockies.

We did not get any further than the Berthoud Pass on the western side of the Colarado Rockies before we made our first stop.

Among the plants that I was most eager to collect were the dwarf species of salix since these are difficult to get hold of due to their short seed viability.

At Berthoud Pass we made our first acquaintance with *Salix nivalis* which we were to see on many occasions. We also frequently met with *Salix arctica* a smaller-leaved species.

Now with live material from different areas of the Rockies in cultivation I feel most uncertain about the naming of my collections. So even if the labels say that I have only collected two different species the look of the plants suggests that it might be ten or more.

In pine sphagnum at lower elevations we met with another charming and more conspicuous dwarf shrub, *Kalmia microphylla*. It is not more than 10cm high and stays that size in cultivation which is not the case with the eastern *Kalmia polifolia* of which *K. microphylla* is often considered to be a subspecies.

Close to the kalmia but in moist, black muck *Primula parryi* was plentiful. It belongs to the same section as *Primula angustifolia*, but is its

opposite, the sturdiest of its section, almost extravagant and an easy and rewarding garden plant.

Further down, in the aspen forest, the state flower of Colorado, *Aquilegia caerulea,* grew. This large-flowered columbine preferred a much more fertile soil than I had imagined, which might be the explanation for my lack of success with it. It is a plant for the herbaceous border or the woodland rather than for the rock garden and it is one of the showiest species in the genus.

It is not restricted to Colorado. In some areas, like in the Vintah mountains the lovely creamy white form is dominant.

As with Arizona I had imagined Utah to be hot and dry, which it is to a large extent. But also in Utah there are the high mountains to provide a cool and moist contrast to the scorched plains. Our main stop here was Thompsons Peak in the Vintah Mountains which runs in an east-westerly direction along the Wyoming border.

Here, in the spruce-forest we found *Allium brevistylum,* a rhizomatous species which attains a height of 30-40 cm. It is very attractive and ought to do well in any decent position.

Another amenable plant of similar size is *Penstemon procerus* that grew in meadows. This is one of the few reliable species that are long-lived in cultivation. The highlight of Thompsons Peak was *Penstemon vintahensis* one of the most charming representatives of the genus. It is endemic to the Vintahs and its scapes, carrying clear-blue flowers, rarely exceed 10cm.

At lower elevations, on a limestone hill, we saw the diminutive *Penstemon acaulis,* with stemless sky-blue flowers on prostrate mats. The rain prevented any photographing but take my word for it that these two species are among the top ten in a genus crowded with good garden plants.

Yet another fascinating species was found at a higher elevation, *Penstemon whippleanus,* medium sized with dark brownish-purple flowers, a well known and easily grown plant.

Lewisia pygmaea is the most widespread species in the well-known genus and common at moderate to high altitudes in the Rockies where it is found in humus soil that is very moist when the plant is in bloom.

It varies tremendously in size and flower colour, and this was a particularly richly coloured form.

The most remarkable find in the Vintahs was a showy crucifer, *Parrya nudicaulis,* with a mainly arctic distribution extending through Siberia into Central Asia. It also occurs in two localities in Wyoming

and here in the Vintahs. This might be the plant that some botanists refer to as *Parrya rydbergi*; if so it is a rare local endemic.

I have tried the arctic form without success and would have liked to try it from southern localities to find out if it might be more easy to grow. Unfortunately it seemed rare here and could not be collected.

From Utah we continued to the Sawtooth mountains in central Idaho. Among the party that had gathered earlier in Arizona was the well known plantsman, Roy Davidson, from Seattle. It was most fortunate that we got to know him since he has a tremendous knowledge of Rocky Mountain plants, a knowledge he did not mind sharing with us.

So from Boulder we more or less followed a route recommended by Roy. I had told him the plants that I particularly wanted to see and he told me where to find them.

Here he had recommended the Livingstone mine, which was a rich area indeed. Unfortunately we were surprised by a hailstorm that prevented us from reaching the highest areas.

In gravelly soil beside the path leading to the mine we saw a phlox relative *Linanthastrum nuttallii* — which is worth a try in a sun-baked position in the rock garden.

Higher up in moist, peaty turf, grew the tiniest shooting star I have ever seen. It keyed out as *Dodecatheon pulchellum* ssp. *watsonii.* We saw it in alpine habitats on a number of occasions but never so extremely dwarfed as here. The total height is approximately 4 cm. In cultivation it behaves like a dry land dodecatheon and aestivates from late June. It also seems to stay dwarf in captivity.

We went further to Galena Summit, a road pass at almost 3000m in the foothills of the Sawtooth mountains. This was colourful sage bush and castilleja country, but the plants that we were interested in were all of the tuberous type.

The ground was dry and most plants were aestivating but in a depression there was some snow left. The spring beauty, *Claytonia lanceolata* was in flower beside the snow patch. It is a nice little plant which is visible only for a short period and spends the rest of the season underground in a round, edible corm

In western USA many species of viola are dryland plants with a pronounced summer dormancy. The leaves of *Viola purpurea* var. *venosa* had withered in most places but by the same snow patch some plants were still in bloom.

True bulbs were also to be found, a tiny allium species and *Fritillaria pudica* which I consider to be the prettiest American frit.

The reason why we went to Galena Summit was *Ranunculus andersonii.* Roy Davidson had told us that it was reported from here, though he had failed to find it himself. Then you can imagine how triumphant we felt when we found the dry, brown leaf remnants on the slope.

Ranunculus andersonii has the reputation of being red flowered and perhaps it is in some places. The only flower that was produced this spring was white with pink veins.

Still it is a beautiful small plant, a bit similar to *Ranunculus glacialis* but probably more amenable in cultivation though its needs are entirely different. This is a plant for the alpine house or the bulb frame.

We left Idaho and went east to the Beartooth Pass in northern Wyoming. By the roadside in the spruce forest magnificent clumps of *Castilleja rhexifolia* were growing. This pink-purple bracted species was the castilleja that mostly appealed to me although I also liked the orange-red and the yellow species very much. They are all claimed to be almost ungrowable but this is not quite true, some species will establish well without any special preparations; others can be raised on hosts and then there are certainly a number of species that are impossible.

At the Beartooth Pass *Douglasia montana* was common in windswept areas. It is a variable plant and I have grown lax forms with poor flowers. A seedling collected here stays tight and bun-like and is very pleasing.

In these areas there are some limestone mountains which are the home for many interesting plants. Not far from Buffalo Bill's town, Cody, at moderate elevation around 2000m, we were going to search for *Shoshonea,* a new genus. The slopes were full of dry remnants of townsendia, penstemon, cryptantha, eriogonum and various indeterminable plants.

Higher up, on the bedrock, other treasures were growing, blue-green cushion of *Kelseya uniflora* and dark green buns of *Shoshonea pulvinata.*

Kelseya uniflora is an irresistible cushion plant and one of the most famous of rock plants. It is a slow growing shrub with an ancient look. One might wonder for how long it will remain on earth as regeneration seems to be almost completely absent. I saw it in three localities and was unable to see a single seedling.

Shoshonea pulvinata was thriving and numerous in the one area where we found it. This is a pulvinate umbellifer with leathery leaves and yellow flowers just above the foliage. For some reason this plant has been overlooked in the past so the monotypic genus was not described until 1982.

It is not conspicuous, but is still a pleasing plant which is easy to cultivate and my guess is that it will find its way to our rock gardens in the future. On this occasion the seed was ripe and seedlings are now growing well in many gardens.

Beside the shoshonea another "new" plant was growing. *Antennaria aromatica* was described as late as 1984. It is extremely slow growing, almost cushion forming, with spicy, white leaves and might be considered to be the best antennaria for us alpine gardeners.

The limestone rocks also hosted a pulvinate *Astragalus* species with shiny silvery leaves. There was no seed so I collected a piece of the plant and to my astonishment it survived and is now established in a pot and remaining dwarf.

In slightly shaded cracks, *Pellaea glabella* var. *occidentalis* was growing. This is probably the tiniest representative of the genus with blue-green fronds rarely exceeding 3cm in length.

Boykinia jamesii preferred similar sites and was already in seed at this altitude.

Our next stop was near the Indian medicine wheel in the Big Horn mountains and here at 3300m the boykinia was coming into flower. Beside it on the cliffs and on the ground, *Aquilegia jonesii,* another plant of great fame, was abundant.

It was past flowering and, judging from the few capsules, it had flowered sparingly this season, but this is said to vary from one year to another.

In cultivation it rarely blooms and when it does the flowers often hide in the foliage.

When one is on a tour like this there are always one or two plants that one would like to find more than anything else.

This time these plants were *Ranunculus andersonii* and *Clematis tenuiloba* (Fig. 75 p. 415). This near relative to *Clematis alpina* does not produce climbing shoots but runs underground among broken limestone rocks in northern Wyoming, adjoining Montana and North Dakota.

I have seen one or two pots of it here in Britain but never seen it mentioned in the show reports, which it deserves to be, as in my opinion it is one of the loveliest of alpine plants. It seems to be quite easy, at least in the alpine house.

It is very much like an imagined hybrid between clematis and pulsatilla. It is by no means uncommon in this area so I collected a number of different clones in different places and altitudes; all but one had finished flowering.

There is much variation in sepal form and colour and I was pleased to find a white form as they flowered this year. Another form is taller

growing and might give evidence that the lumping with *Clematis columbiana,* preferred by some botanists could be correct, but I shall continue to call it *Clematis tenuiloba.*

Quite content with the results we now left the Rockies and went to Washington State. Jim had spent three years in Ellensburg and was familiar with this area. He took me to the most famous plant of the Wenatchee mountains, *Lewisia tweedyi,* endemic to this area. It grew in dust-dry soil-deposits on steep cliffs and was past flowering. Cuttings rooted easily and flowered this spring; one was almost yellow, some were apricot and one apricot with a lilac edge.

We had intended to make a short visit to the Grand Ridge Nursery in Issaquah just outside Seattle. We ended up staying there for three nights enjoying the hospitality of Kitty and Phil Pearson and Steve Doonan.

I have never heard of this nursery before so I was surprised to find a place nearly as impressive and interesting as the alpine yards in Edinburgh and Kew, being run on a part-time basis by these enthusiastic, charming people.

Steve and Phil took us on an excursion to Mt. Townsend in the Olympic Mountains, an area with an interesting flora rich in endemic species. The track went through a majestic forest up to meadows coloured red by *Castilleja miniata* and *Lilium columbianum.*

Beside the path we found a splendid form of *Fritillaria lanceolata* growing in gritty soil. In the dry, black lava-screes, *Delphinium glareosum,* a low-growing species with large, richly coloured flowers was growing. This is another of the aestivating delphiniums and may be the choicest.

Erigeron flettii was growing nearby but also in turfy soil higher up. It is endemic to the Olympic mountains and quite nice with attractive foliage and pure white daisies on 20cm long stalks.

Campanula piperi, the most well known endemic of this area, was just coming into flower on the lava cliffs. It is a delightful plant that grows well in the alpine house and it would probably do well outside too if the slugs could leave it alone.

Polypodium hesperium was covering the base of the same rocks. This must be the smallest, hardy species in the genus with fronds approximately 3 cm long in the wild but attaining double that length in cultivation.

One of the smallest species of lupin, the silky, leaved *Lupinus lepidus* var. *lobbii* was growing in the driest sites. It often occurs in seed lists and is quite easy to grow but of a short duration. I think there is only one hardy lupin that is smaller, *Lupinus breweri,* an extremely desirable plant.

An interesting parasite, *Orobanche uniflora* also grew here. This is a pretty plant, which can not be said about most of its relatives. It is said to parasitise on saxifraga, sedum and composites. I remember once seeing a picture of it, potgrown, with *Sedum spathulifolium*. Despite having tried it on several occasions I have never managed to establish it.

Phacelia sericea was common all over the Rockies growing in gravelly soil and even on the road-banks. I had read a lot about this so-called beauty but didn't like it very much. But this was before I saw the Olympic form which was of a more compact growth with silkier, silvery leaves and a more perennial look.

This form corresponded well with my expectations and I do now agree that *Phacelia sericea* can be an extremely attractive plant.

Douglasia laevigata var. *ciliolata* is common and very vigorous on Mt. Townsend; some specimens were more than 50 cm in diameter. I have seen plants nearly that size in Swedish gardens but can not claim any success with it in the open in Gothenburg.

Elmera racemosa, on the other hand, is adapting well to our conditions. Here it was clinging to north-facing moist lava-cliffs that provided the creamy-white flowers with a contrasting background. *Elmera* is related to *Heuchera* and *Tiarella*.

The highlight of Mt. Townsend, may *Campanula piperi* and all the others forgive me, was *Viola flettii* with leathery, purple-veined, blue-green leaves against which the lilac-pink flowers showed off perfectly. It has proved an easy plant in the alpine house but I have never had enough material of it to try it outside. To see it in its native haunts was a worthy climax to a journey that had widely surpassed my expectations.

Though many western American alpines are in cultivation, they only represent a fraction of what is still awaiting introduction.

The increasing American interest in native alpine plants is a guarantee that many novelties will reach us Europeans in the future, to test our skills and enrich our gardens.

Chile from 34° to 54° South

KEN & LESLEY GILLANDERS

INSPIRED BY J.M. Watson's fascinating account of collecting in Chile in the AGS Bulletins and, in 1982, the articles by John and Brenda Anderson in the SRGC Journals, a desire to also visit Chile became an obsession after meeting John and Brenda when they visited Tasmania.

Our first concern was the language, as neither of us spoke a word of Spanish. However, after the best part of a year, with dictionary and phrase books, we managed to pick up enough essential words and phrases to get us about. Most larger hotels have someone who speaks a little English but in the small country towns our limited textbook Spanish was essential.

We chose February as possibly the best time to see some late flowers and at the same time collect seed from the plants that had bloomed earlier. We in Tasmania are on the same altitude as Puerto Montt and Chiloe and, as our mountain areas are best for seed collecting in February, we reasoned that areas north of this may be earlier but still have seed. But all we could do was hope that south in Patagonia some seed would also be ripe.

Our route from Tasmania to Chile was from Sydney to Tahiti, where after a one day stop we flew on to a fascinating two days at Easter Island and then on to Santiago. With only four weeks at our disposal, we were determined to cram as much as we could into our brief stay, so after an overnight stop in Santiago we flew south to Punta Arenas. The 12°C temperature that greeted us was quite refreshing after the heat of the preceding days—temperatures in Santiago, while we were there averaged above 30°C.

We had been warned never to expect things to go as smoothly as at home and now on landing we found there was no pre-booked hire car waiting and no-one in attendance at the desk. By this time the bus into Punta Arenas had left, so we were fortunate to catch the last taxi into the city. Of course the taxi driver had us under close surveillance and no doubt knew we would have to rely on him to get us to our hotel.

On arrival at our hotel, where our bookings were correct, we had to wait till 2pm to arrange for our car to be delivered as most business in Chile stops for 2 hours between 12 and 2. As we then had only several

hours of good light left in the day, we drove south along the coast for 60 km to Fuerte Bulnes. Punta Arenas has a population of about 111,000 and is a compact little city so it takes only a few kilometres to get away from the built-up areas. One of the most frustrating things we found in Patagonia was the fences along nearly every road we took. The country is farmed wherever possible and the wooded hills and mountains are behind the fenced estancias. Also grass and introduced weeds are epidemic in many areas, much to the detriment of the native herbs.

However, on this drive, we did manage to see *Fuchsia magellanica* in flower, growing within metres of the sea shore, *Bolax spp.* and *Hypocheris lanata* with its dandelion-like white flowers with brown stamens, *Perezia spp.* still with a scattering of their strange light blue flowers and several prostrate *Berberis spp.* with blackish-blue fruits were on roadside verges. Within several kilometres of Fuerte Bulnes, large areas of heathland are covered with pernettya and empetrum. These were in full fruit and were very spectacular. Also near the end of the road, a small area of natural forest was interesting. It was comprised mainly of *Nothofagus pumilio, Drimys winteri* and *Embothrium coccineum,* the last two mentioned still in flower. Large bushes of *Pernettya mucronata,* some two metres high, grew among the trees while, in the heavily shaded positions, *Gunnera magellanica* formed extensive mats sprinkled lightly with plants of the orchid *Gavilea.* A quick look at the Fuerte, which is a reconstruction of the original settlement of the Chileans on the Straits of Magellan in 1843 and we returned to Punta Arenas, ready to make an early start the next day.

It is 250 km north to Puerto Natales, a town of 11,000 situated on the Seno Ultima Esperanza. As the road from Punta Arenas is sealed, it is an easy pleasant drive passing through farmland all the way. Roadside areas at times proved interesting with yellow flowered *Viola spp, Pernettya* and *Bolax.* The black-necked swans seem to be permanent residents on the water in front of the town and the view across the Seno to the snow capped Peninsula Antonia Vares is beautiful. Our final goal, the Parque Nacional Torres del Paine which is another 150 km north-west, is reached by a narrow unsealed road. The scenery became grander and wilder as one approached the park.

Covering 1600 sq km this park borders on the Patagonian ice cap and has several glaciers, many magnificent lakes and rugged mountains which rise to 3000m. Wildlife abounds with herds of guanacos, foxes, geese, swans, flamingos, rheas and overhead; one frequently sees several condors. Much of the lower area of the park is grassland with small forests of *Nothofagus pumilio* in sheltered areas. Cold strong winds are common and to leave the camera on the tripod without holding it was impossible.

We spent three days here searching for and photographing plants in flower, also fauna and the majestic scenery. Embothrium was in full flower here whereas at Fuerte Bulnes most plants had seed pods on them, also, the form here had much shorter rounded foliage. Many sisyrinchiums were in seed, a few plants left with the occasional yellow flower still intact. This also applied to violas which were in profusion. Identification was difficult as several yellow flowered *Viola spp.* occur throughout this area. A small calandrinia growing in rock crevices at Lago Grey had finished flowering and seems to key out to *C. caespitosa.* Perezias were plentiful, also, bolax and azorella formed dense hard cushions, strangely familiar in habit to our Tasmanian abrotanella and phyllachne. Several different monocots had been flowering in large colonies, also *Primula magellanica* and *Anemone magellanica. Calceolaria tenella,* though finished flowering, was easily identified creeping in moist vertical and horizontal rock crevices.

Calceolaria uniflora, I believe, is the new name for *C. darwinii.* This plant was most abundant from the sandy shores of the lakes to the tops of the wind swept hills we climbed, generally favouring some shade under low shrubs or the small clumps of dwarfed nothofagus, its last few flowers showed quite a variation in banding and colour. I had grown this plant several years ago and eventually lost it. After seeing it growing in Patagonia, I am sure I killed it with kindness. The rather sandy soil in this area dries out very quickly and the wind, which blows most of the time, takes moisture from the soil and plants as well. This in no way seems to worry them as some were about blown out of the ground, hanging on by a few remnants of bare root but with flowers and foliage unaffected.

Several other plants were quite interesting but the names were unknown to us. One, a creeping prostrate shrub, had intense silver foliage and at a distance looked like a raoulia. However, on examination, they were quite woody with a central trunk of 3 cm and stiff spreading stems.

On our return to Punta Arenas, we had only one day left so decided to drive to the shores of Seno Otway about 80 km by road to what we hoped would be areas free from weedy growth, which we had found along the road to Fuerte Bulnes. The road, really only a single lane gravel track, passes through several large estancias. Some sections were unfenced but had cattle grids on the road. Eventually we emerged onto the pebbly shores of Seno Otway and continued along in a parallel direction until we found an area between the road and the beach which proved to be extremely interesting.

There were cushions of *Bolax gummifera* formed into dense hard mounds of glaucous green rosettes with attractively cut foliage and packed so tightly they were unmarked when walked on. Another cushion plant was coalescing with the bolax but with a finer very deep green foliage. We were unable to identify this gem. Pernettya and empetrum produced their berries in such profusion as to hide the complete plants which were quite prostrate. Sisyrinchiums appeared again and caltha which provided a good crop of seed. A stop on the pampas while returning proved fruitful with *Pernettya pumila* forming dense mats bearing large pale pink berries looking too large for the tiny matted foliage. *Primula magellanica* growing in full sun was in seed and a tiny pale blue *Gentiana sp.*, its 1 cm flower hugging the ground and scarcely visible in the turf, yielded some seed which germinated within a week of our return home.

The following day we flew back to Santiago. A flight of about four hours with brief stops at Puerto Montt and Concepion, a day spent in Santiago to organise a hire car and we were off again to several nearby ski resorts in the Andes. Farellones, La Parva and El Colorado are only about 60 km from Santiago on a good sealed road. As the road starts to ascend the Andes clumps of puya and tall cactus, growing up to 2m with bright red flowers, grew on the roadsides.

Just below Farellones we found a beautiful bright red mutisia in flower but unfortunately no seed was set this early in the season. An *Alstromeria sp.* with plenty of ripe seed capsules abounded also several other bulbous plants but flowers and leaves had shrivelled away completely so identification was impossible. *Tropaeolum polyphyllum* and a sisyrinchium still had a few seeds among the dried up foliage and a shrub *Chuchaga oppositifolia* with silvery foliage and clusters of golden flowers was covered with its fluffy seeds. Dr. Wygananki, who is well known to gardeners visiting Chile by his knowledge and helpful advice, told us that the seed of chucaga is very infertile and possibly 1 in 1000 will germinate. At this stage no germination has taken place, although we took home a large bag of seed. Possibly a bucketful would have given us a better chance. Only several hundred metres walk from the village of Farellones, a pink alstromeria with a prominent yellow blotch grew among the rocks. Heights varied from plants in full sun being 12 cm to those in the shade of large rocks reaching 30 cm.

A prostrate suckering mutisia with creamy-yellow flowers was abundant, only reaching 12 cm high but forming large colonies several metres across. We were able to get seed of this desirable little plant. Like most compositae it produced its achenes with plumose pappus bristles. When picked from the calyx and examined it is obvious which seeds are

fertile and in this case only 3-4 per head at the best could be obtained. We had been told by Brenda Anderson of the trouble they had with the seeds being eaten by a grub in the flowers. We were lucky in that we collected seed from five different species and did not have any trouble in that respect. I have found the same problem in Australia when collecting seed of celmisia and craspedia. Some seasons the flower heads are full of tiny grubs that destroy all the seeds and other seasons there is no sign of them.

Leucheria spp., Sisyrinchium spp., Perezia nutans and a silver leaved *Calceolaria sp.* with a few wine-red flowers but lots of seed were all found close to the village. The perezia, an upright growing plant to 30 cm held its flowers horizontally, the colour being a light maroon with white centres. The calceolaria was most likely *C. arachoides.*

The village of La Parva is only several kilometres and 200m higher than Farellones, while El Colorado is about the same distance but 700m higher. The villages have very expensive and luxurious hotels and ski facilities but are deserted during the summer period except for the frenzied building that was in progress on roads and lodges, no doubt in readiness for the snow season.

An amaryllid, possibly *Placea ornata,* was still in flower, its large white trumpet shaped flower spotted red within, also a small *Tropaeolum sp.,* although dried off had plenty of seed—many had fallen and collected in cracks in the ground. Two calandrinia provided some seed and were still in flower. *C. graminifolia* formed clumps with fine strap-like foliage and its large delicate pink flowers had deep lemon-yellow centres. It favoured situations where some moist seepage occurred. *C. gayana* impressed us greatly. It is almost shrub-like in habit and individual plants varied in the colour of the flowers from white flushed pink to mid pink with crimson centres. An oenothera with huge white sessile flowers grew at the edge of the road. This we were told is also known as *Lavauxia mutica.*

Lagunillas was our destination the next day—a much smaller ski village and the final 20 km a rather dusty rough road. The village is at an altitude of 2000m but it is necessary to climb up higher to see the really interesting plants. *Argylia viridis,* a member of the Bignoniaceae, grew on a very dry exposed ridge. Its large incarvillea-like flowers varied from a creamy-yellow to bronzy-pink with some crimson pencilling in the throat. Plants had both flowers and seed pods which were long and narrow, up to 10 cm long. Careful checking found ripe seed. We had been able to drive to this point following a track that gave access to the ski tow. However, our car had to be coaxed very hard to make the last 50 cm.

Our next find was the one plant that I really wanted to see in flower. It is, from what I had read, so different from anything else in the alpine world. *Cruckshankia hymenodon* did not disappoint us. Even from a distance, its brilliant flamboyant flowers and bracts stood out, appearing to be out of place in such a dry hot position. Only reaching 5 cm, the flowering stems each held a cluster of 4 or 5 tubular orange-yellow flowers with their petals spread out like stars. These are backed by large papery irregular-shaped bracts of pink which, as the flowers die, slowly turn to white. It is these white faded bracts which indicate that seed is ripe. The most unusual colour combination of the flowers of this plant makes one ponder as to why the plant has put on such an exotic display and which particular insect or bird pollinates it. *Mutisia subulata* var. *rosmarinifolia* grew nearby, scrambling among the rocks, its flowers only several centimetres above the ground, were as large as a gerbera and a bright glistening red.

Like all the areas we visited in the Andes north of Volcan Llaima it was dry and dusty. Lots of "nasties" in the way of burrs and other prickly devices the plants use to help disperse their seed, built up on socks at an alarming rate. It became a time consuming chore every time we returned to the car to remove the worst offenders, who somehow worked their way up one's trousers and made their presence felt when sat upon.

Growing in association with the cruckshankia on the northerly exposed ridge, we also found *Pachylena atriplicifolia.* It formed rosettes of grey glaucous leaves and bore large soft pink flowers with a hint of orange in them and a central boss of yellow stamens. Obviously a composite, it yielded a good quantity of seed which germinated very quickly when sown. *Rhodophiala rosea* although showing thousands of its plump 3-sectioned capsules packed with seed, appeared to have finished flowering. We were fortunate to find two flowers still open just before we descended. Although we collected seed of several different *Calandrinia spp.* the only one in flower was *C. picta* with bright shining deep rose-pink flowers and a yellow throat. All the alstromerias and sisyrinchiums were finished flowering but had plenty of seed ripe. The only other plants of interest here that we saw were a tiny *Chaetanthera sp.* and *Ephedra andina.* The chaetanthera formed little ball-like plants, each with a white daisy-like flower sitting neatly on top. Driving back down the mountain some shrubs covered in red flowers drew our attention. These turned out to be a species of *Phrygilanthus* a parasitic plant that we saw frequently in southern Chile, many growing on branches high in the trees but these must have attached themselves on to the roots of their hosts.

We have never consumed so much soft drink and beer as we did while travelling in this area. Numerous small stands along the roads sell soft drinks (Bebidos) even in the lesser populated areas. With no electricity they kept the drinks cool in tanks or barrels of water. After walking most of the day in the sun and driving in dust, it took several hours of drinking in the evening, including several cups of tea, to feel normal again.

Portillo is about 150 km north of Santiago on the main arterial road between Chile and Argentina. It is at a higher altitude than the other areas we had visited and is just a few kilometres from the Argentinian border. The road from Los Andes follows up a valley by the side of the Rio Aconcagua and abruptly starts the climb to Caracoles which is before the tunnel that passes through the Andes into Argentina. At first impression, the mountains seem devoid of plants. Peaks in this area rise to just over 7000m as in the case of Aconcagua which is about 30 km away on the Argentinian side of the range. The area in which we looked was just below the customs station and is about 3000m. Huge screes of loose rock run up to the base of practically vertical cliffs. This is often repeated until the mountains are finally terminated with their snowcapped peaks.

Flowers were found within several hundred yards of leaving the car, masses of *Alstromeria spathulata* in full flower erupted from the rocky debris. The rather succulent rosettes of leaves are a pleasing blue-green, while the flower colour did not vary much, a lovely pink with a slight salmon undertone. Although the flowering stems were only 12 cm high, the stems underground must have gone down for several metres, as a bulldozer, which had been working in this area pushing up loose rock for road works, had recently stripped away 1.5m and the alstromerias had come up and were flowering. *Perezia carthamoides* had just come into flower. Unfortunately it was too early to obtain seed of this very desirable plant. We saw only the one plant but it had sixteen of its creamy yellow flowers full out. They had a slight tinge of the palest orange in them as they opened.

The brightly coloured seed vessels of *Astragalus cruckshankii* caught our attention. Only a few sprays of its purple flowers remained but the inflated bladder-like seed capsules are up to 2 cm long by 1 cm in width and are pink covered with red spots and blotches rather like a bird's egg.

We had missed finding *Viola atropurpurea* at La Parva but located it without difficulty here. How diverse nature is. It was hard to believe that this plant with its wonderfully symmetrically arranged bronze foliage is a violet. We were to find several other rosulate violets in other

areas but this plant impressed us most of all. It favoured loose rocky heaps of rubble beneath the vertical cliffs. Although nearly finished flowering, we did see several of its deep maroon-black flowers on several plants. *Calandrinia dianthoides* with its bright rose flowers had set some seed but we were not so fortunate with a tiny shrubby verbena covered with soft pink flowers. This was growing in a crevice in vertical rock and was so tight and congested it looked like an androsace.

Several kilometres down the road on our return, we stopped at a rushing mountain stream, where we discovered a huge colony of *Tropaeolum polyphyllum* mixed in with a thriving colony of stinging nettles. The plants away from the influence of the moist stream banks were dried out but with good seed still attached. Those near the stream were still in full flower, most a deep yellow but a few were almost cream.

After returning to Santiago, we started on our journey south to Puerto Montt, which is about 1000 km from Santiago. The Pan American Highway, which is concrete in some sections with the rest in bitumen, was in very good condition, but many of the side roads we took were unsealed and rough.

We first tried to get to Lagnas del Teno, which is reached by a road branching off at Curico. After a very dusty hot drive we reached Termas Los Quenes, a small town with a lot of holidaymakers and campers. From this point on, the road deteriorated very quickly, one section being destroyed in a flood where it had followed the banks of Rio Teno up the valley. At this point the traffic was using the dry gravel bed on the side of the river, which actually was better than the road itself. Our hire car was a Chevette with very little clearance underneath, so after "bottoming" many times we decided not to continue any further. A beautiful red flowered amaryllid was in bloom here beside the river bank in dry hard stony ground. We tried to dig a bulb but after slowly working down with a small trowel to 30 cm, gave it up. Two different puyas were in seed and a yellow flowered *Calceolaria spp.* seemed to love the dry steep banks at the roadside.

What we had heard of Lagna del Maule sounded most exciting, so we drove on to Talca, where we were to branch off on a gravel road, which took us 160 km up the Maule valley. This road is under the control of the Carabiniere and permission has to be arranged at Talca before leaving. This took us to four different authorities over a period of four hours before permission was obtained for us to go the next day. We decided to leave right away and go to Vilches Parque Nacional, which is about 30 km along the Maule road and then another 30 km on a side road. Our plan was to stay the night here and then head off the next

morning very early. How easily one's plans can come undone. The drive to Vilches is the dustiest we have ever made and very rough. The material used on most of the roads in this area is of alluvial gravel, consisting of rounded stones from pea size to almost a football. When dry, the dust erodes between them leaving a corrugated nightmare. It was not possible to drive more than 20 km an hour and our car, obviously not dust proof, quickly changed, both inside and out, to a soft brown. The fact that we were perspiring with the heat of the day, soon changed us to the same colour. These conditions made plant spotting impossible as everything on the sides of the road was also brown. Reaching Vilches at last we found some mixed nothofagus forest but nothing else in the way of interesting plants. We decided that if the rest of the road to Maule was like the first 30 km, we could not take another 130 km or even spare the time to drive at such a slow pace even if our car could, which I very much doubt, as it had now developed a throaty roar when accelerating. A couple of days later, the exhaust broke away completely but fortunately we were able to have a new one put on by the Auto Club in Temuco. So, sadly we left the Maule valley hoping that perhaps one day we might return but with the right sort of vehicle to withstand the trip.

Chillan is just over 400 km from Santiago and has a most interesting church and a large market with many stalls offering local pottery, woollen and leather handcrafts and fruit and vegetables. After a brief stop here, we took the road to Termas de Chillan. A good sealed road goes as far as Recinto, then a good gravel road for the last 25 km. This area is popular with the Chilean people, as a ski resort in winter and also in summer for its hot thermal baths. The Hotel Termas de Chillan is very large and provides good but very expensive accommodation. It operates a ski lift every day, so we availed ourselves of this excellent method of getting well up the slopes of the Volcan. We found that the lift finishes well above where any plants venture to grow. There were only cinders and snowdrifts with the odd tuft of a coarse grass.

We walked about one third of the way down before we found some interesting plants. *Viola cotyledon (?)* appeared first and luckily for us was loaded with ripe seed. We did manage to find a small group later that had been covered with a late snowdrift and were in full bloom. Most were lilac but a few had pure white flowers. A small stream fed by the melting snow came cascading down through the black volcanic rock and cinder beds. On the sides of this, colonies of *Mimulus cupreus* were in full flower. On some moist rocks *Ourisia ruelloides* (Fig. 73 p. 414) stood out like a beacon with its sprays of orange-scarlet tubular flowers. This area was full of interest. A *Calceolaria sp.*, obviously a moisture-

lover, formed rosettes of foliage like *C. biflora* but with much larger leaves. The yellow pouched flowers, larger than *C. biflora,* were held on 20-30 cm stems. *Caltha andina* made large mats in very wet areas. The white star-like flowers reminded us of our Australian species. *Ourisia microphylla* also appreciated this wet position, its soft pink flowers held just above the ground. This was mixed in with the caltha and *Calandrinia affinis.* A silver-foliaged mat plant, looking just like a raoulia, formed dense carpets up to 60 cm in diameter, where the soil started to lose the moisture from the stream. This we have had identified as a lucilia possibly *L. frigida.* Two *Nassauvia species* provided us with some seed; their preferred habitat was dry loose cinders. Further down the slopes, we found two other different *Calandrinia spp.* one with magenta flowers, the other just finished. Nearby under dwarfed groups of *Nothofagus pumilio* there was an attractive yellow flowered viola.

Leaving the area the next day, we found a Bromeliad growing on steep rocky cliffs alongside the road. This plant was *Ochagavia carnea.* It formed compact clumps with serrated pungent leaves and in the centre of each rosette of foliage were held tight clusters of three-petalled pink flowers. There was no way we could climb up or down to photograph this plant but we were able to collect some seed of a small yellowed flowered *Calceolaria sp.,* with red marking in the throat, that grew nearby. *Mutisia decurrens* seemed at its best scrambling over light scrub at the roadside. Its brilliant orange gazania-like flowers were at their peak. Because of this only a few seeds were ripe. We tried the road into Shangri La which the Andersons had unsuccessfully tried. We also found that after several kilometres, it was only negotiable with a 4WD. The small valley which the road winds along is very pretty with *Nothofagus spp.* scattered about. This gave an almost park-like effect. The prostrate cactus, *Maihuena poepigii,* formed large mats in open spaces between the trees. It had finished flowering and had quite large yellow-green fruits held just above its very prickly foliage.

Temuco is about 670 km south of Santiago and the turning off point for Volcan Llaima, 3125m in the Parque Nacional Conquillia. Volcan Llaima presents a very attractive view, as one approaches it, showing a perfect snow-capped cone with its dark cinder slopes. Mixed nothofagus forests cloth the foothills with mutisia and embothrium providing colourful patches along the roadside. The road finishes at some ski buildings where the tree line abruptly ends. In this area the forest has changed to predominantly *Araucaria araucana,* the Chile or Monkey Puzzle Pine. These picturesque trees lose all their lower limbs as they mature and their silhouettes on the skyline create quite a prehistoric

look. The mountain slopes present a very barren sight, red and blackish volcanic rock stood out in huge outcrops with loose cinders of the same colour between. Nothing appeared to be growing here at first but after a short walk up the slopes *Nassauvia revoluta* appeared, its strange contorted foliage with the same reddish hue of the surrounding cinders. *Chaetanthera villosa* was plentiful. It formed balls of silvery hair-covered leaves. The yellow daisy-like flowers are produced singly and sit tightly on top of the plant. A *Pernettya sp.* with clusters of white berries seemed to find the barren stony conditions to its liking, also a rosulate viola possibly *V. cotyledon. Habranthus andicola* must have been a sight several weeks earlier, judging by the quantity of seed heads visible. We were disappointed that we could not find *Viola fluhmannii* which we knew to grow here. Obviously when out of flower, it is hard to locate when one does not know what it looks like. The only other plants we found here were another yellow *Calceolaria sp.* and a *Sisyrinchium sp.* in seed. A patch of embothrium several kilometres below the ski building was very interesting. No plant seemed to be any higher than 1-2m and the foliage quite narrow, only 5 mm wide. The flowers were just the same as the typical taller plants that are so common in southern Chile.

Our last mountain stop in which we found anything of interest was the Volcan Casa Blanca in the Parque Nacional Puyehue. We had gone to the Parque Nacional Villarrica and Parque Nacional Nahuelbuta but the only plants of interest were *Hippeastrum splendens, Mutisia sp., Lapageria rosea, Puya spp.* and *Desfontainea spinosa.* Of all the areas we travelled in Chile, the rain forest in Puyehue reminded us most of our Tasmanian forests. The rainfall must be quite high and regular as illustrated by the dense growth. *Asteranthera ovata* covered the road cuttings in dense mats, lightly sprinkled with its large carmine flowers. *Mitraria coccinea* trailed through the undergrowth and hung down the road cuttings and over many streams that the road crosses as one ascends on the road to Antillanca. *Philesia magellanica* (Fig. 74 p. 414) was in full bloom hanging over the edge of the road. We stopped and found that several metres into the dense forest the philesia was climbing up to 2m high using the decaying bark of the trees as a means of attaching itself. The strong shoots passing through the bark and even in some places rooted into it. The flowers here were a deep pink while those we saw several days later on the island of Chiloe were a deep crimson. However the light factor could have been the cause as the plants at Chiloe were in full sun. Higher up the mountain near the tree line, large areas of *Drimys winteri andina* were in flower. This shrub is almost small enough for the large rock garden as most of the plants we saw there were no larger than 60 cm.

A drivable track goes up Antillanca from the ski lodges and leads to a ridge at about 1200m passing through dwarfed stands of *Nothofagus pumilio* and *N. antarctica*. On the ridge, the whole area is just rock and black or red cinders, harbouring very little plant life. However, *Nassauvia dentata, N. lagascae, Sisyrinchium pearcei, Silene andina, Perezia pedicularidifolia* and *Empetrum rubrum* were not difficult to find, also a little legume *Adesmia longipes* with fine ferny foliage pushed up its delicate leaves between the cinders.

We purchased the book "Flora del Parque Nacional Puyehue" in Osorno after we had visited the park. It is a great help in identification and locality within the park in relation to altitude and type of areas in which particular plants grow. Each plant is described (in Spanish) and illustrated.

As mentioned earlier in this article, we visited the isle of Chiloe for a day, hoping to find *Philesia magellanica*. After driving as far as we could in the time available, which was only about 60 km as the side roads are narrow and rather rough, the only plants we saw were *Pernettya spp.* and *Eucryphia cordifolia* in full flower. The eucryphia seemed to be the dominant tree in this area and numerous small timber mills, driven by steam engines were milling them. Finally, a few kilometres from Ancud, the town from which our ferry was to leave we discovered areas of philesia growing in a spaghnum bog along the roadside. Growing in full sun, they had beautiful bunches of flowers and also some seed. Also growing in the mounds of moss was *Myrteola nummularia* bearing its white flowers and plenty of its large pinkish fruits at the same time.

We found food quite cheap, also accommodation, but in some areas which are popular as holiday resorts, it was very dear. The cost of petrol was reasonable but in country areas much higher than in the larger towns. The one expensive item we encountered was car hire. The 20% Government tax which applies to car hire and hotel accounts has to be taken into account when costing. Car hire in Punta Arenas was the highest but an expense that was unavoidable, as it is not possible to plant hunt from a bus. I feel that we chose the right time to see flowers and be able to collect seed, as there were not many plants that we were unable to obtain seed from.

We found Chile a safe place to travel in and the people very friendly and courteous. If you are contemplating a trip to Chile don't be put off by my complaints of the dusty and rough roads. They are worth putting up with for what you will see in this beautiful country.

Plant Portraits

Daphne cneorum pygmaea

Margaret and Henry Taylor

The colour illustration on page 416 (Fig. 77) takes us back to an early July, when we spent happy hours wandering across limestone pavement at 2,000m in the French Alps, enjoying a search for a white daphne and not finding one.

The pink *Daphne cneorum pygmaea* is a highly desirable slow growing, ground hugging, evergreen shrub with attractively scented flowers. We have seen similar compact forms of Daphne in the Pyrenees but growing in mountain turf with no visible limestone. The Pyrenean plant has leaves around 4 mm across whereas the French Alp form has slightly narrower leaves. Now let us compare the usual garden *Daphne cneorum* with *D. c. pygmaea* from the French Alps. The former in a few years can grow 30 cm tall by 100 cm across, with 5 mm by 17mm leaves extending down the stem 50 mm or more from the apex. *D. c. pygmaea* after 10 years is only 2 cm tall by 50 cm across, with 3 mm by 9 mm leaves extending 20 mm from the apex.

Propagation is a problem. We have occasionally rooted cuttings taken in late June but find these difficult to grow on successfully. Possibly grafting may be an answer. Recently we have compared *D. retusa* and *D. mezereum* as rootstocks for *D. petraea* and find more vigorous growth of the scion with the evergreen *retusa*. As we have never had any seed set on our *D. c. pygmaea*, we will have to keep trying cuttings or grafting to maintain our plant. These daphnes are a temperamental race given to suddenly turning up their toes.

Because of slow growth and difficulty in propagation this plant is rarely available from nurseries. It's just part of the perverse nature of life that the things we consider desirable tend to be difficult to come by.

Fig 72 *Erysimum amoenum* (see p. 391) H. Zetterlund

Fig 73 *Ourisia ruelloides* (see p. 408) K. Gillanders

Fig 74 *Philesia magellanica* (see p. 410) K. Gillanders

Fig 75 *Clematis tenuiloba* (see p. 397) H. Zetterlund

Fig 76 *Androsace vandellii* (see p. 429) J. B. Smith

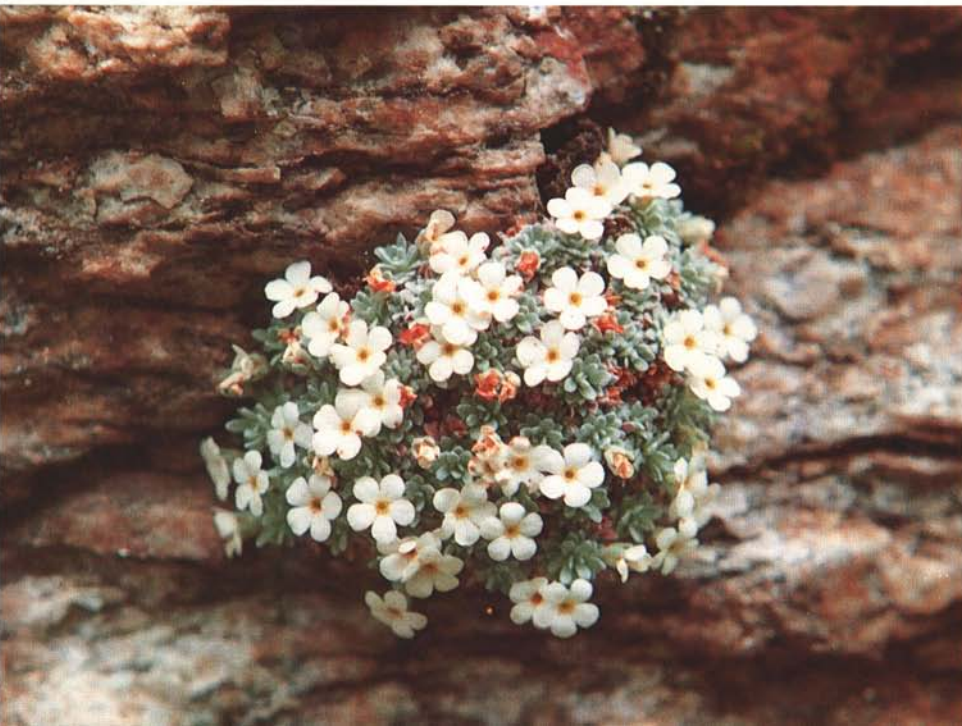

Fig 77 *Daphne cneorum pygmaea* (see p. 412) M. & H. Taylor

Saxifraga hypostoma

Ronald J.D. McBeath

The kabschia or porophyllum saxifrages in the Himalayan area are a very difficult group of plants to name with any degree of confidence. Over 40 species have been described from this region and, as most are compact cushion plants with white flowers, only minute differences discernible with a high power lens separate the species. The flowers may be stemless or stalked, clustered or solitary. Often in one small area many plants can be found growing together, displaying all combinations of these characters.

In the Himalaya, kabschias are found over a wide range of altitudes, from c. 3000m to 5500m. They are most abundant on stable screes and moraines and can also be found in short turf, on rock outcrops and open habitats near streams.

Saxifraga hypostoma (Fig. 79 p. 433) is one of the most distinct and desirable species. In its natural habitat in Nepal it occurs on stable scree between 4,300m and 5,200m. In cultivation it can be grown as a pot plant in a cold frame, open to the elements from spring through to autumn and lightly shaded in midsummer from the strong sun. It will grow well in scree and in both situations grows best in a well-drained gritty compost which is never allowed to totally dry out.

Propagation is quite simple. Cuttings consisting of solitary rosettes or clusters of rosettes can easily be detached from the edge of a cushion after flowering in late spring and rooted in sandy compost in a cold frame.

The hard domed cushions consist of a great many tiny rosettes all packed tightly together. The leaves are small and finely toothed. The solitary, stemless flowers are large in comparison to the size of the individual rosettes; the white undulated petals can obscure the cushion as flowers are freely produced in cultivation.

A word of warning; *Saxifraga hypostoma* and many of the other Himalayan species can be damaged by ground frosts in late spring (May) after growth has commenced. Presumably in the wild, frost is seldom experienced after the snow has melted by early summer.

The plant illustrated was photographed on 25 July 1983 at 5,200m on the Thorong La at the head of the Marsyandi Valley, central Nepal.

Iris decora

Ronald J.D. McBeath

Iris decora (Fig. 78 p. 433) is a member of a small group of three species belonging to subgenus *Nepalensis.* All three are native to the Himalaya and the mountains of SW China. *Iris decora* is found wild along the entire length of the Himalaya. The plant illustrated was photographed in late July at 3600m in the Marsyandi Valley, central Nepal. Open sunny pasture is its normal habitat, although the plant illustrated was part of a large colony growing on a flat area of baked, bare earth in full sun.

The faintly-scented, rich lilac-purple flowers have quite long spreading falls with whitish veins and a bright orange-yellow crest. The much shorter standards are incurved. Three to four flowers are borne on a distinct stem up to 30 cm tall and they only last a few days.

In cultivation at the Royal Botanic Garden, Edinburgh, *Iris decora* is long-lived and easy to please in full sun, growing well in light sandy soil in the Rock Garden. Propagation is easily accomplished by division of established clumps in the spring when growth is starting, or by the freely produced seed.

Honeysuckle as a rock plant

HAMISH BROWN

On a storm beach on the island of Rhum I saw a rock effect which was most unusual. It involved the ordinary wild honeysuckle *Lonicera periclymenum,* which is not normally thought of as a rock plant. A great sweep of football-sized boulders had been cast up to form a distinctive bank at the top of the shore line and, twining among these, was a treat of honeysuckle, the effect both catching the eye and rewarding the nose. This prostrate honeysuckle, mixed with the smooth shapes and gentle lichen tones of the boulders, struck me as an effect well-worth copying in a rock garden. Unlike other materials, shore or river-rounded boulders are easy enough to find in Scotland. It is a pleasing novelty which I'll definitely try out some day. Meanwhile someone else might like to copy nature's use of honeysuckle as a rock plant.

Sir William Jackson Hooker, F.L.S. 1785-1865

ANGUS C. SMALL

BORN AT NORWICH, William was the son of Joseph Hooker an amateur collector of succulents. At the age of ten he became the heir of property in Kent which he inherited a year later, not an unmixed blessing as it later proved. As a youth who was a keen naturalist he built up a herbarium and when just twenty discovered, by chance, a species of moss previously unknown in this country, *Buxbaumia aphylla.* He took it for verification to Dr. James Edward Smith who had bought the herbarium, library etc. of the great Linnaeus. It had been offered to Sir Joseph Banks who passed on the offer to Smith who, to make it available to other naturalists, founded the Linnaean Society and became its first President.

One year after finding the moss William was elected a Fellow of the Society, having been proposed by Dawson Turner a banker in Yarmouth who was a keen collector of, inter alia, cryptogams, flowerless plants e.g. mosses, liverworts etc. A young friend introduced Hooker as the finder of *Buxbaumia aphylla* and a small piece of the plant having been given to Turner he responded by giving Hooker a copy of the Botanists' Guide of which Turner was part author. Hooker followed this by visits to the Turner household which included five young daughters who were all very talented and were kept busy from 6.30 a.m. sketching all day and making music in the evening. Besides his interest in botany, Hooker had inherited artistic talent from his mother's family and had studied under Sir John Crome a well-known landscape painter and teacher of art. Soon Hooker was making the first of many drawings of plants for Turner, especially illustrations for Turner's great work 'Fuci' (sea weeds). Hooker was now introduced by Turner to Banks who received him warmly and gave him the freedom of the library, herbarium etc. at 32 Soho Square. He now finally opted for botany as a career and started laying out a garden on Linnaean principles.

During 1807 Turner took him on a botanical excursion to the Scottish highlands including climbing the three Bens, Lomond, Nevis and Lawers, and he reported collecting, at Killin, a prodigious mass of plants. The following year, 1808, he covered the same ground again,

then went further north taking in Ben Hope and Ben Loyal, then on to Orkney. When the party returned to Sutherlandshire they were under suspicion of being spies due to the fears of an invasion by the French.

In 1809 he visited Iceland and noted the similarities to the Scottish flora. Sailing back they had to abandon ship because of fire, William losing all his plants and two thirds of his notes. Fortunately the party was rescued by the British vessel "Orion" and no lives were lost. Despite this set-back and having been bitten by an adder he had an urge to travel, but for the next two years he was kept busy with his history of Jungermannia (liverworts) illustrated with colour plates of 197 species.

Encouraged by Banks he thought again about travel, perhaps to Ceylon or the Cape but financial problems connected with his inheritance proved an obstacle. Dawson Turner and his family did their utmost to discourage him, much to the displeasure of Banks. Next, Turner persuaded him to invest in a quarter share of a family business, the brewery at Halesworth including a house where he could install his growing herbarium. Increasing intimacy with the Turner family led to his engagement to marry the eldest daughter Maria (16).

However, in 1814 he went to the continent with Turner and Charles Lyell of Kinnordy, the geologist, and in Paris he met many famous naturalists and began a huge correspondence. Humboldt engaged him to write the Cryptogamic section of his South American Botany. An enjoyable visit to Italy ended the trip and he returned in February 1815 just in time for the death of his elder brother. This cast a shadow over the preparations for his wedding which took place in June. He now turned his attention to his part in the production of Humboldt's "Mosses" and also finished the first part of a twelve years' project 'Flora Londonensis'.

In April 1816 his first son William Dawson Hooker was born and fifteen months later his second son Joseph Dalton Hooker.

The slump following the end of the war against France cut the income from the brewery and he was under the necessity of trying to obtain a regular income and was recommended by Banks and Robert Brown for the Chair of Botany at the University of Glasgow. He had to make a speech in Latin and, in desperation, persuaded his father-in-law to write one for him and was rewarded by the appointment and an LL.D. in 1826. The salary was small and fees very modest so he needed all the income from his property. His lectures, illustrated by his own paintings, hung round the walls, were very popular and, being open to the public, drew many visitors.

The Botanic Garden, privately owned, came under his control too and he arranged 8000 plants on the Linnaean system and started a programme of plant and seed exchanges with Kew and other gardens. He also organised and led excursions for students to Bowling and the Campsie Fells and later to Arrochar, covering thirty to forty miles per day taking in the mountain tops all the time wearing formal clothing. Perhaps he could not afford alternative wear as he had taken in private students to eke out his income.

For thirteen years he lived at 7 Bath Street, then moved to 10 Woodside Crescent at Charing Cross. Later on he rented a house at Helensburgh from May to October; to see his family he walked the 22 miles to Helensburgh on Friday and back on Sunday evening.

Besides his professional duties he was writing and publishing much botanical material and in 1856 he received a knighthood and the following year he bought Invereck Cottage with two acres of land, the purchase including one eighth of the Island of Shuna, south west of Loch Melfort in Argyllshire.

The Botanic Garden was a problem. It was privately owned and the shareholders objected to supplying plants to other gardens. The popularity of his lectures aroused jealousy amongst the other professors who ganged up against him. Cuts in fees and other means were employed to try to force him out. At this time his elder son William was seriously ill with tuberculosis and all this set him thinking about applying for a post in the south. The possibility of a post at Kew arose but nothing came of it. Then the Duke of Bedford, a good friend of Kew and of Hooker, died and Lord Surrey proposed to convert the greenhouses at Kew to vineries and the contents disposed of. The plants were hawked around Regents' Park and Chiswick Garden. They were offered to the Royal Botanical Society and the Horticultural Society but were not accepted, so the plants were to be destroyed. When this news broke there was such an outcry that the gardens were transferred to the Commission of Woods and Forests. Now Lord John Russell stepped in and offered the Directorship to Hooker, something he had longed for and now he could scarcely believe it was his for the taking.

But it was a sad time for him, his daughter Elizabeth was ill and away at Leamington, his youngest Harriet also ill and in Jersey. In March 1841 after twenty years at Glasgow he moved to Kew for a salary of £300 plus an allowance of £200 to rent a house called Brick Farm, later renamed West Park. When he arrived at Kew he came alone, his elder son William dead, his second son Joseph was away in Antarctica, his wife and girls in Jersey and his old father left behind as unfit to travel until the arrival of warm weather.

At Kew there was plenty to do: the garden consisted mainly of the Royal Botanic Garden of 1759 extending to eleven acres but this was quickly increased to fifteen. He set about reorganising the two greenhouses and the gardens were opened to the public.

His predecessor William Aiton claimed all books, drawings and documents as his and took them away. Later, after his death, some papers came back but all correspondence had been burnt. One can only conjecture the reason for this behaviour.

When Banks died in 1820 he had not completed the task of realising the potential of Kew, but Hooker had both the ideas and the energy to do just that.

His house, West Park, was of considerable size having three floors, his library and herbarium occupying thirteen rooms still leaving adequate space for him to receive the many botanists from all over the world who wished to consult him.

At this time his second son Joseph was in the Antarctic on Capt. James Clark Ross's Expedition, a fact which caused his father much fretting as he was extremely attached to all his family. Joseph had sent some plants and drawings which William had had mounted and these Prince Albert asked to see and showed them to the Queen. As this soon became commonly known it caused some embarrassment since the results of the Expedition were not to be released to the public until the return of the party when official reports would be issued. Now Sir William poured oil on troubled water by writing to Capt. Ross that Prince Albert would be happy if the captain would send him a general note of what had been accomplished.

In 1842 Queen Victoria approved an extension to Kew of 40 acres making it five times its original size. Since the death of Banks 22 years before, only one collector had been sent abroad by Kew and Sir William was keen to send some more. He arranged with the Duke of Northumberland and the Earl of Derby to share with Kew the cost of sending another two.

He had also resumed the practice, started in Glasgow, of exchanging plants and seeds with correspondents world-wide. David Douglas was one of the contributors and, after the resignation of Sabine as Secretary of the Royal Society, he sent all his plants to Kew. Douglas named a peak in the Rocky Mountains, Mount Hooker.

The invention of the Wardian case had been a great help and he wrote a letter of appreciation to the inventor Dr. Nathaniel Ward. Between 1847 and 1850 there were sent to barren Ascension Island about 5000 living plants and nearly as many packets of seeds plus trees and shrubs to work a transformation. His next project was the construction

of a palm house 362 feet long with transepts 100 feet wide and 66 feet high to be heated by an underground furnace fed through a tunnel 150 yards long and leading to a campanile-style chimney, though this led to problems when the tunnel was flooded.

Visitors in 1841 numbered 9,000, three years later 15,000, and by 1847 64,000!

In 1841 Oxford had honoured him with a DCL.

Nothing stood still; in 1847 he created the Museum of Economic Botany, displaying practical applications of advancing practical knowledge and this was opened to the public.

In his Glasgow days he had started the Botanical Magazine and now he was able to tell Joseph that the magazine had made a profit (of £250) which it continued to do thereafter.

Queen Victoria was greatly interested in his drawings and he was invited to visit Osborne House, Isle of Wight, so he took the opportunity to take *Victoria regia*, the giant water lily.

At Kew an arboretum of 200 acres had been created with 2325 different species, while Kew's reputation for training students was increasing all the time. Accommodation for the expanding number of herbarium specimens was a serious problem and the Queen granted permission for the ground floor of Hunter House to be occupied by the herbarium and also the library. At the same time Sir William moved into the Director's house on the Green which was very convenient for access to the garden.

His health had not been good since he had suffered an attack of scarlet fever at Glasgow and he worried when Joseph was away. Development at Kew, a huge correspondence and crowds of visitors to be seen all on top of his regular duties made it urgently necessary to get an assistant, in his eyes his son Joseph. Eventually in 1855 his wish was granted and Joseph was officially appointed Assistant Director. He did not, however, get his own way all the time and that year he was ordered to cut out 50 flower beds in the lawn to be planted with annuals etc. and this policy continued until 1865.

A new tree nursery for London parks was begun in 1855 and 20,000 trees were planted. Greenhouse accommodation was badly needed since 10 years earlier one of the oldest and largest had become so dilapidated that it had been demolished. In 1859, approval was given for a new temperate house. By 1862 the main block was completed but Sir William was not to live to see the completion of two large wings.

Malaria, in those days, was a fatal disease and as far back as 1839 J.F. Royle, backed by Banks, advised the Government that cinchona trees (for quinine) be planted in India. But it was not until 1859 that the

India Board accepted the recommendation and four Kew collectors were sent: R. Markham to Peru, R. Spruce and R. Mackenzie-Cross to Equador and Dr. James Taylor already in Bolivia were sent plants and seeds.

His magnum opus "Species filicum" which had taken 18 years, was completed and he started work on "Synopsis filicum".

Eczema troubled him greatly in later years, but he continued to deal with practical matters. On 7 April 1865 he went with Joseph to inspect plants at Battersea Park. Later he walked back to Kew and met two old friends and walked with them in the gardens. Next morning Joseph's manservant told him that Sir William could not swallow. As his wife was away at Yarmouth, Joseph and the manservant nursed him as best they could and at night Joseph slept on the floor beneath an open window in his father's room but, suffering from rheumatic fever, moved to the dressing room next door. Lady Hooker returned on 10 August but two days later he died quietly aged 80.

In Kew church there is a memorial plaque of Wedgwood jasper ware of which Sir William was very fond.

The whole of his library, letters, herbarium and botanical portraits were bought for the nation as was his wish.

The number of plant species "hookerii" are far too numerous to be listed here but appended are the names of some of his written works.

Jungermannia
The Crytogamic part of Humboldt's 'Botany of South America'
The Botanical Miscellany
The exotic flora
Filica exotica
Garden Ferns
Species Filicum
Synopsis Filicum
Icones Filicum (with R. Greville)
Flora Londonensis

Principal Sources:
Dictionary of National Biography
British Encyclopaedia
The Hookers of Kew — Mea Allen
The Plant Hunters — Tylor Whittle
The gardener's companion — Miles Hadfield
Johnson's Gardeners' Dictionary
Guide to Kew Gardens

First Glimpses of Pyrenean Flora

JOEL B. SMITH

WHEN THE opportunity to pass a few days in the Pyrenees arose, on the way to the sun-drenched beaches of Spain, after the hardships of my 'O' levels, I eagerly seized it. For many years my dream had been to visit one of the European mountain ranges and to discover some of the many treasures found there.

We drove down to a small town in Andorra, called Encamp and stayed in the very comfortable hotel Belvedere. Even though we arrived at our destination on a dull, wet evening, the sheer magnitude of these rocky masses was awe-inspiring, as we came over the pass from France to the lush valleys of Andorra.

A bright, sunny morning heralded the first day of exploration, marking the eve of a perfect day. After driving up a mountain road to the small river-valley, beneath the Caire Forc, we parked at 1980 metres above sea-level. I was not expecting to see alpines in profusion, but was richly rewarded, with a picturesque view up the valley of alpenrose *(Rhododendron ferrugineum)* cascading over boulders, in a sea of crimson. I immediately began the task of instant identifications, brief notes on each species habitat and photographing, while my family searched for unusual specimens and new species. In the short grass on a flat area, the common rockrose *(Helianthemum nummularium)*, the hoary rockrose *(Helianthemum canum)* and the blue globes of the globe-headed rampion *(Phyteuma hemisphaericum)* mingled with the

Sempervivum montanum *(see page 426)*

pea flowers of the false vetch *(Astragalus monspessulanus)* and the inflated milk-vetch *(Astragalus vesicarius)* and the deep maroon pyramids of the black vanilla orchid *(Nigritella nigra).* In one grassy dell, a fine specimen of the pale-flowered orchid *(Orchis pallens)* grew.

We proceeded further up the valley, past pink, fleshy mountain houseleeks *(Sempervivum montanum)* growing in rock crevices. A mountain aster *(Erigeron alpinus),* with a solitary flower, protruded from a crevice, between the fragrant mats of thyme studded with pink buds. At 2100 metres, on one rocky slope Pyrenean thistles *(Carduus pyrenaicus)*, with their grey, spiny leaves, occurred. All around the turf was filled with Pyrenean forget-me-not *(Myosotis pyrenaica),* field mouse-ear *(Cerastium arvense),* Hoppe's Lady's mantle *(Potentilla hoppeana),* tufts of the pink Nice milkwort *(Polygala nicaeensis)* and the pink spikes of the alpine bistort *(Polygonum viviparum).*

After walking along the valley sides, we returned to the small river (probably a misfit stream in a hanging valley, above the main valley), a rushing torrent that arched its way over the boulder-strewn bed, as it tumbled ever downwards. Here growing in the moist, boggy turf were the purple, fluted trumpets of the Pyrenean gentian *(Gentiana pyrenaica)*, intermingled with the purple, spurred blooms of the southern butterwort *(Pinguicula leptoceras).* Nearer the water were dense mats of the water saxifrage *(Saxifraga aquatica),* carrying tall stems of large, white flowers. Here and there the odd turquoise star of the spring gentian *(Gentiana verna)* graced a shaded nook on a bank. On a nearby gritty slope a fine mound of the moss campion *(Silene acaulis)* studded with pink blooms, was found at 2150 metres.

Gentiana pyrenaica

I then turned my attention to the flora higher up and climbed toward the screes, passing plants of the plantain-leaved thrift *(Armeria alliacea)*, the yellow Pyrenean toadflax *(Linaria pyrenaica)* and the tall, bicoloured spikes of viper's bugloss *(Echium vulgare)*, in search of the more exciting cushion plants. At 2300 metres, alpine knotgrass *(Polygonum alpinum)* frequented the base of the screes, forming large patches, a metre wide, covered in wispy, white plumes. Other plants enjoying the sunny, well-drained, gritty conditions included maiden pinks *(Dianthus deltoides)*, with bright pink blooms; a tall member of the Umbellifer family, the xatardia *(Xatardia scabra)*, with its broad, fern-like foliage; pink clumps of the Pyrenean kidney-vetch *(Anthyllis vulneraria pyrenaica)*; the mauve alpine skullcap *(Scutellaria alpina)* and the pink flowering alpine eyebright *(Euphrasia alpina)*. Reaching 2400 metres, the only cushion plants in evidence were the domes of vitaliana *(Vitaliana primuliflora)*, which had finished blooming.

The view was breath-taking, across to the frost shattered peaks dappled with snow and to the loose screes, accumulating beneath the peaks and down to the silver ribbon of water below.

Unfortunately the thunder was nearing and I considered the screes too hazardous to continue further, so we returned to the tributary, discovering many clumps of aconite-leaved buttercups *(Ranunculus aconitifolius)*, covered in blooms, actually growing in the water. A lonely clump of pheasant's eye narcissi *(Narcissus poeticus)* graced a river bank at 2000 metres, the snow-white petals perfectly complemented by the fiery orange cup. I was later angered to see a woman carrying a bunch of the narcissus, which I later found discarded on the road. No wonder there was only a solitary clump here. Another water-loving plant found was the starry saxifrage *(Saxifraga stellaris)*, with its tiny star-shaped blooms on short stems.

The mix of plants growing here is curious, with some requiring limestone rock and others usually frequenting acid rocks, according to the field guide. For instance, *Anthyllis vulneraria pyrenaica* is usually found on limestone and *Orchis pallens* on chalk or limestone, while *Vitaliana primuliflora* frequents acid rocks. I conclude that the region is either composed of a neutral granite or composed of two rock strata of differing pH.

After a hard day's exploring, we returned to the car and drove down the mountain, stopping on the way down to admire a lovely pink mound of *Asperula lilacifolia*, which made my small tuft of this species, growing in tufa at home, seem very meagre. Near to that were the spiky blue blooms of the Pyrenean eryngo *(Eryngium bourgatii)*; both plants were at 1800 metres. Other roadside plants were the rock soapwort

(Saponaria ocymoides) and in a damp meadow, the spiked rampion *(Phyteuma spicatum)* and the appropriately named burnt orchid *(Orchis ustulata)*. One annoying discovery was the sight of a large rock in the centre of a fast-moving river, covered in the regal-looking, white blooms of the St. Bruno's lily *(Paradisea liliastrum)* and an unidentifiable encrusted saxifrage, with white spires (probably *Saxifraga cotyledon)* quite out of reach.

That evening in the hotel I chatted happily to an English couple about the day's finds. Two Americans told me of a valley at Soldeu, where they had seen trumpet gentians in bloom and I decided to heed this suggestion and explore the valley. I fell asleep that night picturing the Pyrenean flora; my only remaining desire, as yet unfulfilled, was to find some of the high alpine plants.

I was eager to set forth the following morning, despite the ominous gathering of clouds. Today 's exploring centred on the Val d'Incles, above Soldeu. After a thirty minute drive from Encamp back toward the pass to France, we turned off on a large bend, just before Soldeu itself and drove up a track from the main road and parked by a campsite, at the base of the mountains. Although the car-park was 1800 metres above sea-level, the peaks soared above us a further 1000 metres. The rock here consisted of a hard granite and the soils were thick, peaty and acidic.

The first plants seen were mainly a repetition of the previous day's, with the aconite-leaved buttercup *(Ranunculus aconitifolius),* globe flower *(Trollius europeus)* and many others as we proceeded along a shady track, then across grassland by the river. New faces here included the common butterwort *(Pinguicula vulgaris),* spreading its lush green rosettes on shady banks; *the arnica (Arnica montana),* with its rich orange, composite flowers and the familiar blooms of the marsh marigold *(Caltha palustris)*. As we crossed a stone bridge on the path to the Juclar lake, we gazed up to the nearer peaks. The path steepened and the almost monotonous meadow flora gave way to new plants. We stopped for a rest by a crag and the sweet smell of the fragrant orchid *(Gymnadenia conopsea)* arose from the pink spikes. On the same crag, the white flowers of the rough saxifrage *(Saxifraga aspera bryoides)* covered the tight cushion of foliage at 1900 metres.

In between the boulders on the increasingly steepening sides, grew the yellow turk's cap lily *(Lilium pyrenaicum),* in bud, the huge, white spires of white asphodels *(Asphodelus albus)* and the white trumpets of the St. Bruno's lily *(Paradisea liliastrum),* obviously enjoying this inhospitable site. As we passed through a channel between two granite faces, a splash of yellow caught my eye and there to my joy was the

alpine pasque-flower *(Pulsatilla alpina apiifolia)* growing from a fissure.

At 2000 metres, I stopped to drink from an icy mountain stream and happened to glance up; a flash of purple caught my eye and I clambered up through the scrub to a shady rock face. The sight of the large-flowered butterwort *(Pinguicula grandiflora)* nestling in the moss was now surpassed by my excitement at seeing ten, small cushions of the imbricate rock-jasmine, *Androsace vandellii* (Fig. 76 p. 415). The white flowers were nestling above the grey, hairy cushions, which clung to the damp granite, in the shade. What a find, to discover this aristocrat of alpines, its beauty and stature epitomizing, what is to me, one of the real gems of alpine flora.

We continued in the hope of better things to come. At 2200m, near the first patch of snow, were the single flowers of *Ranunculus pyrenaeus.* My aim now was to find some primroses and gentians. We came upon a rough scree leading to a snow ridge, so I crossed the foot deep snow to a narrow, grassy ledge. I clambered on to the ledge and although balanced precariously, I loaded my camera, ready to photograph a few plants of *Gentiana acaulis* shyly showing their blooms in the gloom.

I then crossed the other side of the snow bridge, past a wide mat of *Primula hirsuta,* enjoying the snow meltwater, up a rocky path to a grassy plateau, skirted by peaks. Here my brother discovered a carpet of gentians in some boggy turf, their deep blue trumpets dotted in the grass, like huge jewels, sparkling with dew and even some cambridge blue forms. Nearby were the pink heads of *Lynchis alpina* and the tiny pink clusters of *Androsace carnea,* beneath a rhododendron. Also growing in this lean soil were the mauve *Linaria alpina,* pink heads of *Antennaria alpina* and the white daisy flowers of *Leucanthemopsis alpina.* All the while storm clouds had been gathering and we decided to turn back. At 2300m, I found a single plant of *Primula integrifolia,* with its deeply lobed, rose blooms above the shiny leaves, growing between two boulders in a pocket of soil.

The descent yielded only three new finds, *Pedicularis foliosa,* with its architectural design of fern-like foliage, *Saxifraga granulata* and back near the car a fine specimen of *Gentiana lutea,* some 90 cm tall, with its yellow starry flowers, while some 300m higher the plants were only 20 cm high, with no buds showing.

This concluded a two day visit, in which I identified over 140 species and probably missed countless others of the, excruciatingly difficult to identify, Umbelliferae and Leguminosae. I do not think that any book emphasises how easy it is to incorporate a trip to the mountains in a Mediterranean, sun and beach holiday and how really accessible many alpines are.

Show Reports

Stirling
28 March 1987

The Stirling Show was held for the second year in its widely acclaimed new venue at the Albert Hall, Stirling. There was ample room, not only for the competitive plant show, but for many other features. While judging was in progress, Mrs J. Stead gave an informative and enjoyable lecture entitled "What is rock gardening?", to both Club members and members of the public. Mr R. McBeath, of the Royal Botanic Garden Edinburgh, brought along an interesting collection of plants for non-competitive display. There was a large entry of a high standard in the Twice-Yearly Competition organised by Professor and Mrs Simpson. There were also four non-competitive art-work displays of photographs and paintings, as well as the sale of books, plants, seeds and clay pots.

As usual at the Stirling Show, much of the colour on the benches was due to the abundance of primulas, and in particular forms of lovely *Primula allionii.* Therefore it was perhaps appropriate that the George Forrest Medal was awarded to Mr T. Hodgson for an immaculate plant of *P. allionii* 'Edrom form', 9 inches in diameter. With this same plant he also won the Spiller Trophy for the best primula in the show and the Ben Ledi Plants Trophy for the best European plant.

Another outstanding primula was a superb specimen of *P. sonchifolia* which won a first in the class for plants grown in the open ground for Dr. and Mrs I. Bainbridge. An intriguing primula which won first place in the class for new, rare and difficult plants was *P. fedtschenkoi.* It, along with some of the other plants shown by Mr Eric Watson, our President, had featured in Gardeners' World on television the previous evening. *P. fedtschenkoi* is a native of Uzbekistan and has very non-primula-like tuberous roots which become dormant in summer.

It is interesting to reflect how much the Show would have been depleted without plants from the family Primulaceae. The genus *Dionysia,* native to the mountains of the Middle East, and difficult in cultivation, was nonetheless well represented. A perfect plant of *Dionysia tapetodes,* 4 inches in diameter and smothered with its clear yellow flowers won the Institute of Quarrying Quaich for the best non-European plant in Section 1 and a Certificate of Merit for

Mr E. Watson. The RBG Edinburgh was also awarded a Certificate of Merit for another plant of the same species. Other species of *Dionysia* for us to enjoy were *D. ianthina, D. aretioides, D. lamingtonii* and *D. balsamea,* all with yellow flowers, and the pink-flowered *D. curviflora.*

From the Primulaceae again, there were some nice pans of *Cyclamen coum,* and particularly memorable was a 12 inch pan shown by Mr H. Shepherd, the large, fat flowers poised immediately above the dark green shiny leaves. Still in the same family, there were staged two pans of *Douglasia* native to North America, an excellent pan of *Douglasia nivalis* winning a first for Mr R.A. Hodgson; the other plant was *D. laevigata ciliata.*

We have come to expect a large and varied collection of plants from Dr. James Cobb, and once again we were not disappointed. Dr. Cobb was awarded the Carnegie Dunfermline Trust Trophy for the most points in Section 1.

Amongst his many well-presented plants I particularly admired a couple of well-grown specimens of *Androsace ciliata* (Primulaceae once again), and a 10 inch pan full of perfect blooms of *Pleione speciosa.*

In the class for orchids other than pleione we could compare perfect specimens of the purple-flowered *Orchis mascula,* which won a first for Mr F. Hunt, with the albino form, *O. m. albiensis.*

The current popularity of the genus *Fritillaria* was well demonstrated with the large number of entries staged embracing about a dozen different species (I noted the following:— *Ff. stenanthera, caucasica, latifolia, carduchorum, kurdica, michailovskyi, canaliculata, bucharica).* Also, in particular, I admired a fine pan of *F. bucharica* shown by Mr H. Esslemont, some well-flowered specimens of *F. alburyana* shown by the RBG Edinburgh, two pans of the attractive yellow bells of *F. purdica* shown by Mr A.J. Leven and by Mrs B. Craig, and a number of exhibits of the pale yellow, lightly-chequered fat bells of *F. aurea.*

Another genus which is being staged more commonly now than previously is *Corydalis.* Amongst a number of different species on display I noted *Cc. schanginii, ambigua, aitchisonii, persica,* and *pumila.* A popular one was *C. transsilvanica,* until recently rarely seen. A pot displaying about two dozen racemes of the beautiful deep pinkish terra-cotta coloured blooms in perfect condition won a first for Mrs L. Bezzant.

In the class for a pan of crocus, a lovely pan of the yellow-orange flowered *C. scardicus* from the snow-melt areas on high mountain pastures in Southern Yugoslavia won a first for Mrs J. Wyllie. Another

beautiful pan of bulbs was *Narcissus (monophyllus x romieuxii) x romieuxii,* grown from seed, resulting from a deliberate cross pollination by Mr and Mrs H. Taylor. The sinuous thin dark green leaves spreading laterally contrasted pleasingly with the crystalline purity of the sixteen upward-reaching open trumpets of the palest yellow.

In the genus *Saxifraga* an outstanding 9 inch pan of *Saxifraga burseriana* won a first for Mr H. Shepherd. An interesting and attractive reintroduction, from seed collected by Mr R. McBeath in the Marsyandi Valley and grown by Mr E. Watson, was *S. lowndesii,* with its large rosy-pink flowers similar to *S. oppositifolia.* Also grown from seed collected by Mr McBeath in the same valley were two pans of *S. andersonii,* shown by the RBG Edinburgh. Each pan contained about half a dozen young plants, in each case the offspring of a single parent plant, and in each case showing wide variations in colours (from white to a deepish pink), and in size of flowers.

A species that has only recently begun to make its appearance regularly on the show bench is the superficially daisy-like and highly-appealing *Callianthemum anemonoides,* a native of Austria. It was intriguing that with an entry of seven plants in the class for one pan Ranunculaceae, the three plants of this species, which once again demonstrated the great degree of variation that can occur in flower colour and petal size, were awarded first, second and third place, the winner being Mr and Mrs H. Taylor.

A Certificate of Merit was awarded to Mr and Mrs V. Chambers for their lovely plant of *Rhododendron ciliatum,* two feet in diameter, and grown to perfection in the open garden. Another outstanding entry was Mr R. Brown's miniature garden, set within the confines of a 14 inch circular pan, and making effective use of tufa blocks. A large number of tiny plants, many in flower, looked very much at home.

Amongst cushion plants not in flower there were a number of New Zealand 'vegetable sheep'. A perfect little specimen of *Raoulia eximia* won a first for Mrs B. Craig in the class for a plant grown from seed by the exhibitor. Also seen was the very woolly *Haastia pulvinaris* shown by Mr E. Watson, and another specimen of the latter species and of *Raoulia eximia x petrienis* shown by Mr R. Hodgson.

There was a very pleasing entry in Section II—twelve exhibitors staged 58 entries. The Special Prize for the best plant shown by an exhibitor who has not exhibited before was won by Mr R. Pollard from Kirriemuir, with a lovely plant of *Primula bhutanica.* Another plant of outstanding merit shown by Mr Pollard was *P. clarkei.* Mr Pollard was awarded the Fife County Trophy for the most points in Section II and

Fig 78 *Iris decora* (see p. 418) R. McBeath

Fig 79 *Saxifraga hypostoma* (see p. 417) R. McBeath

Fig 80 *Primula x muretiana* (see p. 375) M. & P. Stone

Fig 81 *Nomocharis mairei* (see p. 473) H. Esslemont

The Bronze Medal. The new Convener for the Stirling Group, Mr R. Drummond, staged two nice plants of *Draba polytricha* and *D. hispanica.* Several other Stirling Group members entered plants and Mrs H. Carfrae won a first for three plants grown in the open garden. Other exhibitors winning several firsts were Mr R. Allison and Mr G. Collie, both coming from quite a distance. A particularly well-grown plant of *Viola alpina* won a first for Mr K.H. Rolfe.

Four non-competitive art-work exhibits were mounted. Of interest botanically, aesthetically and historically was a large exhibit of black and white prints of plants (mainly primulas) photographed by George Sherriff and Frank Ludlow in 1949 and before this, and loaned by Sir George Taylor. Mrs Ann Chambers exhibited a number of beautifully executed paintings of plants of the Burren in Western Ireland. Dr. Michael Almond displayed some fine colour photographs of mountain flowers of north-east Turkey. Mr Lawrence Greenwood exhibited a large collection of his highly regarded paintings of plants ranging from large-leaved rhododendrons to high alpines like *Gentiana depressa* and *G. urnula.* Certificates of Merit were awarded to all four of these exhibitors.

The judges were Mr E. Watson, Mr R. McBeath, Mr P. Semple, Mr A. McKelvie, Mrs L. Bezzant and Mr D. Tattersfield.

EVELYN STEVENS

Newcastle
4 April 1987

Cold grey springs have been a characteristic of the weather in North-East England over the past decade. This in turn has lead to a slow start to the Alpine Season. Nevertheless it was extremely heartening for the Show Secretary, Mr M. Dale to see yet again a very large entry of fine and colourful plants.

The Show was held under AGS rules this year and a Farrer Medal was awarded for the best plant in the show, a fine pan of *Saxifraga retusa* shown by Mr D.B. Lowe. Duncan's recipe decrees that the plant must never dry out. In that way a good bud set is guaranteed.

A number of fine plants were awarded Certificates of Merit. They were *Douglasia nivalis* (Mr D. Walker), *Kelsya uniflora* (Mr T. Hodgson), and *Saxifraga oppositifolia x biflora* (Mr A. Furness), the flowers of which stood out on the show bench as an almost startling shade of cherry red. Mr R. Brown was also awarded a Certificate of Merit for his magnificent trough garden. Within my memory Robin has yet to fail

to win a first prize for this class in any show. He is undoubtedly the master of the art.

The R.B. Cooke Plate for the highest points aggregate in the Open Section was won by Mr T. Hodgson of Stokesley who also won the AGS Medals for the two Open Section six pan classes. His small pan entry included *Primula x miniera* 'Sunrise', *Primula allionii* 'Ponton's Form', *Dionysia balsamea, Douglasia nivalis, Dionysia lamingtonii* and *Saxifraga stribrynii.* His twelve inch six pan entry consisted of very fine plants of *Androsace vandellii, Kelseya uniflora, Draba longisiliqua, Primula allionii* 'Edrom Form', *Dionysia aretioides* 'Paul Furse' and *Saxifraga x anglica* 'Myra'.

Other worthy plants in the Open Section included a number of bulb entries, significant among which was the pan of *Galanthus nivalis lutescens* 'Hawick Yellow' (John Richards), a legendary snowdrop whose origin still remains somewhat obscure, and an entry from Mr J. Brownlees of the delicate white North African *Narcissus watieri,* grown from seed. In the one pan Ericaceous class we saw two fine but very different plants share a first prize; Mr J. Richards' abundantly flowered *Rhododendron pemakoense* and a delicate Arctic species shown by Mr R. Brown; *Cassiope bryanthus gmelinii.*

Callianthemum anemonoides seems to be a variable species. The plant shown by Mr and Mrs H. Taylor with its smallish green flowers gained the Judges' preference over a more upright pink flushed and larger flowered form shown by Mr A. Furness.

Two years ago the AGS introduced a class for a cushion plant grown for natural effect. To date very few entries in such classes have really moved away from the traditional symmetrical form. At the Newcastle Show Mr E. Watson exhibited a plant of *Dionysia tapetoides* flowering over and around a number of embedded rocks entirely, I feel, within the concept of this class. He also showed a small but stunning *Dionysia bryoides,* with its white eyed dark pink flowers, in rock plant in flower. This increasingly becomes a very hard class to judge as it always seems to attract a large entry of high quality plants in a wide variety of genera.

Rare plants on show included a Japanese woodlander, *Isopyrum ohwianum* and *Primula stirtoniana* McB.150, both shown by Mrs J. Wilson who was awarded the E.G. Watson Trophy for class 44 and *Primula drummondiana,* a plant which has finally set seed in cultivation. Hopefully some of the young plants may prove to be more frost tolerant than in the form tenuously in cultivation.

In Section B the Gordon Harrison Cup was won by Mr J. Dennis of Doncaster whose many first places included such plants as *Corydalis*

ambigua, Soldanella alpina and *S. minima, Draba rosularis* and a fine plant of *Cassiope selaginoides* L & S 13284. Other good plants in Section B included *Androsace brevis* shown by Mr and Mrs Bainbridge of Edinburgh, a very fine *Pusatilla vulgaris* shown by Mr W. Ronald and *Convolvulus cneorum* shown by Mrs C.M. Coller. Mrs Coller was awarded the SRGC Special Bronze Medal for Section 2.

Section C was well contested with many new exhibitors trying their hand. The Cyril Barnes Trophy was won by Mr M. Stevenson of Nottingham and he was also awarded The Lowndes Bowl, an AGS National Award, for a fine plant of *Soldanella carpatica.* Other worthy plants in this section were *Helichrysum sessile* and a *Primula allionii* hybrid shown by Mr L. Walker and *Shortia galacifolia* shown by Mr and Mrs McGregor.

The judges this year were the AGS President Dr. J.G. Elliott, Mr W. Kirby, Mr D. Lowe, Dr. and Mrs Stead and Mrs J. Wilson.

ALAN FURNESS

Glasgow Show
9 May 1987

This has been a strangely mixed year, with summer-like weather (which encouraged the plants to rush into growth) alternating with bitter winds, straight from the Arctic, which stopped everything. However the absence of spring frosts, meant that exhibitors were able to put on a most colourful and interesting show at Milngavie.

The Forrest Medal, and the Orchid Cup (which commemorates the late C.M. Simpson, one of our former Show Secretaries) were awarded to Mr F. Hunt, for a superb pan of *Orchis morio,* the green winged orchid. Mr Hunt also won the W. Buchanan Rose Bowl for his excellent entry in the 6 pan class. Dr. P. Semple won the Archibald Trophy for his entry in a hotly contested 3 pan class. Mr and Mrs H. Taylor were awarded the W. Buchanan Trophy for 3 pans Rare, New, or Difficult Plants, and the Darling Trophy, for 3 pans Dwarf rhododendrons, must be feeling quite at home with Mr and Mrs V. Chambers once more. The Donald Trophy, for a Scottish Native Plant, was awarded to Mr R. Salvin for a pot of the false oxlip, *(Primula veris x P. vulgaris).* No less than four plants were awarded a Certificate of Merit—*Clematis x cartmannii* (Mr and Mrs H. Taylor); *Viola delphinantha* (Mr F. Hunt); *Cypripedium macranthum v. noteiatsu-morianum* (also Mr F. Hunt); and the superb *Shortia soldanelloides illicifolia* (Mr and Mrs V. Chambers), which had been awarded the Forrest Medal at Edinburgh,

the previous week, and so was ineligible for the premier award at Glasgow. A Certificate of Merit was also awarded to Rev. M.P. Hackett for a most evocative, non-competitive, exhibit of photographs of plants and scenes, taken at Nuria, in the Pyrenees, in 1986.

Plants which particularly caught the eye, apart from the Certificate of Merit ones already mentioned, included *Sarcocapnos enneaphylla,* (Mr F. Hunt), a mass of flower, and in immaculate show condition; *Hesperochiron californicum* (Dr. P. Semple) an elegant American, which is not seen as often as it deserves, (seed is sometimes offered by our Seed Exchange); *Calandrinia affinis,* and *Zaluzianskya ovata,* (Mr H. Taylor); and the superb *Rhododendron* 'Razorbill' (Mr & Mrs V. Chambers), which was included in the Darling Trophy entry.

Section 2 was very poorly supported. We must hope for better things next year, for there is no lack of enthusiasm to be tapped.

Narcissus were almost over, so that the enthusiasts who normally support Section 4, had difficulty in 'making' it this year. All credit to them, that their entries were possible, in spite of the season.

The Rhododendron Section was supported with great enthusiasm by the Scottish Chapter of the American Rhododendron Society, and included some quite wonderful trusses of flowers. A very colourful display.

The judges were Mrs L. Bezzant, Mrs J. Stead, Mrs E. Ivey, Messrs H. Taylor, P. Foley and J. Wotherspoon.

J. STEAD

Edinburgh Show
18 April 1987

The weather before the show was one of contrasts. Very warm conditions for about a week were replaced by cold and this affected the kind of entries made because many plants went past their best quickly, while others came forward quite suddenly. Some classes had large numbers of entries, like those for Lewisia and Fritillaria, while others had few.

The George Forrest Memorial Medal was won by Mr and Mrs V. Chambers, Glasgow, with a magnificent pan of *Shortia soldanelloides illicifolia.* I counted 48 flower stems but there might have been more. The Reid Rose Bowl for most points in Section 1 was won by Mr and Mrs H. Taylor, Invergowrie and the Bronze Medal for most points in Section II went to Mr W. Carr, Newcastle. The Midlothian Bowl for the best plant in Section II also went to Mr Carr for a fine pan of *Pleione limprichtii.*

Primulas were not strongly represented, but there were some good plants; the R.E. Cooper Bhutan Cup for the best Asiatic was won by Mr R. Maxwell, Aberdeen with *P. rotundifolia* and the K.C. Corsar Trophy for the best European or American by Mr & Mrs C. & I. Bainbridge, Edinburgh with *P. ellisiae* (how does one tell the difference from *P. rusbyi?*). The Midlothian Vase for the best Rhododendron was given to Mr and Mrs V. Chambers for a magnificent plant of R. 'Razorbill'—one of the newer Cox hybrids. The Henry Tod Carnethy Quaich for the best bulb corm, or tuber in Section I went to Mr & Mrs M. & H. Taylor for a fine pan of *Fritillaria pontica*. The Henry Archibald Rose Bowl for three plants of different genera in Class 1 was won by Mr F. Hunt, Invergowrie who had *Clematis marmoraria, Draba mollissima* and *Sarcocapnos crassifolia;* the Elsie Harvey Memorial Trophy for three new or rare plants of different genera went to Mr E.G. Watson, Newcastle who showed a new *Leontopodium sp., Cotula atrata* and *x Jankaemonda vandedemii,* a beautiful gesneriad with purple-violet flowers whose shape showed clear evidence of its hybrid parentage—*Jankaea x Ramonda*. The A.O. Curle Memorial Trophy for three plants of different genera grown from seed went to Mr & Mrs M. & H. Taylor for *Clematis marmoraria, Fritillaria pontica* and *Sarcocapnos enneaphylla.* The Bronslie Cup for a miniature garden was won by Mr R.R. Brown of Hexham and the Kilbryde Cup for a floral arrangement by Dr. D. Rankin, Edinburgh.

To round off an excellent show three Certificates of Merit were awarded all to New Zealand Clematis: *C. marmoria* shown by Mr F. Hunt; *C. x. cartmanii* "Joe" and the pale green *C. petriei* both shown by Mr & Mrs M. & H. Taylor.

D.C. GRAHAM

Aberdeen Show
23 May 1987

The Aberdeen Show was held this year for the first time in the Cowdray Hall which proved to be an excellent site even if parking was a little bit of a problem.

The standard and size of the Show were as good as ever thanks in no small measure to a large number of exhibitors from the south. The six-pan class was won by Mr F. Hunt with an entry which included *Orchis morio* and *Edraianthus serpyllifolius* 'Major' the latter being justifiably awarded the Forrest Medal for its mass of blooms and for its immaculate condition.

In the three-pan class Mr Hunt won with an entry which included a splendid plant of *Anemonella thalictroides* 'Oscar Schoaff' of a delicate mauve hue, and also a beautiful cerise plant of *Lewisia* 'George Henley'. In this class an eye-catching plant shown by Mr & Mrs H. Taylor was a delightful clear yellow *Lewisia* 'Carol Watson' seedling.

It was nice to see such a well-flowered plant from Mrs E. Stevens of *Dryas octopetala* win the class for Scottish natives. Easy enough to grow it does not always flower so freely as this.

In the two-pan class from seed the winning entry from Mr & Mrs Taylor consisted of two uncommon plants, *Cortiella hookeri* (collected by Sinclair & Long) which was a striking umbellifer with a compact flat head over a rosette of finely divided leaves, and *Lewisia leana* from the Siskiyous Mountains, a charming little jewel with sprays of cerise flowers.

Onosmas are not often the most elegant of plants but *Onosma alboroseum* shown by Mr A.J. Leven was a most distinguished plant, 15 cm in height and with white-flushed pink flowers. Another large plant was Mrs L. Almond's *Campanula rupestris*, 80 cm across and masses of lilac flowers over deeply serrated leaves.

It was difficult to understand the judging in Class 13 for Cruciferae. No 1st prize was awarded so that an absolutely magnificent plant of *Aethionema* 'Warley Rose' shown by Mr W.J. Holmes was only given a 2nd prize. Was it too common for the judges?

It was a bit late in the season for ericaceous plants but an immense plant of *Kalmiopsis leachiana*, 60 cm across, in splendid condition obtained a Certificate of Merit for Mr H. Esslemont.

Eye-catching rhododendrons were 'Maricee' a *sargentianum* cross, 'Chikor' a *chryseum x ludlowii* cross, *R. camtschaticum* with deep pink open bells which gained the Simpson Salver for the best rhododendron in the show for Mr R. Salvin and *R. yakushimanum* 'Grumpy' with waxy shell pink flowers shown by Mrs & Mrs I. Young. Because of the late date of the Show the lewisias were quite spectacular. Particularly notable were *L. 'Trevosia'*, *L. columbiana wallowensis* and *L. columbiana rosea* which was delicately scented. It was interesting to see a large plant of *Phlox mesoleuca* 25 cm across with very clear pink flowers; it was illustrated in the June 1987 Journal.

Primulaceae had some interesting plants with white flowers with Mrs B. Craig showing *Dodecatheon dentatum* with pure white flowers over bright green foliage, Mr T.G. Sprunt showing *Primula sieboldii* 'Winter Cream' with creamy-white flowers and Dr. C. Jones showing *Primula reidii* with immaculate white deeply scented flowers.

The Walker of Portlethen Trophy for most points in Section 1 was awarded to Mr Hunt. The Aberdeen Quaich for the best plant in Section 2 was awarded to Dr. Jones with *Potentilla tabernaemontani,* a plant 50 cm across with large yellow flowers. He also won the Bronze Medal for most points in Section 2.

Non-competitive displays were staged by the Cruickshank Garden, Aberdeen District Council Leisure and Recreation Department with a massed display of dwarf dianthus and Dr. A. Anderson with a display of dwarf rhododendrons.

The judges were Dr. D. Hardy, and Messrs E. Watson, J. Lawson, R. Rutherford, H. Milne and A. McKelvie.

A.D. McKELVIE

Perth Show
18 April 1987

The Alexander Caird Trophy, awarded for the Six Pan Class, this year went to Mr F. Hunt. His very fine exhibit included the white *Fritillaria bucharica* and a pan of *Fritillaria michailovskyi* containing no less than 18 flowers in perfect condition. Equally stunning were the 13 flowers on his *Tecophilea cyanocrocus,* which contrasted with well-grown plants of *Primula marginata* 'Clear's var', *Cyclamen pseudibericum* and *Trillium rivale.*

The Dundas Quaich for the Three Pan Class was won by Mr E.G. Watson with *Primula aureata forma,* an 8 inch pan of *Draba dedeana* and the large-flowered *Shortia uniflora grandiflora* 'Attraction' which also gained him a Certificate of Merit.

For gaining the highest number of points from first prizes in Section 1, Mr and Mrs H. Taylor received the L.C. Middleton Challenge Trophy. Their entries included *Townsendia rockrockii,* and a three pan entry of *Narcissus rupicola, Ranunculus acetosellifolius* and *Sarcocapnos enneaphylla* as natives of one country (Spain). A stunning plant of *Androsace carnea* spp. *laggeri* 'Andorra', a form collected by themselves with large dark pink scented flowers, gained them the Major-General D.M. Murray Lyon Trophy for the best plant in the show exhibited by a member resident in Tayside.

Three new trophies added further incentive to the continued high standard of entries. The Joyce Halley Award for the best plant grown from seed went to a fine cushion of *Haastia pulvinaris* exhibited by Mr E.G. Watson. The R.S. Masterton Memorial Trophy for the best

Asiatic Primula in the show was awarded to a superb 10 inch pan of *Primula petiolaris* L&S 19856, shown by Dr. E. Stevens. The Bulb Trophy, for the best bulbous plant was won by a very fine pan of *Narcissus bulbocodium* collected in Morocco and shown by Mrs S. Maule, for which she also received a Certificate of Merit.

Mr R.J. Salvin received the Perth Trophy being the member of the Perthshire Group gaining most points in the Show.

Keen competition was shown in Section II, Mr R. Pollard being awarded the Bronze Medal. The most striking plants were Mr E. Mulliner's *Cassiope x* 'Randle Cooke', Mr R. Pollard's *Primula denticulata* 'Alba' and Mr and Mrs Chambers' *'Rhododendron* 'Snow Lady' which was awarded the E.H.M. Cox Trophy for the best dwarf rhododendron in the Show.

The Junior Section was won by Ayley Salvin with best plant going to Andrew McBeath.

Many other well grown and interesting entries provided excitement and prompted much discussion. The Class for a cushion plant not in flower was won by a perfect silver dome of *Helichrysum* sp. BH5216 shown by Mr E.G. Watson. It was also nice to see such a well-flowered plant of the rarely seen *Androsace brevis* shown by Drs. I and C. Bainbridge and two Australian terrestrial orchids, *Pterostylis curta* shown by Dr. J. Cobb and *Chiloglottis gunnii* from Victoria shown by Mrs B. Anderson. The almost square pink and green flowers of *Fritillaria walujewii* shown by Mr H. Esslemont made a very eye-catching exhibit.

With so much quality and diversity to choose from it was with great difficulty that the judges awarded the George Forrest Memorial Medal to the 6 inch pan of *Dionysia aretioides* 'Paul Furse' exhibited by Mr T.G. Sprunt.

Finally we were grateful for the non-competitive exhibits which added so much interest to the Show. Certificates of Merit were awarded to Cluny Garden for a well flowered plant of *Shortia uniflora*, to Mr L. Greenwood for his exhibition of watercolours of Alpines of the Andes and to Dr. M.J.B. Almond for his photographs of mountain flowers of north-east Turkey. Miss J. Halley provided a display of pleiones and Mr D. Mowle staged a fine exhibition of *Fritillaria* showing variation among seedlings.

D.M. TATTERSFIELD

THE JOINT ROCK GARDEN PLANT COMMITTEE

(Recommendations made at Scottish Rock Garden Club Shows)

PERTH, 18 April 1987

AWARDS TO PLANTS

Award of Merit

To *Fritillaria walujewii* as a flowering plant for the alpine house. Exhibited by Mr H. Esslemont, 9 Forest Road, Aberdeen.

Certificate of Preliminary Commendation

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

To *Calandrinia affinis* as a hardy plant for flower on the rock garden or in the alpine house. Exhibited by Mrs B. Anderson, Wester Balruddery, Invergowrie.

AWARD TO EXHIBITOR

Certificate of Cultural Commendation

To Mrs B. Craig, 9 Hillpark Road, Edinburgh for a plant of *Raoulia eximia*.

ABERDEEN, 23 May 1987

AWARDS TO PLANTS

First Class Certificate

To *Ramonda nathaliae* as a flowering plant for the rock garden or alpine house. Exhibited by Messrs Jack Drake, Inshriach Alpine Plant Nursery, Aviemore, Inverness-shire.

To *Kalmiopsis leachiana* as a flowering plant for the rock garden. Exhibited by Mr H. Esslemont.

To *Edraianthus serpyllifolius* 'Major' (Syn. *Wahlenbergia serpyllifolius* 'Major'), as a flowering plant for the rock garden or alpine house. Exhibited by Mr F. Hunt, 34 Morris Place, Invergowrie, Dundee.

To *Campanula alpestris* as a flowering plant for the rock garden or alpine house. Exhibited by Mr and Mrs H. Taylor.

Certificate of Preliminary Commendation

To *Bellendena montana* as a plant for flower, fruit and foliage in the alpine house or cold frame. Exhibited by Mrs E.M. Bezzant, Monievreckie, Port of Menteith, Stirling.

AWARDS TO EXHIBITORS

Certificate of Cultural Commendation

To Messrs Jack Drake, for a plant of *Ramonda nathaliae.*

To Mr J. Crosland, Treetops, Torphins, Aberdeenshire for a plant of *Cassiope selaginoides* (L&S 13284).

To Mr H. Esslemont, for a plant of *Kalmiopsis leachiana.*

To Mrs E.M. Bezzant for a plant of *Rhodohypoxis baurii* 'Albrighton'.

To Mr F. Hunt, for a plant of *Edraianthus serpyllifolius* 'Major'.

To Mr A. Leven for a plant of *Asperula sintenisii.*

Tufa

PETER CUNNINGTON

THERE CAN BE few rocks with greater character than tufa for it presents us with an amazing variation in surface features with interesting faces, overhangs, caves, fissures and pockets. Couple this with relatively light weight and ease of handling and one may wonder why it is not as widely used as it might be. Here lies the rub, however, for by the very nature of its formation is created an extremely porous substance difficult to keep moist in summer and prone to alternate freezing and thawing in winter causing its eventual disintegration. However, it is so simple to build with, having no definite strata lines and so soft that planting holes may be bored to the very heart of a piece, that it does provide a remarkable medium in which and on which to grow those alpines that need especial protection at their necks.

Tufa is a porous, limestone rock often still in the process of deposition. Some say that Welsh tufa, found abundantly near Bodfari in Clwyd, is 99.9% calcium carbonate, but its lime content depends upon the area from which it is derived and may well contain magnesium carbonate. Whichever of these carbonates may be involved, the process of creation is the same. Rainfall, often a weak carbonic acid, falls on limestone areas and dissolves the carbonates as it passes through the previous layers sometimes creating spectacular caverns and chambers dripping with water and producing the well-known stalagtites and stalagmites, the substance here involved being known as travertine. On reaching impervious layers the water eventually emerges as springs. Where water from these springs passes over moss beds or amongst fallen leaves, twigs or grasses, petrification may occur gradually building up across the centuries to form deposits often several feet thick; the decay of the vegetation creates the porosity of the rock, hence its name from the Latin, tofus, a soft stone. If in time a layer of travertine is then deposited on the surface of the tufa a less porous more durable crust is produced thus giving us a better stone to work with, especially if it is to be used outside, for only with glass overhead will the soft tufa really last.

Before the advent of alpine gardening, quarried tufa was crushed and carted to be spread on heavy land where it helped the clay particles to coalesce, forming a more open crumb structure enabling better

drainage, a process known as flocculation. As growing alpines became more popular, those living in areas where tufa occurred naturally used it for a variety of purposes and extolled its virtues for building rock gardens, topping and 'mulching' raised beds, for creating greater depth in shallow troughs by building above the rim and, in many cases, experimentally, by growing directly into large pieces of tufa often as large as or indeed larger than a wheelbarrow. However, tufa really became of age with the appearance of the tufa cliff (see Front Cover) a great wall of tufa frequently placed against a south-facing wall with pockets created for planting and allowing in its construction for crevices and crannies with many aspects for plants preferring to face into or away from the sun. This type of construction incidentally was not without precedence for it had been tried under glass in Victorian conservatories for growing ferns; when built outside, however, for alpines, a cantilever glass roof was all that was considered necessary for protection from excessive rainfall and low temperatures. The tufa cliff gave the alpine gardener the opportunity to grow unrestricted those plants previously confined to cramped conditions in pots; now plants could be seen producing a habit of growth much as they would display in their natural environment. In many cases plants developed an almost aggressive character not previously considered possible.

The excellent drainage created by tufa enables many plants to grow without protection by artificial aids. By protecting the vulnerable neck of the cushion of *Diosphaera asperuloides* or the hairy leaves of *Asperula suberosa,* for example, from winter wet, survival can be more confidently expected. In extreme cases a carpenter's brace and bit may be used to drill a hole straight into the soft rock and into such a hole the root ball of a young androsace or saxifrage can be inserted with any spaces around the roots being packed with soil. *Helichrysum milfordiae* planted in this way will spread out across the surface of the rock exactly following the contours and creating a perfect mound which will remain tight and free flowering for many more years than it would in a pan or in the open rock garden. When building, north facing crevices may be contrived for *Ramonda myconi,* which here at Ness Gardens seeds itself around even growing where no soil has collected. The roots of many plants will penetrate the softer parts of the rock itself and if this is kept well moistened no harm will befall the young seedlings. It has been said that there is no free lime in tufa and that this accounts for the ability of plants such as ramonda to adapt so readily to it. This I doubt for when encrusted saxifrages are grown in tufa they do not become 'unencrusted' but continue to produce limy leaf margins. I suspect that in the case of ramonda in the wild it is more important to be moist and

shady with a highly organic soil than it is to have an acid soil. It is the problem of watering that can present the greatest difficulty when gardening with tufa and those who choose to use the rock must pay careful attention in periods of hot, dry weather to irrigation. A regular watering overhead will undoubtedly be essential and is best done in the early morning or late evening to avoid the possibility of leaf scorch. In some instances the grower will have to resort to cunning to retain moisture in the stone, a constant overhead drip clear of the plants, for instance, or a capillary mat perhaps; invention frequently comes into play when faced with such matters.

If it is not possible to keep the rock continually moist then those plants that naturally inhabit the drier regions of the world must be selected, for example, *Verbascum dumulosum, Helichrysum orientale* or *H. chionophyllum* recently introduced from Turkey, or maybe *Saxifraga longifolia.* However, by careful use of water and the creation of shady faces and the correct selection of plants an extremely wide range of alpines, often those more difficult to grow, conventionally can be tried. For example, *Omphalodes luciliae* seems to escape the attention of slugs, *Campanula zoysii* may also grow unmolested and with the passing of time and the gaining of experience, aretian androsaces, *Draba imbricata* and even dionysias may become firmly established on tufa.

The Davidson Slide Library

ANGUS C. SMALL, *Curator*

IT MAY BE of some interest to members to be given a rough idea of the contents and sources of the seven thousand plus slides comprising the library which was the brain-child of the late Dr. James Davidson of Linton Muir. A first note appeared in the Journal of April 1953 inviting donations to be sent to him, and he became the first Curator.

Some of the slides bear the names of members and many have the names of places, e.g. gardens where the photographs were taken, although in the absence of correspondence it is not possible to say that the donor was the owner of the garden or just a visitor. Where the location is open to the public the possibility is that the donor was a visitor. Most of the earlier donations are mounted in glass-covered frames which protect the films but could produce problems when projecting. Also, a box of seventy or so suitable for an average lecture is very heavy and expensive to post and requires careful packing to avoid breakages.

A considerable number of these slides bear the initials S.M. in the corner, presumably those of the late Stuart Mitchell who was an excellent photographer besides being the Club's Treasurer and a Vice-President. Recent slides are mostly in cardboard or plastic mounts without glass covers.

Since the slides require to be inserted upside down in the projector it would be helpful if donors put the name likewise orientated and written in clear block letters on the edge of the mounts.

The bulk of the slides are of plants growing in gardens but some of those in the wild have notes about the elevation of the locus and the nature of the soil. There is also a sizeable number of slides in the following locations:

1 Ben Lawers; 2 Atlas Mountains; 3 Switzerland — Diavolezza; 4 Kleine Scheidegg; 5 Lautaret ; 6 Saas Fee; 7 St. Luc; 8 Wengen; 9 Italy — Dolomites; 10 Yugoslavia — Julian Alps; 11 Colorado; 12 Rocky Mountains.

Others show unnamed alpine meadows, screes, etc. Intending borrowers of such slides should give a general indication of what they wish.

Appended are the names of some of the places where large numbers of slides have been photographed and donated:

The Royal Botanic Gardens, Edinburgh.

The Botanic Garden, University of St. Andrews, Fife.

Ardcuil, Pitlochry Perthshire — owner the late Maj. Gen. D. Murray-Lyon.

Ascreavie, Kirriemuir, Angus — owner the late Maj. and Mrs G. Sherriff.

Branklyn, Perth — owner the late Mr and Mrs J. Renton (now NTS).

Cluny House, Aberfeldy, Perthshire — owner the late Mr R. Masterton.

Corralea, Kirkgunzeom, Kirkcudbrightshire — owner the late Mrs E. Clark.

Culderry, Garlieston, Wigtownshire — owner the late Maj. A. Walmsley.

Douglas Bank, Bearsden, Dunbartonshire — owner the late Mr Wm. C. Buchanan.

Edendale, Invercargill, N.Z. — owner Mr Alistair Blee.

Glenarn, Rhu, Dunbartonshire — owner the late Mr J.G.A. Gibson.

Inshriach, Aviemore, Inverness-shire — owner Mr Jack Drake.

Keillour Castle, Methven, Perthshire — owner the late Maj. and Mrs Knox-Finlay.

Kilbryde, Corbridge, Northumberland — owner the late Mr R.B. Cooke.

Linton Muir, East Linton, Midlothian — owner the late Dr. and Mrs J. Davidson.

Mill Glen, Pitlochry, Perthshire — owner the late Mrs M.R. Stuart.

An interesting small group of Forrest medal plants at shows.

Besides the slides the library also has six taped lectures and one tape of a B.B.C. Gardeners' Forum lasting half an hour.

As might be expected slides are, in many cases, duplicated so as three of any one plant should be sufficient, it is proposed that surplus slides should be offered for sale at a nominal price. On the other hand there are gaps which should be filled. Two lists have been prepared, one of each group, and perhaps swops could be arranged. The rules say that slides or tapes should be returned the day following the lecture unless a special arrangement is made. Postage, including Recorded Delivery Charge, presently 22 pence, is payable both ways.

Gertrude Jekyll (1843-1943)

J.T. AITKEN

MISS JEKYLL was one of those responsible for the contemporary 'natural' style of gardening. No woman compares with her so far as her influence of the philosophy and practice of gardening is concerned and it may be argued additionally that no man compares. She was a practical practising landscape gardener in the van of the contemporary designers. She wrote — and wrote prolifically — but essentially she worked with plants and fitted them into the gardens where she was employed.

This gardening was carried out in the modern style, leaving the formal Victorian garden. It was a style which fitted the Art and Craft movement of Ruskin and Morris of the late Victorian age. In her hands it was a style which used plants, their blooms and foliage, as an artist uses the colours of the palette on the picture.

Indeed, the simile is apt because Miss Jekyll began as an artist and made her mark as an interior designer and embroiderer before she turned to the garden. In contemporary art circles she is accounted outstanding as an embroiderer and is as respected in these quarters as in gardening.

She was one of the seven children of a 'well to do but not rich' father. She attended the South Kensington School of Art which led on to the satisfactory foundations of a career in interior designing where she acquired a number of worth-while commissions.

Meanwhile, the revival of traditional embroidery stitches was being encouraged by Morris and his followers. In 1872 there was founded the Royal School of Needlework. Among the earliest designers for it, was Miss Jekyll. It appeared that a lucrative and successful career as an artist with specialities in embroidery design and interiors was opening.

She was, however, increasingly afflicted by myopia and her doctor advised against farther detailed work. It was this which switched her concentration to gardening.

She came of a family interested in gardening and had herself always been keen on the garden and its flowers. About this time too, her father died and the family moved by her prompting to a property in Surrey, the name of which she was to make famous for the quality of its plants — Munstead.

For the rest of her life she practised garden designing, often in collaboration with leading architects of the day, particularly, with Sir Edwin Lutyens. Additionally, she wrote a series of books narrating her experience of plants and garden lay-out and her philosophy and her practice. The first of them 'Wood and Garden' appeared in 1899. There followed many others. She also wrote prolifically for the press, including many of the periodicals owned or edited by William Robinson. For a time, she was co-editor of 'The Garden'. Some of these books, now out of copyright, are being republished. The originals have become collectors' items.

As well as writing and designing, she ran a profitable nursery to supply the plants she recommended. The characteristic of these was the improved form or clone which was — and often still is — designated as the Munstead variety.

The gardens she designed were intended to have a natural and not contrived appearance. They were intended for the smaller garden being designed at the turn of the century. One of her books is 'Gardens for Small Country Houses' and, while she never really practised in the suburban garden, her planting schemes of intermingling plants which merged into one another were suited for that environment also. Her writings brought her style into that milieu. The modern natural garden commenced half a century before, under the influence of Louden, came to its polished perfection under the philosophy of Miss Jekyll.

The advantage she had over many contemporaries who wrote and planned, was that she also herself gardened. It is said that when she died at 88, after only a few days illness, they found at her back door a pair of army boots which she wore in the garden, still caked with earth from her garden. She was a garden philosopher with earth on her boots!

The Gold and Silver Mountain Pangéo 1987

PAUL HACKETT SJ

I felt excited. The mountainside sloped away to a line of trees in new leaf; in the fresh green were white and grey patches of snow-melt and far below the Macedonia plain lay in a soft haze.

I was standing on Pangéo, on a part of the mountain known as Kiláda Orphéo at a height of 1750 metres. To the north 25 miles across the plain, rose up blue in the distance, Mount Falakró. This is the mountain known to botanists, but to no one else that I can discover, as Boz Dagh. Presumably this is an old Turkish name from the time when this part of Greece belonged to that country, but a fairly large scale atlas of this period belonging to some friends of mine nowhere mentions it.

Due east the Aegean coast was faintly visible in the direction of Kavála some 30 miles distant.

Immediately behind me rose Afghó the second highest peak of Pangéo 1836m.

To the west a rough road snaked upwards to a television and radio mast, not visible from where I stood.

Pangéo is famous, a Greek book on their mountains informs me, for its gold and silver mines. Gold I was to find—the crackling flame of *Crocus chrysanthus* bursting into bloom through melting snow patches. Silver I found, not in the flowers, but on the underwings of the Queen of Spain Fritillary butterfly—*Argynnis lathiona* which fluttered about the many, many violets.

I was alone too. Few people visit the mountain in summer except the maintenance engineers up at the mast. The paraphernalia of the ski season—lifts and cabins rather littered the landscape but the view north and east was uncluttered. Still it is because of the television mast and the skiing in winter that there is access to alpine heights by a rough road.

I came up by taxi. This was because I no longer have the stamina to carry full kit, especially in the Greek climate, for a long distance and also because I had no desire to run the gauntlet of fierce Macedonian shepherd dogs especially should they hurl themselves with such ferocity

at human beings as they do at cars. Various methods of dealing with the beasts have been suggested—small arms ammunition in the form of little pebbles aimed to bounce just in front of the animals nose—Kundu technique with a stout stick concentrating on the weakest of the pack, but I am suspicious of my prowess in both these skills and prefer to give the brutes a wide berth.

There were two problems. Pangéo was not mentioned in any of the botanical books readily available. This meant I would have difficulty identifying plants unfamiliar to me. Secondly any sort of map is not easily obtainable, indeed the map of Pangéo in the local tourist guide of the area reminds me of that of the sea in Lewis Carroll's Hunting of the Snark—highly intelligible but totally uninformative. Kew have come to my rescue on the first score so I can write about the plants I have found with confidence, and the Greek mountaineering Society EOS kindly gave me a book which contains a rough but detailed map of the area.

The first flower to catch my eye was *Crocus veluchensis* common in the melting snow patches where it grew in company with *Scilla bifolia* and a few *Crocus chrysanthus.* Associated with them were patches of a *Gagea sp,* turning its delicate yellow fringes upwards when the sun shone, and drifts of *Corydalis solida densiflora.*
However, before exploring further I had to establish a 'base camp'. The Greek Mountaineering Society had kindly consented to my using the projecting front of their hut for shelter and I was comfortable enough there. I busied myself making in suitable places nearby a 'neolithic' table, chair and toilet. The table and chair faced the morning sun. By most afternoons the mist had descended. It came rolling in solid, like a real cloud, with a shining edge but the murky depths were not as wet as the mists of Scotland.

I also found some intact plastic sheeting and made a small water tank in which I melted down snow. The nearest spring was half an hour's walk away down the road. Greek mountains are very dry by our standards—no little rushing burns tumbling down the hillsides. The rain and melting snow seeps away through the mountain to watersheds below.

My hermitage complete I was ready to explore further afield. In the rough stable scree and the wide stony tracks of the ski-runs there were violets, hundreds of them. They varied from a deep purple to an exquisite ice-blue; large clumps of them in all their variety bloomed everywhere. This was *Viola perinensis* a West Bulgarian and North Eastern Greek endemic. Polunin mentions it as being found on the Pirin Planina in Bulgaria but gives no description. On Pangéo it is one of the

most enchanting flowers. Other violas there are but more familiar, *V. tricolor* and *V. riviniana* in grassy spots.

I do not know whether *Viola perinensis* has ever been in cultivation. I should love to have it in my rock garden, especially the beautiful pale forms.

Near the violas, but preferring, on the whole, slightly more sheltered conditions, grew *Saxifraga sempervivens,* its dark reddish plumes and silvery green rosettes decorating the earth banks by the ski-runs and the roadside in light woodland.

Nearby was the meadowland, bumpy and difficult underfoot with its tufts of course grasses. Large clumps of *Primula veris* of the subspecies *columnae* were common here but even more striking were the yellow and red spires of *Orchis sambucina.* I have seen this orchid in the Alps and Pyrenees but never so commonly as on Pangéo; the hillside was studded with them, both colour forms about equal in number, below the hut and away up on the slopes of Afghó. Here also was a muscari species and at the rough edges bordering the paths a euphorbia closely resembling *Euphorbia rigida.*

I must have passed it a dozen times on the path near the hut and then suddenly I saw it—*Fritillaria drenovskyi,* two bells waving on an upright stalk. I searched carefully everywhere round the area but could not find another. Maybe it is commoner on another part of the mountain.

The grass always seems greener on the other side and on Pangéo it was. I took the road towards the television mast and it climbs up just south of the summit ridge. The highest peak is called Mati (1956m). Its eastern side is a precipitous cliff of several hundred metres but to the west it slopes back very gently to a wide open valley. On my last day on Pangéo I walked across part of it. As I descended the gentle slope I was astounded by the number of *Crocus veluchensis.* They were in their hundreds right down the hillside. *Crocus veluchensis,* I have read, is a variable species but I saw no different shades here. They were all of a uniform lilac, closely resembling *Crocus sieberi* but with a white not a yellow throat. There were also two bracts, the distinguishing feature of this species. Here too was *Scilla bifolia* but I saw no *Orchis sambucina.* Then signs of the mist returning appeared so I made my way back towards the road. As I was on my own I thought it unwise to stray far from it and possible help in case of need. On the banks and rocks near the track in company with *Saxifraga juniperifolia* grew a robust little draba possibly, I thought *D. lasiocarpa.*

Darkness fell. Tomorrow it would be civilisation again. I had spent some days in isolation on Pangéo, during those days the mountain had been all mine and I had taken it to my heart.

For Peats Sake

JAMES COBB

A FEW YEARS AGO a very well preserved human body was dug up in a peat bog in Cheshire. I think he is known as the Lindow man but needless to say the popular press christened him Pete. It later became clear that he had not died of natural causes but had been foully done to death in some sort of ritual killing. What I can now disclose is that he ran a pre-historic garden centre and sold the natives peat for their herb plots. Regrettably for the poor chap, dissatisfied customers in those days were inclined to take matters into their own hands!

One of the surest signs of spring is the appearance of peat in many types of package, breaking out all over the retail trade from garage forecourts to food supermarkets; from little handbags for the blue rinse brigade's roses to the maxi-bale for the young upwardly mobile's executive patio. This modern pre-occupation with peat as the ultimate panicea for the garden is fascinating but it is easy to see where it comes from. As a child carthorses were still much in evidence for rural and even agricultural transport and they left large brown mounds in the road at frequent intervals. My mother and her mother-in-law (who lived next door) used to compete for these rich trophies and I don't think it did much good to family relations that my mother invariably won since she took the lawn clippings box and my grandmother a more modest shovel. In a rural village one's status was measured by the large pile of stable manure dumped in the driveway each autumn; certainly the local squire, doctor and vicar could count on it. I'm not suggesting it was they who actually shifted it but those steaming mounds on cold autumn mornings were a symbol of great respectability. They did smell a bit, of course, and the whole idea of animal faeces is not 'quite nice' to a town dweller. Large brown mounds—I'm sure you have already arrived there—find a large brown mound that doesn't smell and your fortune is made. Now you know why peat is a spring ritual—spring because autumn is also not 'quite nice' outdoors.

Before we go any farther one must say that peat is the very basis of a great range of soil-less composts which have revolutionised the container-grown plant industry to the benefit of us all. However, these composts are all dependent on careful mixes of inorganic fertilizers and trace elements and long term planting in them is exactly the opposite of

what most are designed for. Admittedly some amazing plants have been put on Scottish show benches grown in soil-less composts and not just 'peat garden' plants either.

We must also admit that peat can be used as a soil conditioner particularly in relation to increasing both the water holding capacity and the degree of aeration of soils, but the amounts generally used are not likely to be that significant and it is an expensive treatment if done effectively. The whole problem of soil structure and the organic matter in it is rather controversial and readers who are serious should read a horticultural textbook (not a gardening book) or refer to serious articles in this journal (such as Evelyn Stevens article in the last issue). A most stimulating article is in the May 1987 issue of the Royal Horticultural Journal; Peter Willmott, the author, will raise your blood pressure at some point if you have a real commitment to gardening.

The present article really aims to dissuade you from top-dressing your peat bed with peat, or worse pulverised bark or such like, especially in areas where all your treasures grow. It actually does no good and is in general a guarantee that most things will eventually fade away. You may initially have to incorporate a great deal of peat when you start to produce a particular soil structure and maybe change the acidity but that is not top dressing.

If you have had the privilege of walking in the delightful New England woods of say New Hampshire in spring you will notice bare deciduous trees and a deep leaf litter underneath. What you will not see is a delicate dusting of peat either falling off the trees or arriving by some mystic process involving little men with green ears and pointed caps. The leaf litter progressively breaks down to form a thin layer of leaf soil and underneath that, maybe, a fairly hard substratum. Many of the typical plants of these woods are adapted to exploit this leaf litter layer and there is a continual release of nutrients because the breakdown by bacteria is a non-stop process consuming nutrients but releasing an excess. Many of our most treasured plants come from this sort of habitat. Cypripediums, stem-rooting lilies, and a whole range of plants such as *Sanguinaria canadensis*. If you top dress with peat, especially the bulky acidic moss peats that have hardly started decomposing, what nutrients there are in your soil will be used by the peat and it will be years before they are returned. If you apply enough peat to be really significant you will smother many plants and the totally sterile conditions you create on the surface will remove any chance of finding the many natural seedlings that occur in a well managed 'peat' garden. If you try to dig the peat in you will damage the roots of many surface rooting plants adapted to run through the rich leaf litter.

All this may have put you off using peat but an alternative is required. Ideally this is leaf mould of at least two years decomposition and preferably from oak or beech. This is certainly not easy to acquire but the effort must be made even if only enough to keep a square metre or so top-dressed for your most choice plants. Less than 1 cm is needed in depth or about a gallon bucket per square yard (my sort of measure). It is necessary to add about 25% coarse grit to stop it blowing away and this also greatly improves the soil structure when applied annually. This is a top dressing; it is not dug in and needs applying at least once a year. The improvement in my 'peat' bed since changing over from peat top dressing has been quite phenomenal to the extent that plants classically adapted to this constant leaf litter rapidly build up, such as *Sanguinaria canadensis* (flora plenum form). This is now rooted out by the bloody handful, and *Epipactis gigantea* is a quite serious weed.

One has to ask oneself whether there are alternatives because of the difficulties in obtaining good leaf mould. One can certainly dilute the leaf mould by fifty percent using a really good quality dark sedge peat. I have also successfully used one year composted sea-weed, which turns in this time to a rich brown open material not unlike moss peat that looks good enough to eat. I use it a great deal in the vegetable garden. I am sure too, that the very bottom of a good compost heap where the product looks like a dark soil would be excellent. It would need sterilising for weed seeds and drying out for sieving down to a fine particle size. Care is needed with this material because it can cake and may thus need extra grit. One could bulk out these composts with a really good sieved loam, but this is scarce too. Pine needles can be composted especially if nitrogen is added initially and some lime to neutralise the intense acidity. As a last resort I would use a sedge peat to the same depth of 1 cm (such as Fisons Rich Dark peat but some supermarkets also have own-brand sedge peats) and add an inorganic fertilizer. I used to use Enmag but this was unsuccessful; the likely candidate is a resin-based slow release fertiliser. The difficulty with these is that release is temperature, humidity and pH dependent and some experimentation would be necessary but theoretically one should be able to achieve something as soon as leaf mould without the real risk of introducing soil pathogens. If I did not have access to the natural materials that I do, I would certainly adopt this system and work out dosing regimes for the different types of resin-based slow release fertilizers available. But don't, whatever you do, use moss peat.

There are of course some types of peat plant that are not adapted to this sort of feeding regime. Meconopsis are a case in point and need a really substantial amount of compost dug into their plots every three

years when they require splitting up (if perennial) or with each new planting (if monocarpic). Ideally one has the front part of the bed top-dressed annually with leaf mound and the back part dug and composted every three years.

I am slightly less sure or ericaceous plants since I have room for very few, maybe they do like being starved. Cassiopes certainly thrive with leaf mould worked into their crowns and I guess many other such plants do as well. Mike Stone pointed out to me that even in many gardens with a high reputation for rhododendrons the leaf litter is cleared from under them and the ground left bare. It is a moot point whether the bare soil is worse than forest bark or moss peat. The former will merely starve them, the latter may actually deprive them of what little nutrients there are for their own decomposition. Once I had been enlightened on this point my best species rhododendron are really showing rapid improvements from a big dollup of very well rotted farmyard manure under each.

There is the final point about acidity of soil. The story is that the newest and least decomposed peats on the surface are very acid and as they decay to the greasy black soil at the base of the deposit the pH rises towards neutral (although there are alkali peats in areas where the standing water drains off limestone). I think there are very few plants that will not grow in a really rich soil, whatever the pH, and certainly many of the himalayan plants such as meconopsis actually come from limestone areas. I suspect Blue Poppy blue is affected by pH, but there are chemical ways of correcting pH. The only plant that has ever shown symptoms of chlorosis with me was the hybrid rhododendron Pink Pearl and even this was corrected with Sequestrene (chelated iron). The surface layer of my beds is probably acidic due to the leaf mould but it certainly is not at depth. Growth of most plants is only in this surface layer and while various natural processes do bring solutes upwards and leaf mould downwards, providing your top-dressing is at least annual, with little and often the motto, it is simply irrelevant. Think therefore on poor old misguided Pete in his Cheshire bog, preserved for ever by sterile peat—surely you don't want your precious plants fossilised too!

A Balkan Journey: Part 1

MICHAEL ALMOND

I HAD THOUGHT of calling this article *Around Albania* for reasons that will, I hope, become apparent but decided that it was, perhaps, a little too misleading. I hope the present title is appropriate enough: the journey in question covered parts of Yugoslavia and northern Greece and was undertaken during the last two weeks of June and the first two weeks of July in 1987.

Some idea of what *Balkanization* really means can be gained when one remembers that Yugoslavia is a federation of separate states with the same kind of local autonomy as have the states of other federations, such as the USA. After quitting Austria, we passed through Slovenia, Croatia and Bosnia and Hercegovina (all on the same day), and later went on to Montenegro, Kosovo, Serbia and Macedonia before crossing the border into Greece. Although we had many fine views of the mountains of Albania we did not actually enter the country!

We gave the Plitvice National Park, in north-western Bosnia, short shrift partly because we had a lot of ground to cover, partly because it was not really very inviting in the monsoon-like weather affecting the area at the time and partly (it must be admitted) because a fee of £14 was demanded for the privilege of two people and a car entering the park! The weather showed little sign of relenting until we had passed through the picturesque little town of Jajce and the Bosnian capital of Sarajevo, with its beautifully restored but somehow too sanitised old market quarter. We saw little of interest in the way of flowers, although it is true we did not venture very far from the car.

We entered the Durmitor range and the Republic of Montenegro (Crna Gora: the Black Mountain) from the north-west, via the gorge of the Piva river. The river Piva circles Durmitor on the southern and western sides and joins the Tara (which guards the northern flanks on the massif with its own great gorge) at the village of Šćepan Polje. From here up to the medieval Piva Monastery (Pivski Manastir) the Piva Gorge is spectacular in the extreme; apart from a good crop of wild strawberries, however, we saw little to interest us botanically until we reached the limestone plateau north of the town of Nikšić.

In the grass at the roadside in this area we saw a number of orchids *(Anacamptis pyramidalis, Gymnadenia conopsea, Orchis coriophora,*

O. morio (including some white forms), *O. pallens* and *O. ustulata).* As well as common wayside flowers such as *Asphodelus albus, Veratrum album, Helleborus cyclophyllus,* myosotis and thyme, we also saw hereabouts *Gentiana verna, Narcissus poeticus, Viola gracilis* (both purple and yellow), *Globularia meridionalis, Edraianthus serpyllifolius, E. serbicus, Primula elatior, Polygala major* (pink and blue), *Campanula spathulata, Silene (viscosa?)* and a pink crepis.

Although we passed the end of a road leading up one of the few side valleys out of the Piva Gorge signposted to Trsa, we decided to go the long way round via Nikšić rather than take this rather rough track that was not marked on our map. And so we came to the main heights of Durmitor from the south, along the road from Niksić, and turned off just south of Žabljak on to the track which skirts the south of the main group of high peaks and is also marked to Trsa. We drove up this track almost to the pass (Sedlo) and just above Valvovito Jezero (jezero = lake). We had no map of the range (although we did manage to acquire one from the National Park shop next to the Hotel Durmitor at Žabljak just before we left). Having no idea exactly where we were in relation to the highest parts of the range, therefore, we simply headed up the ridge above the track until we came to the summit. In fact we climbed to the top of Vrh Šljemena (2455m) and were rewarded with superb views of the Black Lake (Crno Jezero) and the massive cirque at the centre of the Durmitor massif, as well as a panorama of the whole range, including the highest summit of Bobotov Kuk (2523m).

On our way up to the summit to Vrh Šljemena we saw some seed heads of fritillaria and, in flower, *Edraianthus tenuifolius,* muscari, *Primula elatior, P. halleri, Orchis pallens, Scilla bifolia, Androsace villosa, Dryas octopetala, Globularia meridionalis, Soldanella alpina, Silene acaulis, Saxifraga aizoon, S. spruneri* (or *scardica), Corydalis bulbosa* and, forcing its way up through the edges of the unmelted snowbanks and through the matted grass nearby, *Crocus veluchensis.* The summit area was a mass of *Viola calcarata spp zoysii,* in all shades of violet from light to very dark and also in yellow.

The woods to the east of the main Durmitor massif, to the west of Zabljak and around Crno Jezero, are impressive and allow picturesque glimpses of the summits and the many lakes in the area, but had little or nothing of interest in the way of flowers (at least as far as we could tell from our brief exploration, in which we logged only *Viola biflora* and another small wood violet, *Paris quadrifolia,* pyrola and, on the meadow at the edge of the wood, *Linum capitatum).* The meadows alongside the road southeast of Žabljak were bright with dactylorhiza and cotton grass.

After a detour to visit the medieval monastery of Mileševa, we pressed on south towards the Albanian border and the upper valley of the river Lim. Here, in full view of the impressive snow-capped peaks of the north Albanian Alps (Prokletije—up to 2694m), we camped beside the Lake of Plav. We were entertained to coffee by the wife of a Yugoslav army major, who was out fishing on the lake; she was a Muslim from Bosnia and he a Christian (can majors in the Yugoslav army be Christians?) from Serbia. The meadows beside the lake were dotted with orchids—*Dactylorhiza incarnata, Orchis coriophora* and *O. laxiflora spp palustris*— together with broomrape, echium and water avens, *Geum rivale.*

The next day we explored further up the valley and visited the village of Gusinje, one the most picturesque villages we saw in Yugoslavia. The village has a spectacular site below steep mountains on either side. The Albanian frontier is only a couple of miles further up the valley and the architectural traditions of the forbidding stone tower-houses and quaint wooden dwellings (not to mention the beautiful little wooden mosque) are entirely Albanian. It is ironical that this area used to be one of the remotest and most inaccessible parts of Albania (see Edith Durham's description of her efforts to reach Gusinje and Plav in her book *High Albania)* and now it is infinitely easier to reach than any part of the *People's Socialist Republic of Albania.* The meadows by the roadside were bright with *Dianthus giganteus* but we were disappointed at not being able to explore the snow-covered peaks above us.

Our route south next lay over the Čakor Pass (1849m) from which we enjoyed the superb panorama including the distant snows of Durmitor to the north-west, Prokletije to the south-west and the Rugovska Gorge and the hills of Kosovo beyond to the east. There are no mountains very much higher than the pass itself in the vicinity of the Cakor Pass, but on the bluff overlooking the pass on the southern side, above the trees, some snowbanks still remained to nourish a last flush of *Gentiana acaulis.* In the turf and on the limestone rocks we also found *Gentiana verna, Geum montanum, Androsace hedraeantha, Crocus veluchensis, Saxifraga sempervivum* and *Edraianthus tenuifolius.*

The road east from the Čakor Pass zigzags steeply down through pine woods and meadows dotted with *Asphodelus albus* until it enters the Rugova Gorge (Rugovska Klisura). It then follows the torrent, with glowering crags on either hand—and among the trees at the roadside we found an impressive stand of *Orchis saccifera*, flourishing indeed despite the thick coating of dust thrown up by the traffic passing along the unmetalled road below. It was on this road that we met the only police check point that we encountered on our travels in Yugoslavia;

the emptiness of the countryside and the proximity of the Albanian border easily explained this in a province the majority of whose population is ethnically Albanian and which has a strong Albanian irredentist movement (our only other brush with the Milicija was when we were stopped for speeding on a Macedonian backroad near Lake Prespa: but that is another story).

The mouth of the Rugova Gorge, where the river flows out onto the plain of Kosovo, is guarded by the town of Peć (Peja) and in particular by Peć Patrijaršija—an impressive group of monastic buildings just below the road and right at the entrance to the gorge—which was the seat of the Servian Orthodox Patriarchate from 1345 until 1766.

The plain of Kosovo is intensively cultivated and (certainly in summer, as it lies only about 500 metres above sea level) there is little of botanical interest to see at the roadside. As you speed on your way from Peć to Prizren and the Šar Planina, however, do not fail to turn aside a while at the small town of Decani (Decan) to see the monastery of the same name nestling at the foot of a densely-wooded valley a mile or so west of the town. Prizren (Prizreni) itself is an interesting town, with old churches and mosques and a very Turkish atmosphere; this last fact is enhanced by the fact that all official signs in the town are trilingual—in Serbian, Albanian and Turkish—as opposed to the bilingual (Serbian and Albanian) signs in the rest of Kosovo.

As the road signs are (as usual) not as comprehensive as one might wish, it is worth remembering that the road to the Šar Planina lies through the centre of the old town and up the left-hand side (true right bank) of the River Bistrica, past the impressive old stone bridge and the mosque of Sinan Paša on the far bank, out of the town and into the Bistrica Gorge. The lower reaches of the gorge, with its limestone cliffs around the ruined monastery of the Holy Archangels, have little to offer in summer; but the name of the river means "clear" and it is indeed a mountain stream flowing down from the snows of the Šar Planina.

The woods at the roadside gave glimpses of *Digitalis lanata*, but soon we were at the Prevelac Pass (1515m), one of the best points of access to the Šar Planina from the south. The Šar range *(planina* means *mountains)* runs north-east to south-west and forms the border first of all between Kosovo and Macedonia and, further south, between Macedonia and Albania. Its highest points are Korab (2764m, on the Albanian border) and Titov Vrh (2748m, west of the town of Tetovo). The Prevelac Pass gives access, by means of a steep but easily climbed ridge, to the main Šar ridge about two-thirds of the way north from Titov Vrh to the northernmost summit of the range, Ljuboten (2499m). In late June the top of the ridge was almost entirely covered in snow and the weather was varied and difficult to predict.

We left our car at the roadside among some trees just below the pass on the northern side and set off for the top. Apart from the steepness of the climb, the only problem was in running the gauntlet of a pack of sheepdogs guarding a flock of sheep moving across the hillside at right angles to our route; this involved something of a detour, as well as the usual precaution of gathering a clutch of pebbles as potential ammunition. There was a path but, as is so often the case, it was a drove track and much given to unravelling at strategic points—and much easier to follow coming down than going up.

On the lower, grassy, slopes we found pansies, campanula, *Dactylorhiza maculata, Dianthus scardicus, Geum montanum* and *Crocus veluchensis.* As we climbed higher and came within reach of the summit ridge we could see that the cloud was coming down on the tops quite menacingly and we decided to divert into a high valley, instead of making directly for the top, in the hope of finding some interesting flowers—and that the weather would clear later and enable us to make the summit of the ridge. In the first of these hopes we were not disappointed, but the weather did not clear. On the higher slopes and in the high glacial valley we found *Primula elatior, Anemone narcissiflora, Ranunculus crenatus, Androsace hedraeantha, Salix reticulata, Pedicularis oederi, Gentiana verna, Soldanella hungarica, Viola elegantula (?), Saxifraga sempervivum, S. oppositifolia, S. marginata* and, making the whole of the slopes of the upper ridge pink with carpets of its flowers, *Primula minima.*

The weather forced us to retreat sooner than we had hoped and we made it back to the car in double quick time and torrential rain. We drove on to the village of Brezovica and up the side road signposted Sar to the ski resort under construction on the mountainside. This looked another promising route to approach the Šar from the northern side but the weather was so bad when we were there that we made no attempt to explore. Our only consolation was a fine stand of *Campanula moesiaca* and some *Gymnadenia conopsea* by the roadside (and some bright *Geranium cinereum ssp subcaulescens* in the rain at the ski resort) together with a few *Geum coccineum,* yellow pansies and crocus leaves.

The usual approach to the Šar from the south is from the town of Tetovo and up to the ski resort of Popova Šapka. The road is not signposted and you leave Tetovo by proceeding from the town centre along the main road to Ohrid, cross the river and pass the Coloured Mosque (Šarena Džamija) on your right. The mosque is a unique building with painted panels that you can hardly fail to notice (when we were there the large number of shoes at the main entrance testified to

the size of the congregation within and the large number of eyes staring down through the windows of the women's gallery showed that it was not, as is so often the case in Turkey, a men only affair); about a hundred yards after it you turn sharp right off the main road and head towards the valley side. Just before the bottom of the hill you pass the cable-car terminal on your right and just before that a large, overgrown Turkish cemetery on your left—this will serve as confirmation that you are, indeed, on the right track. In this case, however, it is not just a track but is a well made road right up to Popova Šapka.

The road climbs very steeply and gives fine views of Tetovo through magnificent stands of verbascum of varying species. Higher up, the road passes through forest and then reaches Popova Šapka just above the tree line. As far as we could see through the swirling cloud, the resort lies in a bowl facing east and the ridge above it presumably gives access to Titov Vrh. In the conditions in which we found ourselves, however, with intermittent rain and drizzle, high winds and visibility varying between ten metres and one kilometre, and without any maps (none appear to be available), we had to content ourselves with following one of the chair-lift cables up the hillside into the mist. This sort of exercise becomes demoralizing (to say the least) when the cable is crossing ravines and it is difficult to make out the next pylon through the mist. Although we got no real idea of the potential of Popova Šapka, however, we did find the one thing we were looking for in particular and which we had failed to find on the northern side of the mountains: *Crocus scardicus (scardicus* is the Latin adjective meaning *from Šar* and occurs as a specific name in a number of Balkan species). The *Crocus scardicus* was growing among *Crocus veluchensis* and in addition lower down we also found pansies, campanula and masses of thyme, *Crocus veluchensis, Edraianthus graminifolius, Saxifraga sempervivum, Pinguicula balcanica* and *Dactylorhiza sambuccina* (both red and yellow forms).

Our route south from Tetovo to Ohrid lay first along the flat and heavily cultivated upper valley of the Vardar river. We then crossed the watershed and entered once again the river system of the Drim—the White Drim drains the plain of Kosovo and the Black Drim flows down from Lake Ohrid, and the two both flow into Albania, join and then flow into the Adriatic south of Shkodër. The landscape became more heavily wooded and we passed Lake Mavrovo (Mavrovsko Ezero: *lake* in Macedonian being *ezero,* as opposed to the Serbian *jezero* encountered on Durmitor). In the beech woods near the lakeside we found *Neottia nidus-avis,* and in a marshy area between the woods and the road there was a veritable treasure trove of orchids: *Dactylorhiza cordigera, D. majalis, D. saccifera, Gymnadenia conopsea, Listera ovata*

and *Platanthera bifolia,* together with *Geranium tuberosum,* dianthus, a tall foxglove-like flower we have been unable to identify so far and lots of wild strawberries.

After leaving Lake Mavrovo behind we plunged into the Mavrovo Gorge, where the rocks that overhang the road in the narrowest part of the gorge were dotted with the flowers of *Ramonda serbica* and at the roadside, at the bottom of the cliff, there grew a large clump of *Corydalis ochroleuca.* In the gorge we also saw *Saxifraga paniculata,* leaves of *Campanula versicolor (?)* and *Lilium martagon* in bud.

The road then continues down the valley of the Radika, past the monastery of Sveti (Saint) Johan Bigorski with its superbly restored paintings and monastery buildings down to the confluence with the Black Drim right on the Albanian border at Debar. In Debar we stopped (we had little alternative) to watch a Muslim wedding procession pass by up the main road: first came the musicians sounding very oriental with their tambours; next came the happy couple, the bride looking very western in her white wedding dress, then came the families in their best clothes, the men this time looking more western and decorous than the girls dressed in bright colours and dancing for the bride; near the rear came the imam, in western dress except for his fez, and holding his long cigarette holder at a very jaunty angle to demonstrate his sophistication and an air of detachment.

From Debar we wound up the well-wooded valley of the Black Drim until we reached Struga, where it flows out of Lake Ohrid. Ohrid itself is a very picturesque old town, not yet ruined by tourism (probably largely because most of the tourists are Yugoslavs rather than foreigners) but most of the botanical interest in the area is confined to the flanks of Galičica, the mountain to the south of Ohrid and between Lakes Ohrid and Prespa. In the wood of beech and evergreen oak near the road junction above the charming little monastery of Sveti Naum (which sits within sight of the watch towers on the Albanian border and boasts the springs nearby as the source of the Black Drim) we saw *Helleborus orientalis, Acanthus balcanicus* and *Anacamptis pyramidalis.*

Beside the road that leads up from this junction and over Galičica to Lake Prespa we found *Nigella damascena* and, in one place among the open scrub of daphne bushes, masses and masses of *Morina persica,* with its attractive pink and white flowers and acanthus-like leaves. At the summit of the pass and in the nearby woods we found *Primula elatior* (in seed), *Cephalanthera damasonium, C. rubra, Campanula sprunerana* and another campanula with dark blue closed flowers forming an almost spherical inflorescence on the end of a stalk about 10 inches long. We decided not to go in search of *Crocus cvijicii:* partly because we thought

that it was very unlikely that any would still be in flower, there being no snow in sight and the bare hillsides beginning to look rather parched—Galičica being only 2287 metres above sea level at its highest point, which lies in fact (and this was the second reason why we decided not to go hunting for it) over the border in Albania.

The waters of Lake Prespa are shared between Yugoslavia, Albania and Greece (more of the Greek shore later) and it lies slightly higher than Lake Ohrid. Lake Prespa is relatively shallow and freezes over completely in winter: the corollary to this being that it gets quite warm in summer and is, in fact, very pleasant to swim in. We found a number of interesting flowers growing in the woods near the lake shore. In particular we found a number of lizard orchids of the variety confined to this part of the Balkans, *Himantoglossum hircinum ssp calcaratum,* with their long, bright pink "tongues". In addition we found *Asphodeline liburnica, Monotropa hypopitys, Cephalanthera rubra, C. damasonium* (in seed only), hellebore and primrose and crocus leaves.

Next we moved east of Lake Prespa and set off to climb Pelister, at 2601 metres the last high mountain before the Greek border. We found the road up to the ski installations easily enough (as described in Bacon: Mountain Flower Holidays in Europe) and left our car at the end of the road. We followed the clearly-marked path up through the woods to the top of the first ski-lift and the skiers' restaurant but the path on upward had been obliterated by work on the upper ski lift. After a false start, however, we followed this upper lift up through the trees to the top of the ridge and picked up the path again. In the long grass at the top of the lift we found numerous fine specimens of *Lilium albanicum* (See Fig. 68 p.378) together with *Geum coccineum, Geranium cinereum ssp subcaulescens, Sempervivum marmoreum* and *Rosa pendulina* (or perhaps *R. glauca).*

We had read that getting to the top of Pelister involved crossing a large boulder field but we had not realised how extensive this boulder field was, nor how large the boulders! We have crossed any number of boulder fields in our various montane peregrinations but the one on Pelister must be the daddy of them all. As the whole of the top 500 metres or so of the mountain seemed to consist of this type of terrain, we decided that discretion was the better part of valour and eventually decided to retreat. Even if we had reached the summit area (where we hoped to fine *Crocus pelistericus* by the melting snow), we should have been so tired on our return journey that we would have been in grave danger of injuring ourselves in the boulder field. If we visit Pelister again we shall try to find the alternative route described in Zonneveld's article in the AGS Bulletin for December 1981 (vol 49/4, pp. 322-9).

Acid screes—a useful working tool

R.J. MITCHELL

The William C. Buchanan Lecture

WILLIE BUCHANAN in whose memory this lecture is given, farmed not far from Bearsden, the venue for the 1987 Discussion Weekend. He is not remembered for his farming but for the gardening prowess and skill he had in growing, and a vast range of plants which attracted friends and enthusiasts from all over the world.

The first tribute to his memory was given in 1963 by the late David Livingston, himself a superb grower of rock plants, especially primulas. He states "Willie's garden extended to just over half an acre and he grew most successfully many hundreds of rock garden plants, trees and shrubs, many of them rare and difficult to grow by ordinary standards, but not by his".

In the April 1964 Journal you will find photographs of Willie's garden showing the great diversity of plants growing in a large range of habitats. The acid screes features on at least four of them, illustrating the fact that the concept is not new.

In the June 1987 issue of the Journal, Evelyn Stevens rightly informs us that air space is an important ingredient in any soil. So too is the availability of water to the plant. Herein lies the success or failure of growing most plants—alpines certainly.

With this fundamental thought in our minds it goes without saying that the scree method of growing plants is well established and a useful, at times necessary or even essential, method for growing the more difficult of species.

When we consider screes we think first and foremost of the alkaline and lime-rich variety. These after all are the richer soils and natural home for the majority of our choice alpine plants. Why then the acid scree? And is this not a contradiction in terms? At best what plants do we need to grow here if so few occur naturally in this situation? But first let us look at the history of scree gardens.

In 1864 Professor Kerner constructed a garden of stone chippings at the Royal Botanic Garden in Innsbruck to grow his collection of European alpines. This same scree, built to represent in miniature the valleys of the Tyrolean Alps was visited and described by Kolb, Curator of the Munich Botanic Garden in 1890.

Meanwhile in the British Isles, William Robinson was writing about the informal garden, and Gertrude Jekyll too developed the theme of informality. Reginald Farrer "the Father of Rock Gardening" developed this informality of gardening much further, profoundly criticising Robinson for his ideas, but none-the-less the seed was sown and Farrer gives us the construction details of rock gardens as well as screes, and the rock garden with its rocky outcrops and ledges become places for the choice alpine plants.

Fisher's definition of a Boswell-Johnson-like statement (had there been screes in their day) is "Sir, a Scree Garden is a bed of stones in which misguided gentlemen try to grow weeds which would ill repay the gathering from a mountain path".

Ingwersen defines the plants as "those tricky, elusive, accursed, beloved little high alpine wretches, which would just as soon die on us than not."

Farrer in the preface of The Scree Garden is quoted as saying:— "Let us, therefore, wed simplicity with correctness, give thanks for the simple moraine, and go on and prosper each our several ways."

"Our several ways" is a profound statement and one not to be lost when considering the scree garden and indeed any other type of gardening for there are so many ways of achieving the height of perfection we all seek.

Hornibrook in the RHS Journal stated that after three years of experiments his ideal moraine in the centre of Ireland was pure limestone chips straight from a road crusher without an admixture of soil, merely the lime rubble with its accompanying lime dust to bind it slightly. A neighbour 5 miles away found that a mixture of 3 parts chips to 1 part soil suited him best, while another neighbour 35 miles away used 5 parts red sandstone to 2 parts leaf mould to his best advantage— this due to differing soil conditions and rainfall patterns no doubt.

It is certainly established that screes give perfect drainage, a cool and unfettered root run and moisture in the dry season. Please note moisture in the dry season. This factor is fundamentally important and at the crux of this argument. This lies in the fact that the scree provides moisture to the plant in a dry season for this water is not bound to the organic substance but adheres to the surface of the grains and chippings and so is more readily available to the plant.

Furthermore Roland Cooper, a former Curator of the RBG Edinburgh, states that scree conditions emphasise the beauty of the foliage of *Gentiana hexaphylla*, and if the sceptic scorns the idea of gentians in the scree his attention is invited to a field photograph of *Gentiana phyllocalyx* taken when he re-introduced *Gentiana prolata* from Bhutan.

Acid screes are certainly not a novel ideal but have been mooted for fifty years and more. Yet they are not a common phenomenon.

While trying to grow a large range of acid-loving plants for University study, in a medium of peat, leaf mould and the indigenous heavy loam some exceedingly good results have been produced, but alternatively some disasters. I am sure some of you will know what I mean. It is the failures that have brought me round to the acid scree concept of growing some of them. (Indeed during this process we have topdressed our peat beds with chippings instead of peat and leaf mould on more than one occasion to open up the medium.) But let me go back to the problem to quantify the reasons, to look with hindsight at our errors with a view to preventing others from falling into the same trap.

A constant mulch of peat will keep up the organic matter content of the soil and will retain the acid reaction of the soil. If the soil is light and sandy like the RBG Edinburgh then the problem does not exist for there are plenty of pore spaces in the soil and the air/water ratio is high when water supplies are freely supplied. If on the other hand the soil is a heavy loam then this is where the problems can exist.

Over the years working with alpines, some of them not so easy to grow, I have found that additional air space in a compost proves to be most successful. The medium which has evolved, and now in St. Andrews called Mitchell's Mix, is as follows:— mix up your ingredients to the texture you consider is appropriate for the particular plant or group of plants you are about to pot on, then and only then add an equal amount of sharp grip and remix to produce this special medium. It is basically a rich scree mixture but one which has given constantly good results over the years.

It could be argued that the acid scree mixture differs little from Stuart Boothman's Rich Scree mixture with its peat and leaf mould portions and grit, but I envisage more variation in the scree to cope with differing soil and cultural requirements. After all do we not try to produce varying degrees of aridity or moisture in our limestone screes. There is a similar need in the acid scree.

Polly and Mike Stone have at Fort Augustus a huge collection of troughs and I am led to believe there are more acid ones than any other. Here they expertly grow many rare and exciting plants in a variety of situations from open and sunny to quite shady, copying the conditions which prevail in the wild. If we consider planting these in an acid scree I am confident that the bulk of them would not only survive but grow equally well, providing the necessary shade or sunny exposure and moisture requirements were provided.

Another important factor which we should be aware of is the degree of hardiness which a scree mixture, whether in situ or in a container, produces in plants at the onset of winter. It is the triple delicate balance of maturity of the plants at the onset of winter linked to the water content of the soil and the frost factor which determines to a very large extent how plants will come through the winter. I am sure I need not elaborate on this theme, but sufficient to say that the more open the mixture the harder the plants will grow and the better chance of survival. Linked to this must be the balance of moisture during the growing season but as I have already stated moisture is more readily available from a scree situation than a peaty soil in times of drought.

In Ballater Alex Duguid has developed a fine new garden in his retirement and in it he has an acid area using sphagnum to grow his beloved acid loving plants. Members' attention is drawn to Alex's instructive articles in "Alpine and Rock Gardening" 1961 and to his notes on the value of sphagnum in seed sowing and published in our own Journal.

The principle of aeration applies here too and the resultant plants grow so strongly as to indicate what the late Henry Tod considered to be an auxin-like effect from the sphagnum itself.

There is no reason why sphagnum areas or indeed why sphagnum should not be incorporated in the mixture to provide both of the plants' requirements in aeration and moisture supply.

One aspect of this argument is the fact that far more plants will grow in an acid or neutral scree than in an alkaline or lime-rich medium. Certainly there are plants which do much better in the latter and will become lush and lose their silvery appearance if grown in acid conditions. I refer to the vast majority of the Porophyllum Saxifrages which have pores and exude lime giving this silvery look. But it has to be said that many plants which are currently grown in the limestone scree will grow equally well in the acid scree.

However, this is not the real thrust of the argument. It is rather that plants which do not seem to grow as well as is anticipated in the peat garden may very well be good candidates for the acid scree, albeit in one of its many differing habitats.

Most acid loving plants in the wild grow in well-drained, well-aerated soils. There are exceptions like some rhododendron species which are found in boggy conditions, but this relates more to their growing season conditions than their dormant season state. So the argument really remains the same.

Creating the acid scree environment

Climate (covering rainfall and frost prevalence largely), exposure, and growing conditions are the main factors governing the siting or, indeed, the advisability of constructing an acid scree. That being so, a range of situations should be prepared from shady sites to sunny exposures, from dry to moist to quite wet areas to accommodate a wide assortment of species. (I was always most impressed by the bog area at Ascreavie where the winter conditions were remarkably dry but where water was seeped into the area during the growing season for the acid-loving primulas and meconopsis. Here the Sheriffs grew so many rare plants including *Primula kingii,* rarely if ever seen today, and the vast stands of *Primula ioessa* and *Meconopsis quintuplinervia* grown by the square yard. Here too, they grew nomocharis in variety on the fringe of this bog area and *Meconopsis sherriffii.* Growing at Ascreavie in an acid trough were *Meconopsis delavayi* and *Lilium sherriffii* in the sheltered security of their "secret garden".

It is a well known fact that *Rhododendron forrestii* var *repens* will produce more flowers if grown in full sun, or alternatively planted so that the plant will drape itself over a stone to enhance the ripening of the young shoots in late summer. The higher the occurrence of rhododendron species in the wild the less rainfall they require in cultivation and therefore they are better suited to cultivation in eastern parts of Britain. It is also well known that with a few exceptions they grow better in the east than in the milder but wetter west. So, like the alpine meadow plantings of the dwarf and particularly Anthopogon rhododendrons at the RBG Edinburgh, it is better to grow these in the better drained (but still moist) conditions of the acid scree.

Among the rhododendrons it is possible to plan a growing requirement regime dependent on water requirement. We know that *Rhododendron pumilum* grows in the higher elevations amongst the moist moss-covered stones, and that *Rhododendron proteoides, R. ludlowii* and *R. lowndesii* require drier conditions, particularly in the winter time. These very conditions can be produced in the acid acree simply by increasing the water supply to the medium in the same way as is done at present in the limestone scree. The expertise is with us, it is just a question of adapting it to suit this "new" situation. Among the taller species to provide shelter and shade many of the Anthopogons are ideal and of course *Rhododendron anthopogon* itself, the clone "Betty Graham" with its deep pink flowers being particularly attractive.

Of the primulas which require drier conditions *Primula farinosa* and its relative *P. frondosa* are regularly grown in rock garden situations, *P. vialii* and *P. flaccida* are strong feeders but demand good drainage,

while *P. kingii* and *P. ioessa* demand summer bog-like conditions. Perhaps we would still have plants like *P. obconica werringtonensis* in cultivation if the acid scree conditions had been used. Could it be that species like *Primula reptans, P. clarkei, P. reidii, P. reidii williamsii* and *P. wollastonii* would be more amenable to cultivation in these same conditions for they have been grown very successfully by a few dedicated growers in the open in the past? We try to produce the same conditions in which they grow in the wild and it is my theory that there is more control of the garden situation, particularly the winter wet, in the acid scree which could be a most useful gardening tool.

That being said it must surely be possible to drip water over a bank to provide conditions for the snow-melt flowering species like *Primula concinna, P. tenuiloba* and *P. soldanelloides* found in the higher elevations of Nepal flowering in the monsoon-soaked hillsides.

Many of the European primulas grow naturally on the lime-rich soils but *Primula glutinosa* must be grown in a well drained acid medium and in a sunny situation, so is a very good example to illustrate our argument.

Similarly *Trillium undulatum* grows in a strongly acid soil and in its native environment is found in deep shade. In cultivation in Scotland it is best grown in a shady spot but where the sun does get to it sometime during the day. What it does demand is a cool moist root run and this too is readily available in the acid scree.

In the dry sunny situations there are a large number of species from which to choose. Included here are *Androsace sarmentosa* and its varieties *watkinsii* and *chumbyi, sempervivoides* and *rigida* var *minor*, a plant found on the Tali Range in the most windswept and barren of situations. Carpeting plants such as *Raoulia grandiflora* (Fig. 66 p. 377) with its large white flowers, and *Ourisia caespitosa gracilis* come readily to mind. *Campanula excisa* grows best in granitic soils and it too responds to the perfect drainage of this type of situation.

Scree conditions not only assist in the ripening of the shoots to enhance flowering but they also help to prepare the plant for the frosty weather ahead, plants grown in a hungry mixture being more able to survive the winter.

Similarly, due to this same kind of medium, plants are dwarfed to near normal growth. Take for example the high Himalayan *Delphinium nepalense* which in normal cultivation is twice as tall as in the wild and as such loses its charm and gracefulness. Instance also the well grown specimen of *Tanacetum gossypinum* growing in one of the acid troughs at Fort Augustus, a plant beautifully in character and with its silvery-grey foliage shown to its best advantage.

Nor should the bulbous plants be left out for they provide a charm of their own and a welcome change to the 'ericoid' habit exhibited by a great many of the plants grown in this situation, such as *Cyclamen coum* which flowers in February and March in a semi-shaded position, and extending on to the spring wealth of species. From western North America *Erythronium revolutum* and many of its allies grow best in humus-rich soils which are freely draining, and similar to the conditions for Nomocharis mairei (Fig. 81 p. 434), now to be called *N. pardanthina, N. saluenensis, N. farreri* (Fig. 67 p. 378), *N. oxypetala and N. nanum. Incarvillea* "Nyoto Sama" and "Frank Ludlow" also produce exciting flowers on dwarf stems. Challenging plants like *Primula reptans* and *Harrimanella stelleriana* which have been grown fleetingly in specially prepared situations over the years but not with any degree of permanence are now being grown in troughs and in the alpine house. They are, I would suggest, plants to try here.

There is everything to be gained from trying the acid scree in all its diverse growing conditions and perhaps with the increased knowledge which abounds today and coupled with the exciting new plants which are coming in again from western China we may well see these thriving in many more gardens. After all it has been done before and hopefully we shall see plants like *Meconopsis delavayi* recently introduced again thriving in the acid scree as it once did at Branklyn all these years ago.

To dip or not to dip and other cutting questions

MARGARET AND HENRY TAYLOR

IT ALL STARTED with Margaret filling in a card for free samples. Last September we were horrified when our friend the postman struggled up to our front door with a huge sack. Perhaps not the ideal time of year for cuttings but we felt obliged to try a few experiments to test the gift materials.

First we used the egg-box method of rooting cuttings. We took four clear plastic six-section egg boxes. In each section of a box we placed a separate compost; these were Vermiculite, Perlite, Terragreen, Perlite with peat, sand and sand with peat. Cuttings of *Androsace carnea laggeri, Saxifraga x kochii* and *Zaluzianskya ovata* were inserted on 2 September 1986 and examined on 25 September 1986. Watering was a problem with these boxes sitting inside our kitchen on the windowsill. We tended, sorry Margaret tended to overwater some while other materials within the same box dried out. Thus rotting instead of rooting was more our fault than the fault of the material. Results showed no statistical difference in the number of cuttings rooted in the different composts, but it was interesting to note the extensive roots filling the Vermiculite and Perlite pockets.

Subsequently on 16 October 1986 we embarked on a more elaborate experiment using three seed trays with plastic propagator lids. Each tray was divided into four sections using a hardboard wall to separate each material. This time the materials were Vermiculite, Perlite, Terragreen and sand. Coarse grained concreting sand was used. Within each subsection of a tray, two cuttings were inserted of ten different plant species. One cutting of each plant was dipped into powdered hormone (1-naphthyl acetic acid) prior to insertion while its neighbour was inserted with no hormone. The plants used in this experiment were—

A *Androsace carnea laggeri*
B *Brachycome multifida dilitata*
C *Chaenomeles* 'Fire Dance'
G *Gentiana verna*
H *Hebe* 'Boughton Dome'

Lg *Leucogenes grandiceps*
Ll *Leucogenes leontopodium*
Ln *Linanthastrum nuttallii*
S *Saxifraga rudolphiana*
Z *Zaluzianskya ovata*

Eighty cuttings were inserted in each of the three trays, watered, covered with plastic lids and stood outdoors in a shady place all winter. Occasionally they were checked for further watering. The cuttings were examined on 4 April 1987 and each was scored on a points system, with 5 points for excellent roots, down to 0 points for no roots.

Table 1 summarises the result of an analysis of variance of our experiment. The LSD figure at the foot of a column is the key to finding whether there is a genuine difference between numbers, or whether the difference is just random and could go the other way if the experiment is repeated. LSD stands for Least Significant Difference and the difference between numbers should be genuine if it exceeds the LSD figure. A single asterisk indicates that there is one chance in twenty that the results are just accidental, whereas three asterisks indicate that there is only one chance in a thousand that the differences are due to mere chance variation.

What does all this prove? As might have ben guessed, there was a significant difference in rooting, with different plants. *Zaluzianskya ovata* rooted very easily whereas *Brachycome multifida* and *Chaenomeles* 'Fire Dance' were difficult.

A hormone dip significantly improved rooting with two of the plants *Gentiana verna* and *Leucogenes grandiceps*. Hormone treatment only reduced the level of rooting in the case of Hebe 'Boughton Dome', whereas the improvement with the two shyest rooters was very big. In general therefore it is probably best to use hormone.

Superficially Vermiculite appeared to be slightly better than the other cutting mediums, but the analysis of variance proved that the difference was not significant. We all tend to search for a universal panacea, but we should have deduced that one cutting medium might be much like another.

The basic requirements of a cutting are air, water and a reasonable amount of light, with a "growing" temperature. Any substrate which supplies these elements should suffice.

TABLE 1

Mean rooting score of cuttings (3 replicates)

Score 5 = excellent roots
Score 0 = no roots

Plant Species	Rooting Compost: Vermiculite Hormone dip	Vermiculite No Hormone	Perlite H	Perlite N	Terragreen H	Terragreen N	Sand H	Sand N	Mean Hormone Dip	Mean No Hormone	Mean of Plant Species
A	4.7	4.3	3.3	3.0	3.0	3.0	3.3	3.3	3.58	3.42	**3.50**
B	0.0	0.7	0.3	0.3	0.0	0.0	0.3	0.3	0.17	0.33	**0.25**
C	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.25	0.25	**0.25**
G	1.0	0.0	2.0	0.7	0.7	0.3	0.7	0.0	1.08	0.25	**0.67**
H	3.3	4.3	1.3	3.0	2.0	2.7	2.7	3.0	2.33	3.25	**2.79**
Lg	1.7	0.0	0.0	0.0	2.0	0.0	0.0	0.3	0.92	0.08	**0.50**
Ll	2.3	2.3	2.0	2.7	0.7	0.7	2.0	1.7	1.75	1.83	**1.79**
Ln	4.0	4.0	3.0	3.7	3.7	3.0	3.0	2.7	3.42	3.33	**3.38**
S	1.3	2.0	1.3	2.0	0.7	1.7	2.0	1.0	1.33	1.67	**1.50**
Z	3.3	3.0	4.3	4.0	5.0	5.0	4.7	4.3	4.33	4.08	**4.21**
Mean	**2.17**	**2.07**	**1.87**	**2.03**	**1.77**	**1.63**	**1.87**	**1.67**	**1.92**	**1.85**	
Mean Compost	**2.12**		**1.95**		**1.70**		**1.77**				

LSD within one species 0.636*

LSD 0.783***

Obituary
Mrs Mary Knox Finlay—1897-1987

By the death of Mrs Mary Knox Finlay on 20 September, the gardening world has suffered the loss of a highly skilled and talented grower of a host of extremely rare and difficult plants.

Major & Mrs Knox Finlay came to Keillour Castle in 1938 and between them created a garden of renown from an area which had been allowed to fall into a state of neglect. It was not till after World War II that work on the garden could proceed, and 25 acres were fenced in and made rabbit proof before any planting could be carried out.

The deep gorges of the Keillour and Horn burns, which flow through the garden, made an ideal home for many species of rhododendrons, magnolias and many other trees and shrubs. The rock and woodland garden contains a huge collection of plants and shrubs while the water garden is devoted to primulas and other moisture-loving plants.

Major Knox Finlay died in 1970, but despite this severe blow, Mrs Finlay was determined to continue the work they had started. She became an authority on liliaceous plants and grew large collections of liliums, nomocharis, notholirion etc., but perhaps her greatest love was for meconopsis, and especially the glorious Dream Poppy, a form of *Meconopsis grandis*.

Major and Mrs Knox Finlay were both awarded the Veitch Medal for their contribution to Horticulture and among her many other awards Mrs Finlay received the Victoria Medal of Honour, an award which has been given to only one other woman in Britain, Her Majesty, The Queen Mother.

In her latter years, Mrs Finlay suffered from poor eyesight, but this did not deter her from working in the garden until failing health forced her to give up the physical work.

However, she continued to plan further planting of trees, shrubs, primulas and meconopsis, and in her mind's eye could decide on their position in the garden in relation to existing plants.

Her many gardening friends will mourn her passing, but the memory of her indomitable spirit will be an example and inspiration to all who knew her.

J.R.A.

Obituary Arthur J. Holman

At the 1975 Newcastle Show I was told by the Show Secretary that someone wanted to see me. Standing by my pot of *Cyclamen creticum* was a silver-haired gentleman. "I'll have a bit of that" he said pointing to my plant. That was my first meeting with Arthur Holman, a man who was not afraid to ask (or tell you) what he wanted and a man who was most generous with his own plants over the years.

His garden at Milnthorpe was full of interesting plants, two large greenhouses contained his main passion, a fine collection of cyclamen; a third greenhouse, various frames and plunge beds held a large collection of primulas. He was proud of his woodland garden in which flourished trilliums, meconopsis, primulas, rhododendrons and many more plants. The remainder of the garden was crammed with conifers, shrubs and alpines, providing something for everyone to see.

An interest in cyclamen was kindled during wartime; walking in the hills above Salerno he was captivated by the drifts of *Cyclamen hederifolium,* a sight which remained vivid in his memory. Recently he and his wife Betty travelled abroad a few times to see cyclamen in the wild, to Majorca with Reg Kaye and to Poros and Crete where my wife and I had the pleasure of their company. He was willing to go anywhere in search of plants whether that be up a hot steep hillside on Hydra or a Cretan gorge. He knew when he had done enough and would rest while we "young 'uns" went on ahead.

He was a member of several garden societies. His local AGS Group was Lancaster but he would also travel to the Penrith Group if there was a lecture to his liking. He took great interest in visiting gardens and was a keen exhibitor at shows. The Discussion Weekend was a highlight of his gardening calendar, where he could have a good 'natter' about plants with gardening friends.

Arthur died on 9 September 1987, just short of his 77th birthday and five weeks after the death of Betty his wife. His loss will be greatly felt by the friends he made in gardening circles but his plants will live on in many gardens, a reminder of this generous plantsman.

J.R.J.

Book Review

The Opinionated Gardener by Geoffrey Charlesworth
Published by David R. Godine, Boston, USA 1988. Pages 193
Price £10.20 (Special price to SRGC members £8.50)

Here is the very book for the non-gardening wife or husband whose other half is a garden fanatic. It will of course be of interest to real gardeners this collection of essays does not show you how to garden better; it is more the random jottings of a man who gardens and also writes—both extremely well.

It is a book to browse through at leisure on a winter's evening being somewhat akin to the style of Reginald Farrer or Gertrude Jekyll. It is pleasantly produced with excellent line drawings but no photographs.

The special price for SRGC members of £8.50 includes postage and packing and is available from Mr Norman Singer, HC66, Box 114, Sandisfield, MA 01255, USA.

A.M.

The Rowan and its Relatives (Sorbus spp.) by H.A. McAllister, Ph.D.
Published by Ness Gardens, Ness, Neston, South Wirral L64 4AY.
1986 Pages 14 Price £1.50

This booklet which is No. 1 in the Ness Series will be of great value to anyone who is interested in rowans (Sorbus spp.). It deals in a most readable way with the close relatives of the common British rowan *(Sorbus aucuparia),* that is those species in which the leaves are divided up into numerous leaflets (pinnate-divided).

It is attractively produced in high quality paper with excellent colour photographs.

B.S.T.

Ness Gardens by J.K. Hulme
Published by Ness Garden, Ness, Neston, South Wirral L64 4AY
1987 Pages 32 Price £1.50.

This is a splendid account of the Bulley family and the development of Ness Gardens, or Bulley's Gardens as they were known until fairly recently. An excellent series of sepia photographs illustrates the history of the family and of the gardens. It describes how the gardens began as a massed flower display open to the public, its development into Bees Seeds Ltd. and then its final transformation into a place where new plants from all over the world, but especially from the Far East, came and were successfully grown.

This book is an example of a garden history which could with advantage be repeated for many of our famous gardens. Not all seem so assured of a future as do Ness Gardens.

P.K.

Discussion Weekend

September 1988

University of Stirling, Conference Centre, Stirling
Friday 2 to Sunday 4 September 1988

The choice of Stirling for this year's Discussion Weekend gives members a chance to see Britain's most beautiful University campus and to attend a unique evening reception at Stirling Castle. Centrally situated between Edinburgh and Glasgow and well served by the motorway network, Stirling is easily accessible from all parts of the country. Stirling lies at the edge of the Highlands and is a good centre from which to visit the Glasgow Garden Festival, Loch Lomond, Ben Lomond, the Trossachs and the Perthshire Glens. Members arriving early may like to visit Stirling Castle, the Wallace Monument, Bannockburn (NTS) or Castle Campbell (NTS). There are good walks in the extensive University Grounds and in the Ochil Hills just behind the University. Stirling town centre has excellent shops and reasonably good car parking. Late night shopping is Thursday. The MacRobert Arts Centre is on the campus. A list of local hotels and tourist attractions will be sent on request (S.A.E. please).

Stirling University is situated on the A9 between Stirling and Bridge of Allan. Accommodation is available in Andrew Stewart Hall until Monday morning, 5 September. There are a few double rooms available. Members needing accommodation on the ground floor should request this at the time of booking. All lectures and the Autumn Show will be held in the Pathfoot building. There is a regular bus service from Stirling rail station to the University.

As usual there will be a club plant stall and a plant auction. Donations of plants for these will be much appreciated. We are also hoping to have a large entry for the Holiday Photographic Competition (details in Show Schedules) and for the Autumn Plant Show. If these are both well supported it will increase everyone's enjoyment of the weekend.

Programme

Friday 2

8 pm **The Life and Legacy of Reginald Farrer**
Mr James T. Aitken, Edinburgh

Saturday 3

10 am **SRGC—Question Time: a Panel of Experts**
Please come prepared with questions.

11 am **Conducted walk in the University of Stirling's magnificent campus** (weather permitting)

2.30 pm *The William C. Buchanan Memorial Lecture*
The Cultivation of Ericaceae and Peat Garden Plants in The Emerald Isle
Mr Harold MacBride, Lisburn, Co. Antrim

4.15 pm **People and Plants**
Mr Michael Upward, Woking, Surrey

7.00 pm **Reception at Stirling Castle**

Sunday 4

9.45 am *The Harold Esslemont Lecture*
The Lilies in their Fields
Dr Jack G. Elliott, Ashford, Kent

11.30 am **Wild Flowers of the Falkland Islands**
Mr Patrick Roper, Staffordshire

2.30 pm **Photographing Alpine Plants**
Mr James Sutherland, Ardfearn Nursery, Inverness.

An informal programme will be arranged for members staying till Monday morning.

COST—If booked before 31 May 1988

Residents

A. Friday evening meal-Monday breakfast £75.50
B. Friday evening meal-Sunday afternoon tea £65.50
C. Saturday morning coffee-Sunday afternoon tea £49.50

The above prices all include the cost of the Reception at Stirling Castle.

Non-Residents

D. Saturday or Sunday morning coffee-lunch-afternoon tea, and all lectures on that day £16.50
E. Saturday Reception at Stirling Castle £12.00

Applications for bookings together with the appropriate remittance should be sent to the Registration Secretary, Mrs A. Leven, 2 Leighton Court, Dunblane, Perthshire FK15 0ED. Tel. Dunblane (0786 824064).

Members wanting further information should write to Anne at the above address.

Letters to the Editor

11 Cricketers Meadow, Cradley Heath, Warley West Midlands

Dear Sir,

I sent a note to the Seed Exchange asking if they didn't get seed donated of certain plants that I am looking for. Could they offer any help in finding them?

I had a reply advising me to write to you; I would be very grateful if you could help.

I grow a wide variety of different genera which to me is a lot more interesting than growing a lot of plants in the same family, genus or species.

The first book I read about growing alpines was the "Collins Guide to Alpines"; I decided to try and grow at least one species in every genus that is listed in that book.

Many miles and a lot of money later there are still 19 genera that I have not been able to obtain a single species of: They are:

Actinella	Cephalanthera	Moneses
Allardia	Chaenactis	Parrya
Anarthrophyllum	Chimaphila	Rupicapnos
Bellidiastrum	Gymnadenia	Serapias
Bessya	Ionopsidium	Triptilion
Calypso	Listera	
Castilleja	Monardella	

I also try and grow at least one species of every genus not listed in the book and would like to obtain *Arctous alpina, Elliota racemosa, Pentapera sicula, Pxydanthera barbulata.*

If you have any plants or propagating material that you would like to sell or swap or if you know where I could get any of these plants please get in touch.

Yours sincerely,
Keith Murdock

Falconers, High Wych Road, Sawbridgeworth, Herts. CM21 0AY.

Dear Sir,

I read with great interest the article in the June Journal about spring in Cyprus.

In the North's article they state that it is not easy to cross the border between the two divisions. I write to let you know that this is not now the case.

I spent a month there in late October and had an interesting time botanising in the South when I decided to try to cross the border into the North.

This was quite easy. By reporting to the checkpoint at Ledra in Nicosia you can obtain a 24 hour pass. All that was involved was to report to the Greek Cypriot side and ask to go through. At the Turkish side you fill in a simple form, obtain a visa at the cost of one Cypriot pound and off you go for the day.

The Greek Cypriots would not let me take the hire car through but you can hire a Turkish car at the border without any problem.

During the day we managed to get up to St. Hilarion's Castle plus a few other areas that were interesting.

The only place that this crossing is mentioned is in the small booklet "Landscapes of Cyprus—a countryside guide" by Geoff Daniel so I thought it would be worth bringing it to the attention of members.

Yours sincerely,
Miss C.M. Walkden

16 Hamesmoor Way, Mytchett, Camberley, Surrey GU16 6JG

Dear Sir,

In your very interesting article in *The Rock Garden* on the genus Ranunculus you mention that *Ranunculus cortusifolius* has disappeared from cultivation. I bought this plant at the joint plant stall run by the Woking and West Surrey Groups of the AGS at Lightwater in August. It looks as if it is the right thing at the moment but I do not know who supplied it.

Yours sincerely,
Gilbert Barrett

Yet another example of the power of saying that a plant is no longer in cultivation. Recently I was given a plant of Ranunculus sulphureus which I had also suggested was not in cultivation. Ed.

Kingsbroom, Kingswood, Sutton Valence, Kent

Dear Sir,

I was interested in your comment on page 283 of the June 1987 Journal about *Erythronium revolutum johnsonii.* I believe Potterton & Martin and other specialist firms occasionally stock it, but I have a quantity in the garden here.

Following an article in the RHS Journal around 1958 with a photograph of a hanging wood in Vancouver Island sheeted with erythroniums, just like a south of England hanging wood of bluebells, I asked a colleague at East Malling who was visiting BC and NW USA to bring me back some seed, which he did and one packet was labelled *E. rev. johnsonii.*

When the resulting plants flowered they were quite constant in colour and type although I have gradually acquired most other available species and hybrids and bred a few of my own.

In contrast to the uniformity of my *johnsonii,* a patch of what was once pure *E. oregonum* now contains a seedling population of all shades of pink and white. Both *johnsonii* and *oregonum* seed readily but do not produce off-sets and for these I no longer sow in pots but scatter the seed on the floor of my wood, parts of which contain many seedlings to the square foot of 1, 2, and 3-year seedlings and upwards. My attempts to cross these two types have failed but I have obtained seed of this cross from seed-lists and have some seedlings coming along. I would strongly recommend the genus to anyone with a "woodsy" soil which is not alkaline and then nothing is easier.

On another point my *Glaucidium palmatum album* had eight flowers this year. Seedlings from it have not flowered yet but I shall be interested in their colour.

Yours sincerely,
John Walker

NATURAL AND UNNATURAL ROCK GARDENING

In this article in the June 1987 issue by D.B. Lowe the diagrams on page 317 were unfortunately transposed and therefore do not follow the text.

SRGC Publications

Some of the back numbers listed below as available are very short in numbers. Thirty back numbers are still available from stock. THE WAITING LIST FOR JOURNALS 1-8 IS CLOSED.

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See under Subscriptions for the Club Giro Number.

Early numbers of the *Journal* are now urgently required for the ever-growing Waiting List. I would gratefully receive these as gifts to the Club, or buy (at half the above prices) up to No. 56. Postage for either arrangement will be refunded.

BINDERS

Stocks of binders to hold four numbers of the *Journal* are available at £2.50 each, post paid.

BOOKS

See the enclosed leaflet.

Journals, binders and books are available from Mr T. G. Sprunt, 17 Claremont Drive, Bridge of Allan, Stirlingshire FK9 4EE, Scotland, UK. Tel: 0786 833607 (evenings only)

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