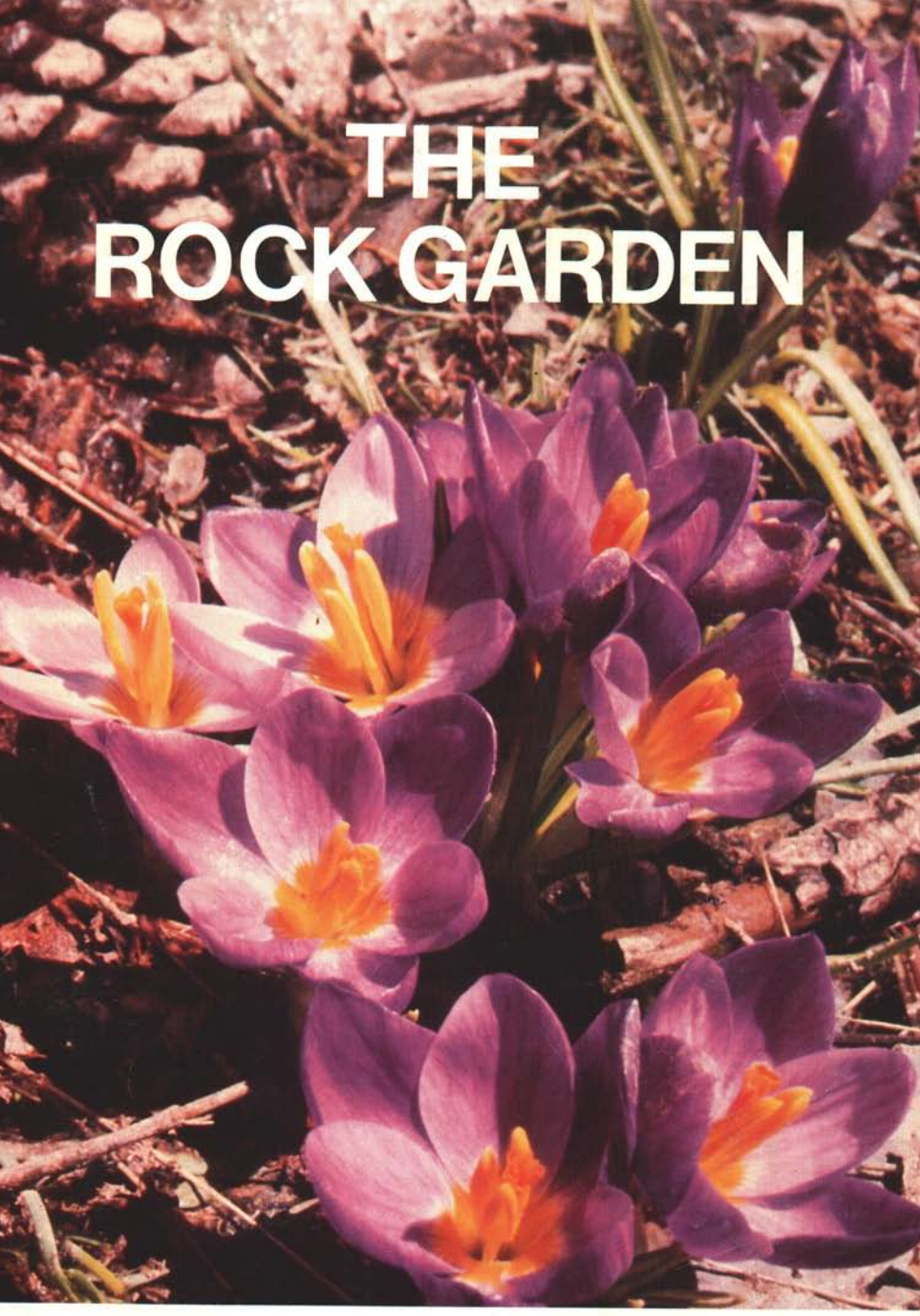

THE ROCK GARDEN

THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XIX Part 4 Number 77

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The Rock Garden

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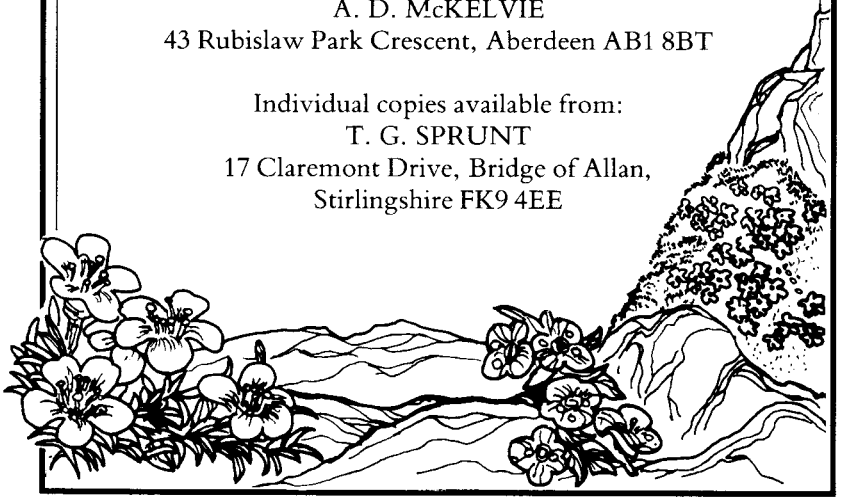


Front cover:
Crocus sieberi (See p. 383)
(Photograph by Dr M. J. B. Almond)

Contents

Editorial

THE TALKING POINT for all gardeners in 1985 has surely been the weather, in particular the incessant rain from May till September, with a respite in October then renewed gales and 10cm of snow here in Aberdeen early in November. Diabolical weather, you may say, but, in fact, things have never grown better, particularly plants from the Himalayan regions. Easy plants such as *Primula denticulata*, which normally look a bit bedraggled by midsummer, continued to grow like cabbages, while the rare petiolarids positively revelled in the conditions.

Waxing eloquently recently to a friend about all this lovely rain, I was brought up short when he reminded me that many parts of the UK, particularly East Anglia, were crying out for rain. The monsoon conditions I was enjoying were fairly local to Scotland.

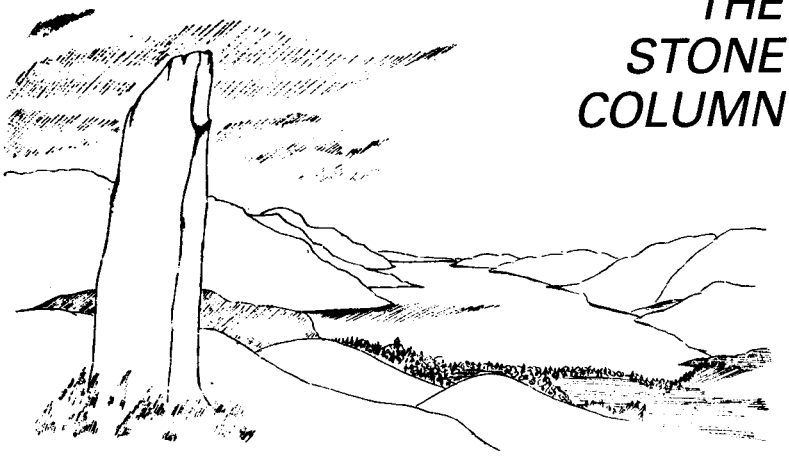
This set me thinking that we are an international club and that it is very easy to write all the time as if all our members were interested in all things Scottish. The SRGC Journal has indeed been accused from time to time by our good friends in the AGS of being too parochial.

This charge cannot be levelled against this issue. We have articles on exploring far-flung parts of the world, particularly the mountains of Pakistan, a relatively unexplored area, and the Kosciusko Mountains of Australia as well as areas nearer home. As usual, we are indebted to the Stones for their unremitting toil in preparing the Stone Column. In addition, we have Part I of two new series, one on meconopsis and one on ranunculus, which should give gardeners excellent advice on how to grow these particular plants.

Through this editorial page, I would like to thank the many people who write thanking me for the excellence of 'The Rock Garden'. We are constantly trying to improve it and hope we are slowly succeeding. Our biggest single headache is achieving consistent colour quality from a range of widely disparate starting material.

ALASTAIR McKELVIE

THE STONE COLUMN



1985: annus obliviscendus

If 1984 appeared a notable year at the time (Stone Column, SRGC journal, vol. XIX, no. 75, p. 110), it turned out to be merely a curtain-raiser for 1985, a year best forgotten as rapidly as possible. Having spent a major part of the spring of 1984 clearing up after storm damage, we lost as least as much time in early 1985 wondering whether we would still have this garden to clear up in at all! However, the crisis passed, we are still here, and hopefully can continue to garden at Askival for the foreseeable future. Naturally, little writing was possible during this period, so we must apologise for the brevity and lack of variety in the last Stone Column. Business as usual now, so keep the ideas coming, please.

During the early months of 1985, the weather conditions provided a suitable overture for the events to follow. The temperature plunged to −20°C (below 0°F), and a freezing N.E. wind blew for weeks on end over iron-hard ground bereft of snow cover. These severe conditions confirmed that, here, alpines and dwarf evergreens from most of Europe and N. America are more resistant to this dehydration than those from the Himalaya or the Antipodes. There were losses, of course, but we try to take them philosophically. There are so many beautiful plants which will survive our climate outside, we can afford to neglect those which won't. No over-wintering here of *Cyclamen graecum* in heat, so that it can masquerade as an alpine at a show.

As winter gave way to spring, so the 'Continental' weather of 1984's summer, and the following winter, gave way to an endless series of Atlantic depressions. It rained and rained and rained – after such temperatures, now record rainfall. Some computer models predict that one possible consequence of the rising carbon dioxide content in the atmosphere is

greater oscillations of weather about the mean. Could be they are right.

We are not, in general, lovers of statistics, perhaps because they are so often abused by politicians and others. However, the weather statistics are far more objective than the unemployment figures and can contribute a great deal of useful information about one's climate. For this data to be reliable, the rain gauge must be placed well away from obstructions such as buildings and trees, and the thermometer should be mounted in a raised, white-painted, louvred box, called a Stevenson screen. We are fortunate in having two such weather stations in Fort Augustus, one run by the Forestry Commission, and the other in the Monastery garden. The following table is from the latter, as we have easier access to the records.

MONTH	RAINFALL [mm]		
	1984	1985	30-year mean
April	54	88	63
May	14	62	65
June	32	53	56
July	22	121	72
August	34	141	84
September	153	143	90
6-month Total	**309**	**608**	**430**

MONTH	AVERAGE TEMPERATURE [°C]		
	1984	1985	30-year mean
April	7·7	6·8	6·9
May	9·4	8·8	9·6
June	12·9	11·2	12·4
July	15·9	13·4	13·9
August	15·7	13·0	13·8
September	10·6	11·4	11·5
6-mth. Average	**12·0**	**10·8**	**11·3**

We have deliberately chosen the average temperature, rather than the maximum or minimum ones. It is the average temperature which influences a plant's metabolism over a given period, and hence its growth rate. Arctic plants and high alpines are adapted to grow in a relatively low-

temperature environment, and so the farther north one's garden, the more liberties one can take in their cultivation. Many parts of England have lower winter minimum night temperatures than us, but their averages, summer and winter, are higher by a few degrees. This may not sound much; but a similar drop in the yearly average would put a permanent snow-cap on Ben Nevis and infant glaciers in some of the high corries of the Cairngorms. Research has shown that, during the mini-Ice Age of the 17th century, the latter did start to form out of the semi-permanent snow patches found on north-facing slopes.

Last summer, we were amazed at the resilience of many of our plants, especially the cushions exposed out on our troughs, which we are often told not to water overhead. Indeed, there were compensations; more cloud cover meant less spring frost, and we saw more undamaged rhododendron flowers than in any previous year. Because of the inevitability of late frosts, we have planted a dozen 'Hardy Hybrid' Rhododendrons in the new territory. Here, these old 'Ironclads' can act as a windbreak along the east side, and also provide some late flowers to look at, after those on their more aristocratic relatives have fallen victim to Jack Frost.

Our meconopsis were outstanding in flower, and grew very strongly as expected; but seed-set was disappointing. This could be due to lack of insects for pollination. Vegetative growth was also excellent on many shrubs, especially the Ericaceae, but it remains to be seen whether these new shoots will be ripened sufficiently to withstand next winter. We are encouraged by the near-normal production of autumn colour. Deciduous ericaceae, including azaleas, appeared not to notice the lack of sun, likewise sorbus; only *Prunus sargentii* failed to turn red, the first time it has disappointed us.

As the planted areas of the garden increase, so naturally does the maintenance load. We have now reached the point where I spend the majority of the summer on upkeep, while Poll splits her time between maintenance and propagation. New construction has to be carried out in clement weather during the dormant months of late autumn to early spring. This year we were fortunate in a mild, dry October, the first such we can remember. I was able to terrace, with low stone walls, a west slope at the rear of the original garden. Planting up this area will be a great visual improvement since it faces the front gate. First impressions . . . Poll dug some areas around the edge of the new territory, our first priority here being fence hiding. As usual on our glacial moraine, she dug out two to three barrowloads of stones from each square metre, going down only one fork's depth. We do not even possess a normal digging spade, only the heart-shaped builder's type for loading barrows, filling sacks and other

such jobs.

When laying out the boundary borders around the new territory, the area which we ourselves refer to as the 'upper garden', we left a gap of 0·6m between the fence itself and the edge of the prepared ground. This path will provide access for weeding, checking the integrity of the fence, and can be kept sprayed with paraquat. Thus we should be able to counter, fairly easily, invasions of running grasses and other weeds from the sheep-walk outside the fence.

The other day, as we worked together on removing a large boulder from Poll's digging area, we speculated as to what choice arctic-alpines could have grown in this glacial debris at the end of the Ice Age. Perhaps *Diapensia lapponica* (see p. 415) has been in our garden before, colonising the moraine hummocks left behind by the retreat of the Great Glen Glacier. After all, it still survives on a hill-top less than 35 miles from Askival.

At the end of our account of 1984 (op. cit.), we posed the question – Will our troughs be planted on time in 1985? As it turned out, they were not planted until July, but in the endless downpour of last summer it did not make any difference, no shading or artificial watering was necessary.

Recent acquisitions

It is a fact of life that people tend to type-cast one another; it makes for convenient labelling. We have shown autumn gentians at the Discussion Weekend, and were referred to for a while as gentian growers. Then, having written and lectured on Ericaceae, we became instant 'Ericaceous specialists'. It was to avoid this latter label that we have, in the past, tried to ration the number of ericaceae included in our plant information part of the Column. All we really achieved by this was a stockpile of items in our file awaiting inclusion; and so we have decided to make up now for lost time. However, if you like cushions, or monocots, don't give up reading now, as there is one of each for 'balance'.

Androsace pubescens 'pink hybrid'

Until we discovered that they were actually quite easy to grow here, and made good trough plants, we had avoided most of those tighter, choicer European androsaces often referred to as the 'Aretians'. During the late summer of 1982, we visited the Yorkshire garden of Geoff Rollinson, an expert grower of such cushion plants. He had *Androsace pubescens* growing well outside, and kindly offered us some seed straight off the plant to try. To avoid an autumn germination, we kept the seed until November, sowing it along with the bulk of our own home-saved seeds. Although they germinated quite well the next April, pressure of space in the nursery

frames meant a wait until spring 1984 before they were pricked out singly into a limestone scree mixture. In fact, it has become our standard practice with all slow-growing plants, not just Ericaceae, to thin if necessary, and give dilute liquid feeds for the first growing season rather than disturb. Perhaps this is a rationalisation.

When the plants flowered in May 1985, one of them surprised us by producing pink flowers in place of the expected white. They were similar in size and shape to those of the other plants, and a good medium pink, not a 'washed out' colour. Its rosettes are very similar to those of the normal plants; the only difference we can detect with a lens is that the hairs are rather shorter. If this plant is indeed a hybrid, then we can only suggest *A. alpina* as the other parent.

Cassiope tetragona var tetragona

Cassiope tetragona is one of those taxa whose name is far more common in gardens than the real plant. We remember an English ericaceous enthusiast telling us he once gathered together plants from over half a dozen different sources, and all of them were impostors. We ourselves have two of these pseudo-tetragonas, both very similar to the well known hybrid *C.* 'Edinburgh'. They differ only in small details and probably belong to the same grex: *C. fastigiata* x *tetragona*. These plants are a very good illustration of the dangers inherent in attempting to identify a garden plant using a Flora for a particular geographical region. Floras only key, and describe, the wild plants found within a limited area, defined by their terms of reference. Monographs, however, are often more reliable guides, since they are generally world-wide in scope, including all known members of a genus or family. In American Floras, *C. tetragona* is distinguished from *C. mertensiana* by only the former having a prominent groove down the back of the leaves. Of course, they do not tell us that Himalayan species, including *CC. fastigiata, selaginoides* and *wardii*, all have furrowed leaves, as do many of their hybrids.

If one sees a plant of a true *Cassiope tetragona* in a garden, then it is usually a representative of the Rocky Mountain race, *C. tetragona* ssp. *saximontana*. This cassiope can be distinguished at a glance by its bright-green adpressed leaves. The only others of this colour in cultivation are *CC. hypnoides* and *stellerana*, but these two species have spreading leaves and solitary terminal flowers. We sympathise with those taxonomists who have transferred them to a separate genus, *Harimanella*. *Cassiope tetragona* carries its flowers, in the normal manner of most cassiopes, on pedicels springing from the leaf axils of the previous years' growth. In subspecies *saximontana*, the white bells are relatively small, 4–5mm, and are held close to the stems.

The arctic race *Cassiope tetragona* ssp. *tetragona* is also very distinctive. Its growths are shorter and more rigid. The leaves are dark, glossy, rich green, and set in four very obvious rows, giving the stems a strongly quadrangular appearance. This combination of habit, colour and stem formation means that, once seen, it is unlikely to be confused with any other. The flowers of the arctic subspecies are larger, 6-7mm bells, and on longer pedicels which normally carry them well above the tips of the shoots.

We obtained seed of *Cassiope tetragona tetragona* in June 1981. It had been collected near Muncho Lake in northern British Columbia, along the Alaska highway. Interestingly, this is at the same latitude as Fort Augustus; but, being well inland, and rather higher, is very, very much colder in winter. The seed was sown straight away onto the surface of 50:50 sieved, dried sphagnum moss and coarse sand. It germinated within a week or two, the minute cotyledons being difficult to see unaided. Growth was agonisingly slow, some not producing true leaves until the following year. So slow were they that they spent two whole growing seasons in their seedpan. Very dilute liquid feeds are given to our ericaceous seedlings, every fortnight or so, in summer, washing the solution off the foliage with clean water immediately. Poll eventually pricked these cassiope seedlings out, into rows, in a deep seed-tray containing peat-based compost, during May 1983. After one more year they were large enough to pot up individually in spring 1984. Most of them survived the hot summer of that year, although they grew very slowly. Happier with this year's cold and wet, some have finally set the odd flower bud for next year. If all goes well, it will be five years from seed-sowing to first flowering, and several more years before they are large enough to plant out. No wonder *C. tetragona tetragona* is scarce in cultivation; a collector's item indeed!

Kalmioddities by the score

We have, in various places in the garden, plants of *Phyllodoce breweri* raised from wild Californian seed. One further plant was retained in a pot, in a cold frame for larger plants, as an insurance. The pot plant flowered very well in 1980 and set a fair quantity of seed. This did not germinate, a rare occurrence with fresh, home-saved ericaceous seed. It flowered again the following year, and the resulting seed was sown in January 1982. This time it germinated sparingly the next April, and about twenty plants were pricked out in spring 1983. Poll was already slightly suspicious of their identity at the time. After their year lined in a seedtray, it became obvious they were not pure *Phyllodoce breweri*. Although the leaves varied somewhat from seedling to seedling, they were all much broader than any phyllodoce, and only slightly recurved at the edge. After reading a description

of x *Phylliopsis hillieri*, an accidental hybrid between *Phyllodoce breweri* and *Kalmiopsis leachiana*, the undersurfaces of the leaves were examined with a lens. As expected, this disclosed a scattering of tiny golden glands, a feature of Kalmiopsis foliage. It is certainly possible that our plants are of this parentage. Several plants of various forms of kalmiopsis are kept in the same frame as the seed parent and flower at the same time.

We retained most of the hybrid plants for comparison and selection; a few of them flowered in 1984 and others in 1985. The flowers are intermediate in shape, i.e. slightly more cup-shaped than kalmiopsis, with projecting styles. Colour intensity varied slightly, generally a mauve pink.

The original Hillier clone has been named 'Pinocchio'. Following the puppet theme, we have named ours 'Punch, Judy, Baby, Crocodile, Muffin, Sooty, Sweep, Kermit, Miss Piggy, Basil, Roland, etc., etc.'; just don't ask which is which! The exception is 'Baby', a compact plant with fine dark foliage. We do not find 'Pinocchio' a very satisfactory garden plant here; it is very straggly, flowers spasmodically, and has suffered from die-back on several occasions. Natural selection in the seedpan may have given us another clone more suited to a northern garden.

Seed from *Phyllodoce breweri* was sown again in December 1983, and has yielded another batch of similar hybrids. Poll is cross! She would like more stock of the original species. In any case, we shall soon run out of space, and names.

The Lilium nanum complex

There is a complex of small lilies, found wild in the Himalayas, bearing nodding, campanulate flowers, with non-recurving segments. Taxonomists have had a field day with this group, including them at various times in *Fritillaria, Nomocharis* and *Lilium*. At present they are described as two species of lilium: *LL. nanum* and *oxypetalum*. Plants under these names were early residents in our garden, 'way back in 1973. In those days the two were easy to distinguish. *Lilium nanum* was the narrow-leaved, purplish-pink flowered one, while *L. oxypetalum* had larger lemon-yellow flowers and relatively shorter, broader leaves. However, things did not remain so simple for very long!

In November 1973, we obtained some seed from Jack Drake, labelled *Lilium nanum* 'Pink Hybrid'. When the resulting seedlings flowered in 1976, they did indeed look intermediate between the species described above. They combined the larger flower size and winged, or ribbed, capsule of *L. oxypetalum*, with the dusky pink colouring and narrow leaves of *L. nanum*. A year or two later, leafing through Curtis' Botanical Magazine, in the Monastery library, I came across tab. 274, describing *Lilium oxypetalum* var *insigne*. The plate closely matched our plants, and

their labels were duly changed. Although named as a variety, we are not entirely convinced that Jack Drake wasn't right all along. They could represent a stabilised hybrid, which now breeds fairly uniformly from seed.

The picture was further complicated in 1980 when some lilies raised from AGS seed produced their first flowers. They had been requested from the 1977 exchange as *L. chalcedonicum*, a scarlet-flowered Greek species. The plants we actually had could hardly be more different; they looked rather like a pale greeny-yellow form of *L. oxypetalum* var *insigne*. By coincidence, Curtis' provided an identification with tab 218: *Lilium nanum* var *flavidum*. We discovered later that these plants lack the winged capsule of *L. oxypetalum*, which is presumably why they are included under *L. nanum*.

Meantime, we had acquired yet another member of the complex, from the Len Beer collection in E. Nepal. We described this dwarf lilac-flowered form of *L. nanum* in Journal No. 68, p. 197, under his number B.510. Our hopes expressed therein were fulfilled; it does breed true. As a collector's numbers should really only be applied to the original wild seedlings, we now call this form 'Len's Lilac'. As befits such a choice delicate plant, it is, however, rather more difficult than the others, and slower to flower. It sets seed less readily, and the smaller capsule is a uniform apple-green. Our old original *L. nanum* has very distinct black lines down the outside of its capsule.

Coming right up to date, another collection from E. Nepal, Ron McBeath's 1220, flowered in 1985. It had been labelled *'Fritillaria* sp.?', but is a lilac-pink *Lilium nanum* falling in between our 'original' and 'Len's Lilac'. The capsule has diffuse dark lines on the outside. A more vigorous grower, several had triple heads on their first flowering. What do we call this one? 'McB.'s Intermediate' has been suggested.

We received six packets of *Lilium nanum* seed from the AGS 1983 Sikkim Expedition. Three were of the type, and three were labelled 'var *flavidum*.' All have germinated, and, if they survive, it will be interesting to see where they fit into the complex.

To round off this survey, there exists in Western China another species, *L. lophophora*, which apparently is distinguished by the flower segments having long, drawn-out (acuminate) tips. The flower colour is, of course, variable; normally a uniform yellow, but it can be spotted with purple, or even wholly purplish. So this makes no less than three species each having yellow and purple-pink forms. Nature's plants do not always fit neatly into the compartments, or taxa, constructed for them. Gardeners will regard flower colour as a very important factor, but the taxonomists may take a different view.

As to cultivation, we treat these lilies as we do nomocharis, sowing the

seed in November onto humus-rich compost in large seven-inch pots. With thinning and feeding, they can be left in these until large enough to plant out. This we find best done just before growth starts in spring, i.e. before there are any infant green shoots to damage. They enjoy a similar situation to ericaceae such as cassiope, a fair amount of sun in Scotland and a humus-rich soil which never dries out. We find *L. oxypetalum* var *insigne* the most accommodating; it even thrives in poor, sandy, gravelly soil between *Rosa farreri* and *R. fedschenkoana*.

Pernettya lanceolata – a natural hybrid?

Pernettya lanceolata was just a name to us for many years, a Tasmanian species apparently not in cultivation. Then at the Alpines '81 Conference in Nottingham, we met Lesley and Ken Gillanders, who run a nursery on the island. In subsequent correspondence, we have exchanged seeds, and had the opportunity to try some of their little-known native alpines. Like Scotland, Tasmania experiences a year-round rainfall, especially heavy in the west. It is rather closer to the equator, on about the same latitude as Galicia, the N.W. corner of Spain, so perhaps this latter maritime climate zone is a better N. hemisphere analogy. This means that some of the lower altitude Tasmanian plants are possibly too tender for inland Scottish gardens.

We sowed seed of *P. lanceolata* in May 1981 and it germinated freely in July, the same time as the *Cassiope tetragona*. Growth was much more rapid than the latter, and when Poll pricked them out in spring '83 they were already about 10-20mm high. A year later they were transferred from tray to individual three-inch pots; by now considerable variation in leaf and habit was becoming obvious. We had seen such variation before in a batch of F_2 seedlings from a New Zealand hybrid. These latter combined the rounded green leaves of *Gaultheria depressa* with the very narrow blackish leaves of *Pernettya macrostigma*, to produce every sort of intermediate. We described the original F_1 hybrid, from which these are descended, back in Journal 62, pages 40-43. Unfortunately the drawing was miscaptioned, 'B' and 'D' were transposed. 'B' represents real *P. macrostigma*, and 'C' is our intermediate F_1. All these hybrids have very similar red fruits, wherein the inflated gaultheria calyx almost surrounds the true pernettya berry.

It has been suggested that *P. lanceolata* might represent a similar fertile hybrid between *Gaultheria hispida* and *Pernettya tasmanica*. Burtt and Hill in their paper on Antipodean gaultherias and pernettyas (Linnean Society Journal, 1935), discount this suggestion on the grounds that *P. lanceolata* is too uniform. However, our seedlings, which we feel sure are true to name, vary quite considerably in vegetative characters. *Gaultheria hispida* has upright stems, clad in prominent reddish bristles, and bearing dark-

green leaves, which, when mature, are 40-60mm long by 10-15mm wide. *Pernettya tasmanica* is a well-known low stoloniferous plant, with tiny bright-green leaves 5-8mm long by 1-2mm wide. Our batch of *P. lanceolata* varied almost from one to the other, i.e. from dark leaves 30 × 5mm on rigid stems, with scattered red bristles, to smaller, laxer, smooth-stemmed plants with bright-green leaves only 10 × 3mm.

P. tasmanica has solitary white bells, while those of *G. hispida* are borne in racemes. Once again our plants showed a combination of characters, some solitary flowered, others in clusters. Burtt and Hill themselves say 'sub-racemose' (op. cit.). In *P. tasmanica*, the slightly fleshy calyx remains below the berry. In those of our *P. lanceolata* which have fruited, the fleshy calyx has expanded to partly enclose the berry, just as in the New Zealand hybrid. They differed, however, in being predominantly white, sometimes slightly flushed pink.

When we put our suggestions and experience to Lesley and Ken, they replied that they feel that the very limited distribution of *P. lanceolata* in the wild lends weight to a theory of hybrid origin. It generally occurs as isolated specimens, and only where the putative parents are also growing. Burtt and Hill even mention (op. cit. page 622) a dwarf form of *Gaultheria hispida* which sounds rather like a back-cross.

Shortia soldanelloides ilicifolia alba

It is a joy of seed-raising that one never quite knows what is going to turn up. We started these notes with a pink-flowered seedling from a normally white plant; now we finish with a white child of a pink-flowered parent.

It has become our routine to sow seed of at least some of our shortias each autumn. Although these beautiful woodlanders can be divided, they so resent disturbance that seedlings often overtake vegetative propagands. So it was that we sowed seed taken from one of our own plants of *Shortia soldanelloides ilicifolia* in November 1980. This seed germinated in June 1981, and, after the usual year's growth, the plantlets were 'trayed up' the following year. When transferring these youngsters from their tray to individual pots in the spring of 1983, Poll noticed that the young growth on two of them was an apple-green colour instead of the usual dark reddish bronze. These two seedlings were carefully labelled for future reference.

It is quite normal for plants of shortia to flower for the first time, towards the end of the growing season, in August or September. Later, as they mature, they settle into routine spring flowering. There was great excitement in August 1984 when one of the pair of green-leaved seedlings produced a pure white fringed bell. The following spring, they both had several flower-stems and, growing well, were potted on into three-and-a-

half-inch pots. We were too preoccupied this year, but, if they flower again in 1986, we intend to isolate them from their pink relatives, and cross-pollinate by hand.

Apart from its green colour, the foliage of these two plants is typical of *Shortia soldanelloides ilicifolia*. In this variety the leaves are smaller than in the 'type', convex on the upper surface and bear fewer, coarser, blunt teeth. Incidentally, a few years ago we were sent a plant of *S.s. ilicifolia alba* by an American gardener. This plant had the normal red-coloured foliage, and when it eventually flowered it turned out to be a very pale pink – unfortunately not a true albino, but a nice plant. All shortias are beautiful, certainly in the 'top ten' of choice plants.

Pearlworts and paraquat

If asked to name the most troublesome weed at Askival, there is no doubt that we should indict the common pearlwort, *Sagina procumbens*. Other possible contenders such as hairy bitter cress or 'poppers' (*Cardamine hirsuta*) and various willowherbs (*Epilobium* spp.) pale into insignificance when the numbers of man-hours devoted to their control are compared.

When travelling around, visiting gardens farther south, we very rarely see pearlworts to compare with the fine specimens at home. Clearly it has found a highly suitable ecological niche in our garden. It was here in limited quantities before we started the garden, but responds extremely well to cultivation. Fertiliser and extra artificial watering produce luxuriant emerald-green mats up to 75mm thick, and spreading widely, rooting as they go. There is a seedbank of pearlwort in almost all our soil, awaiting any suitable opportunity for germination. The necessary conditions are a bare moist soil surface and light. The fine pearlwort seeds do not germinate if buried. Any gardening activity, such as planting out, brings fresh seed to the surface; and our soil is rarely dry enough on top to inhibit pearlwort germination.

Mechanical removal, i.e. ordinary weeding out, is counter productive against pearlwort; the resulting disturbance exposes fresh seed and the next generation is soon growing on happily. Worse, their dense, fibrous root systems mean that, unless the soil is very dry, large quantities are removed along with the plants. Not only is every scrap of soil precious to us, but this action frequently exposes the roots of the more desirable residents of our beds.

Prevention is generally said to be better than cure. In a permanent planting, such as a bed of dwarf ericaceae, an obvious preventative measure is to top dress with, say, peat and keep the pearlwort seed well buried out of the light. Following any replanting, the integrity of this weed-free layer should be carefully restored.

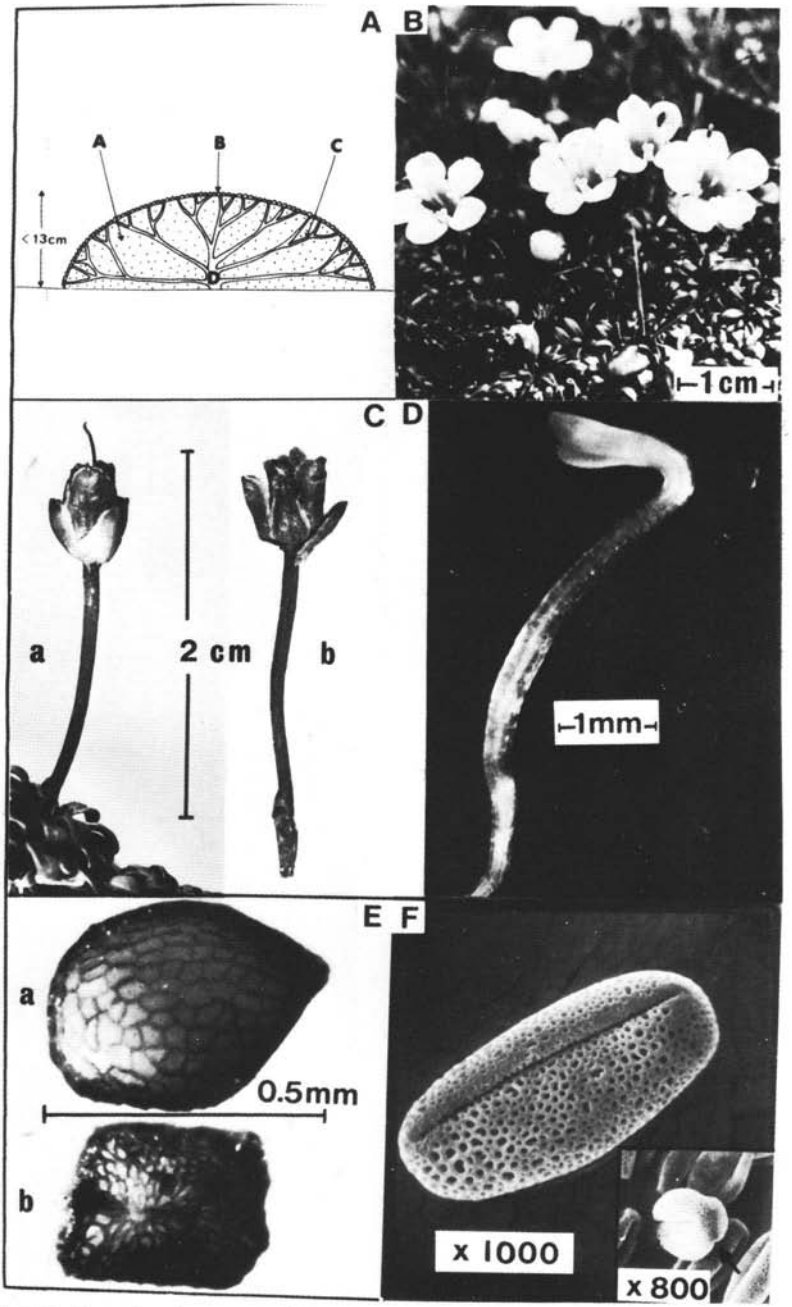


Fig 137 Growth and structure of *Diapensia lapponica* (See p.415) Photo: P. J. Scott

Fig 138 *Diapensia lapponica* (See p.415) Photo: P. J. Scott

Fig 139 *Rhododendron ferrugineum* (See p. 412) Photo: Lynn Almond

Fig 140 *Rhododendron caucasicum* (See p.399) Photo: Lynn Almond

Fig 141 *Rhododendron caucasicum* (close-up) (See p.399) Photo: Lynn Almond

Fig 142 *Campanula barbata alba* (See p.414) Photo: J. Cobb

Should a cure be necessary, the best medicine we have found is a paraquat-based weedkiller. Paraquat has, on occasion, received a bad press because of its high toxicity to humans; but we use it as our main weedkiller for several very good reasons. Paraquat is entirely a contact weedkiller; it acts only through the green leaves and stems of a plant. Thus it can be safely sprayed right up to, and even on, the woody trunks of trees and shrubs, or over dormant bulbs without damage. Secondly, it is not taken up by roots of plants, and its complex molecule is rapidly broken down in the soil, leaving no residue whatsoever. Compare this with a simple contaminant such as lead, which being a chemical element remains as lead virtually for ever. No other weedkiller we have come across has the desirable combination of qualities of paraquat. Most other herbicides do act through roots and cannot be used right next to choice plants. Glyphosate is supposed to have similar properties to paraquat. We have found ourselves, and also discovered in conversation with other gardeners, that it is not very effective on such diverse weeds as dandelion and bramble, even when given the recommended twenty-four hours of dry weather. People have reported damage to shrubs from glyphosate use on their root area only, and the death or distortion of dormant bulbs under treated weeds.

Returning to the pearlwort problem, our usual technique is to half-fill a child's beach-bucket with the paraquat solution and paint it onto the pearlwort mats. For the large mats, and wide spaces between plants, we use a 10cm emulsion brush. For finer, more detailed application, an old 2cm brush, which was once used by the children for flour and water paste, has been resurrected. Our loft is full of junk 'which might be useful one day in the garden'. Although we have not tried it, it is said that wallpaper paste can be added to the solution of paraquat to help prevent splashing. Sometimes, when the tentacles of the sagina are entangled in a garden plant, it is necessary to separate them first. We use anything to hand, such as a label, twig or small stone, to keep weed and host apart before painting on the weedkiller.

Having an entirely green growth, and lacking any appreciable storage roots, sagina is very susceptible to paraquat. It is very satisfying to watch its mats turn through pale green to straw coloured, leaving choice neighbours entirely untouched. At one time we were afraid that rain soon after application would splash droplets onto nearby plants, but we have never seen any noticeable damage from this cause. If the pearlwort is killed before it has set seed, then, after a couple of years, no more germinate in the undisturbed ground. True, moss soon starts to cover the bare areas. This happens in our garden on all exposed soil, not covered by a deep top-dressing of stone chippings, regardless of whether paraquat has been used or not.

Plants featured on TV

Deciding which plants to include in our feature 'recent acquisitions' always leads to considerable discussion. Recently we asked ourselves why we tend to emphasise lesser known plants. Is it because we are falling into the trap of becoming plant snobs? We hope not and like to think that it is our wish to bring them to the attention of a wider audience. Having only space to include about five species out of the hundred or so we raise each year, we feel it makes sense not to simply repeat readily available information.

An item has come to our notice which suggests that the producers of a certain TV gardening programme take a rather different view. One doesn't watch this programme for long before one realises that there is a certain narrowness in the subjects covered. For example, they nearly always feature plants readily available in the trade. Now we may know a possible reason why. We understand it is the policy of one long-running gardening programme to avoid showing rare plants lest they get letters requesting where the plant can be obtained. Not having an answer, they avoid the possibility of the question.

We feel that TV is missing out on a prime educational function here. They could feature some less common plant; and then, if any letters follow, point the enquirer in the direction of specialist society or group. If they are worried about postal costs, there is always the SAE. The general public look at plants, but do they really see them? Any camera can direct the eye, and the accompanying commentary can try to explain why some of us see more beauty in a single gentian than in an entire bed of dahlias.

When covering techniques, they also follow well-worn paths most of the time. Each year there is a great sense of dèja vu about most of the programmes. True, there are always new people joining the audience, but this element is only a small proportion. A trade survey has shown that only one in twenty of British gardeners is a beginner.

TV programmes are not alone in these conservative attitudes. Some newspaper correspondents are even worse. Reading their contributions, one sometimes feels they have 52 standard articles, which they recycle annually. As our Editor's deadline approaches rapidly, would that the Stone Column were as easy!

To be fair, there has been quite an improvement on TV lately; they visit a wider range of private gardens and, which is at least important, the presenters allow the host gardeners to speak more for themselves. We can hope this trend continues. If gardening is not a vehicle for individual expression, then it loses most of its value. There should be no conforming to an imposed 'mass taste'; in programme policy terms, gardening should be far removed from Radio 1 with its endless repetition, and total suspension of critical faculties.

Cultivation of the Genus Meconopsis Part I

JAMES COBB

I HAVE OFTEN asked myself whether, what I hope is an objective and disciplined approach to the cultivation of various plants has actually increased my success at growing them. The trouble is there are too many variables, and not enough of them are understood, let alone under one's control. I must confess at this point that I have only about eight years' serious involvement with the genus *Meconopsis* and am not as successful as I should like to be. I hope, nevertheless, that what follows will at least point enthusiasts in the right direction.

It is over fifty years ago that Sir George Taylor published what I feel is still one of the most remarkable monographs of a plant genus. There has been a surprisingly substantial and comprehensive literature subsequently on the genus, not the least Ratter's cytological analysis[1] and Thompson's[2] research into germination responses. Harley[3] wrote with real detail on cultivation, and Cicely Crewdson contributed regularly to SRGC bulletins on the cultural ups and downs with her Meconopsis. There has been a recent account of growing them from seed[4], and my own article[5] on hybrids in the genus.

It is necessary to describe the climate in the region I grow them to enable adjustments to be made to take account of local conditions. The East Neuk of the Kingdom of Fife in south-east Scotland is one of the sunniest places in the United Kingdom, with an average of 55-62cm of rain which falls throughout the year. The garden is less than 750m from the sea, far enough away to avoid major salt-spray effect but near enough to benefit by at least 5°C from the severest frost. The severest frost we experience is -10°C, but there is almost never any snow cover and no shelter from the great gales that sweep through the Forth-Clyde Valley from the Atlantic. This part of Scotland has a day-length variation of 17 hours in midsummer to about 8 hours in midwinter and may well affect onset of dormancy which could be a critical and little understood factor.

Propagation – seed

Meconopsis seed is generally shaken out of the capsules by wind once it is ripe, but in species like *M. villosa* the capsule splits. In both cases it needs harvesting as soon as it is ripe. On a large multi-flowered plant, it may require ten separate collections to save all the seed. Do not be tempted to

harvest the seed before the capsules have fully opened; it is not mature until this state is reached. This genus is not straight-forwardly self-fertile. I have evidence that cross-pollination is essential for some plants while others can self-fertilise. The mechanics of self-incompatibility is a complex and multi-faceted problem beyond my competence. We can consider two factors, however, which are significant. Firstly, will the stigma remain receptive until the pollen is mature and shed? I know for certain this is a problem with some single-flowered plants of *M. sherriffii*, but it is not invariable even within one species. Secondly, the pollen tube has to grow from the stigma to the ovary for pollination to be effective, and adverse weather conditions can suppress this. In *extremis*, with a single rare monocarpic plant with an apparently receptive stigma and viable looking pollen, it might save a species in cultivation if a plant were dug up and placed in warm glasshouse conditions.

Once seed is harvested, there are two choices – sow it or store it. Kew have done valuable work on germination after storing, and enthusiasts must read the article by Thompson.[2] He suggests storing the seed dry at constant temperature, and for some species this is adequate. There are, however, some reasons to reflect on this. It is quite unnatural, and very often dried seed from the wild fails to germinate. I think Forrest sent home masses of *M. betonicifolia* seed for example, but it was not introduced until later. Seed of *M. quintuplinervia* when sown in autumn will germinate, but it is very difficult in spring. The AGS Sikkim expedition took little light-proof but aerated tubes of dried sphagnum moss treated with Captan and placed undried seed of *M. discigera* in it for me. This germinated in three days in warmth when I received it in November and the rest in spring. The dried seed, however, also germinated well, so these experiments only show that the technique is not lethal to seeds. I am anxious to try it again, and ideally a small Thermos flask might protect the seed from heat and humidity on the way out. I'm sure this is worth a try with many other difficult high alpines. Truly the only reason I can see for drying seed is to stop fungal infection and reduce respiration, but surely with the resources now available we can do better for the rare and difficult species. If these thoughts offend professional botanists, I must in my defence say I have tried hard to find in the literature clues as to why plants that depend on seed to regularly renew the species after flowering produce seed which appears dead or unbreakably dormant when collected. Surely at least it is possible to measure respiration and see if it is dead. With political instability in the meconopsis areas, seed of species new or not in cultivation may only be available on rare chances, and it is no use trying methods that have been unsatisfactory in the past.

This is still only half the battle, because the seed has to be kept dormant

and healthy until the spring. I am currently running a series of experiments with seed planted in sterilised soil at ambient, 4°C and -4°C over winter. I am using *M. sherriffii* and *M. quintuplinervia* as the rare or difficult, and *M. horridula* and *M. nepaulensis* as controls. I will no doubt report the outcome in the second half of this article.

The alternative is to sow after harvest. Some species do not germinate well if sown immediately, and Thompson[2] showed *M. horridula* to be one such. However, beware of generalising with such a highly variable species; it might not apply to the beautiful high altitude forms. There are some clues in nature, since *M. integrifolia* will germinate in the seed pods, and this wet year (1985) there are already *M. nepaulensis* seedlings 2cm across in October. Once seed starts to germinate, it is too late to attempt to dry it off. I can find no clues to what happens in the native habitat, but I find it difficult to believe that much can germinate and grow to a viable size between seed shed and the onset of winter cold, which may well come before the protection of snow. Most self-sown germination that is successful in the garden is a spring phenomenon. Harley claimed autumn germinated seedlings were no bigger by early summer than spring-sown seedlings. If it is necessary to over-winter seedlings, I would suggest capillary watering with a gritty compost, good air movements but not cold or dehydrating draughts, good light, no heating on sunny winter days and non-claustrophobic protection against frost. I find onion sacks filled lightly with white polystyrene chips an excellent substitute for snow, and it is even light enough to lay on top of such things as species *Cyclamen* blooms. Love and attention would bring seedlings through an average UK winter, but I feel should only be contemplated as a last resort. I hope soon we shall make progress on viable storage of the seed of the difficult species.

Seed compost for meconopsis is a tricky mix. It must be light and airy, fine enough to sow the seed near the top, free-draining as well as moisture-retentive, and should preferably have a little feed in it. I use a 7cm plastic pot with a layer of pea grit in the bottom, then 2cm of leaf mould, John Innes No. 1, and grit in equal proportions, and then a mixture of ¼ fine grit (not sand), ¼ Perlite, and ½ soil-less seed-sowing compost which has been sieved. The sieving is necessary since the commercial companies that market it in the UK need to learn a thing or two about quality control. The seed is sown thinly over the top and then dusted with a finely-sieved mixture of soil-less compost and grit – ideally all the particles should be pin-head size. Try not to compress the soil when watering, but generally the Perlite takes care of the soil lightness. Harley sowed his seed in a heated house at 16°C, and therein lies a clue. Meconopsis are very fussy over temperatures. You must either use a little heat or wait to sow your seed

until there is reasonable prospect of spring warmth. The ideal would be 7°C minimum at night and 18°C maximum by day. The fatal mistake is to let the temperature rise above 18°-20°C maximum. A temperature above 22°C even for a few hours can irreversibly affect the growth of young seedlings and equally irreversibly stop germination. Thompson has produced sound experimental evidence for this and my own temperature recordings have sadly confirmed at least one reason for my failures. All their lives most meconopsis need high atmospheric humidity, and it is necessary for seedlings. A mist nozzle in the seed frame is excellent, but the alternative is frequent sprayings in dry weather. Cold, drying spring winds can kill a pan of seedlings in as little as 30 minutes from desiccation. Good light is also necessary, and some meconopsis will not germinate in the dark, but bright sunlight will scorch unless the plants are in almost continuous mist. The compromise is removable shading. My frame has a mist nozzle built in and a 40-watt soil-warming cable and thermostat. It is surrounded by layers of netting to reduce wind speed, and the gravel the pots sit in is kept constantly moist. There is a glass frame over the top with a removable shade. I am not a great believer in automatic ventilation since the technology is crude and expensive, but my biggest problem is a mid-March hot, sunny day. I suppose basically I like the free heat of the sun to heat the frame to 18°C, but it would be safer to rely on the sun less and the soil-warming cable more. I have to say it once more, do not let meconopsis seed frames ever go above 18°C. Hot autumn days may well be another reason to avoid autumn sowing. *Meconopsis horridula* (ordinary garden form), *M. aculeata* and *M. latifolia* will stand temperatures of up to 22°C, but I have no evidence that better or larger plants are produced at higher temperatures. It is quite possible that high-altitude forms may require even lower temperatures to produce viable plants from a germination, so with new seed start low and work upwards. Seed can germinate a full year after sowing, but probably only if conditions were wrong the first year, and this is very risky. Poorly grown seedlings never recover.

Pricking off is regrettably another task fraught with problems. There is no excuse for pans with too many seedlings, as this can easily cause wholesale damping off, and I am not sure colloidal copper fungicides are safe. If a pot starts damping off, clear the infected material away and put the pot somewhere airy; only use chemicals as a last resort. If you have too much seed, sow several pans, give it away or store it, but don't put it all in a small pan. The seedlings compete and you have masses too many, and most of them of poor quality. It has been suggested to me that a good potful grows better; this I feel is because many plants respiring will raise the humidity and create a better local micro-climate. However, controlled growing conditions will create this without the risks inherent in crowding.

The next consideration is the root structure. Plants like *Meconopsis horridula* and *Meconopsis aculeata* rapidly develop a swollen root, as does *Meconopsis bella* even before the first true leaves emerge. The swelling is admittedly fairly insignificant, but it makes them much easier and safer to transplant. On the other extreme, *Meconopsis superba* and *Meconopsis sherriffii* have very fine fibrous roots of great span and complexity at an early stage, and they are very unforgiving if these are broken. A really light compost that breaks up when the pot is knocked out is necessary, and the compost should be on the dry side when the operation is carried out. These difficult seedlings should then be shaken into a similar light and dryish compost and gently watered. Any compression of the roots will lead to a sickly plant or even death. Beware of putting heavy chips on top of the pots of such seedlings when pricked off, even this will compress the compost. Leave this operation until they are well established at 3–4 weeks. I heard of a whole germination of *Meconopsis delavayi* which died of pricking off, so, if in doubt, take the greatest care. Most of the other species are intermediate, with the perennial *M. grandis* types easier than the monocarpic *M. nepaulensis* group. None is, however, really easy, and I suspect the whole problem is related to the root growth strategies evolved by different species. Plants from an area where moisture is abundantly available (east Himalayas and south-facing slopes) have huge root systems to seek food in stable soils and massive transpirational needs. Storage tap roots probably evolved in less consistent and predictable environments, so note the climate in areas from which new seed is obtained. I prick off as early as I can and transplant all my seedlings of *M. bella* before true leaves emerge. Leave the difficult ones like *M. sherriffii* and *M. superba* as late as you can, as the roots do become less fragile with age. I suppose a leaf length of 1 cm is a safe stage to attempt the transplant. Most can be pricked off into boxes and then potted on with a whole intact root ball. I prick rarer material straight into 3-inch pots, but greater care is required to maintain humidity with individual plants, and they do grow better in boxes. I do believe there is a way round the problem of pricking off, and that is to sow seed individually spaced in large, shallowish pans. This may mean that your propagating space is taken up with large pans which may totally fail, and humidity must be maintained for the seedlings that do germinate. I have not sufficient experience of this yet, but non-stop growth is the essence of success with Meconopsis, and the answer must lie here for new, rare or difficult seed.

The compost for pricking on seeds is Perlite and grit in good proportion (say ⅓ between them), plus leaf mould, peat and good loam. I use sieved very old, dry cow dung, but beware of all such organic manures; they are used in parts of the world to make mortar and constipate your composts.

John Innes Base to make the compost equivalent to J. I. 1 is also added. I feed organic and inorganic food should be present, because growth must be extremely rapid at this stage. The aim is to produce plants by early August that are 25cm for monocarpic species, 20cm for *M. grandis* types, 15cm for *M. sherriffii* and *M. horridula*. I have had plants of *M. integrifolia* 40cm by late September.

To grow plants like that, humidity must be maintained and they should not be subject to bright sunlight except morning and evening, and the north side of an east-west wall is good. The humidity can be maintained using a mist nozzle on a hose for an hour in the morning and evening when necessary, or perhaps cloths hung over the plants with one end in a large water container. In a dry climate or a year such as that experienced in the UK in 1984, watering is not enough. All meconopsis in low humidity transpire more than their roots can produce, however extensive and well grown. This leads to fungal wilt and either a rapid or lingering death depending on the fungal species. Plants like *M. horridula* will go prematurely dormant and flower poorly, probably without setting seed the next year.

The aim is to plant out by mid-August. The plants by this time are large but soft. The next month or so may see a doubling in size depending on the autumn weather, but it should see vigorous root establishing activity and a ripening of above-ground plant tissues. A dry autumn will require massive watering, and a wet one cover for some species, but this will be discussed in detail later. The *M. horridula* group are better planted out in mid-July, but great care is needed as a shock will send them dormant and you will be worse off than if you planted them larger and semi-dormant in August. You can, of course, over-winter them in pots or even seed-boxes, but the plants will never achieve the true potential, and I only ever contemplate it for potentially really difficult material, and to date I have never gone beyond contemplating it, I have never intentionally over-wintered a meconopsis in a pot.

Meconopses that are monocarpic must obviously be reproduced from seed. In cultivation many plants do become sterile, and for the long-term conservation of horticultural material this is a serious problem. There are at least three reasons; inbreeding, hybridisation and genetic damage. It is difficult to judge how serious the first is, although it has been suggested with *M. latifolia*. All my prolific *M. latifolia*, now in their fourth generation, came from a single plant, and the very few surviving plants of *M. sherriffii* still set excellent seed, although of course they can be polycarpic. Hybridisation is a major cause of sterility in a great many species. I still think that many plants of supposedly true *M. grandis* are hybrids. I have long-term experiments in the St Andrews Botanic Gardens on this problem, and it will be some years before I have firm evidence. Genetic damage has been

noted by Ratter, particularly in *M. gracilipes*, and, as I fear this species may be almost extinct in cultivation, it is probably a significant factor. It is possible that climatic factors in cultivation may significantly affect the production of gametes. Regrettably this is another complex subject with little readily available literature on Himalayan plants and needs some competent botanical research. It will be necessary to persuade a panel of gardeners to grow the various species subject to hybridisation in isolation.

Propagation – vegetative means

Polycarpic meconopsis can be increased by division or by cuttings. It is probably possible to divide at any time of the year from full growth to total dormancy. It is safest to divide a big clump in two; the more you split, the greater the risk. If you divide in summer or autumn, they must be re-established in humid conditions. They are best divided in spring with growth about six inches high. There can be numerous small side-shoots below ground level at this time of year, and the greatest care is needed not to damage them. Gradually tease and pull the clump apart or to pieces, only using the knife if you have to. A measure of perfection is to dress any wounds with flowers of sulphur. Try to keep the root ball as large as possible, even if giving it to a friend who has a nice clean floor in their car! If I were a nurseryman, I should have 'Division Sunday' in spring and make the customers turn up and take away open ground divisions. It is certainly difficult to pot up these divisions and maintain them in pots for any length of time. I have to admire those in the trade who produce good quality plants in small despatchable pots.

The small basal shoots in spring or even early summer that break off or are detached without roots can be persuaded to grow on. Mist and heat make the process fairly certain, but leave plenty of space beween cuttings and have most of the compost a really sharp grit. They will rot off in hours if the humidity is cloying, but must never wilt. Some species such as *M. grandis* and *M. betonicifolia*, as well as the hybrid 'Houndwood', throw axillary shoots, and these too can be rooted as cuttings. However, most of these polycarpic plants, particularly *M. grandis* forms and hybrids, will increase hugely if well fed, and in no time at all one becomes limited as to the ground available. I would estimate, in good rich ground with controlled humidity, one big clump could produce a hundred plants in four years.

Some of the monocarpic plants do occasionally show polycarpic tendencies. I have seen this in *M. aculeata, M. latifolia* and it is reported for *M. nepaulensis*. It might be possible to produce polycarpic strains of these vegetatively, but I have never had enough material to try. It is certainly possible to cross polycarpic with monocarpic species and produce poly-

carpic progeny, and this is discussed in the previous article that I have written.[5] This may well be horticulturally very valuable, but there are chromosome differences between these plants and most crosses fail, so much effort will be needed. It is just conceivable, however, that hormone treatment might be used to force dying monocarpic crowns to throw buds for growing on.

One problem I raised in my previous article is the difficulty of stopping potentially polycarpic plants flowering and dying in their first year. I have been taken to task for suggesting plants that flower from a single shoot in their first year will die. All right, there are exceptions, but I still hold it to be a general rule in average circumstances! The problem is bad enough with truly polycarpic species such as *M. grandis*, but much more so with *M. sherriffii*, and what will we do when someone brings back seed of *M. punicea* again? It would be best to plan now. There is obviously a fine balance between a plant putting all its reserves into seed production and having enough strength to produce viable side-shoots. I expressed horror last summer at a friend who had cut the whole flower spike out of a single rosette plant of *M. sherriffii* after flowering and thus lost any chance of seed. I was wrong, it did produce two small side-shoots, but eventually in the adverse conditions of UK summer 1984 the plant died. My single rosette plant that year fattened a seed pod but had no viable seed. This year a single rosette plant did set apparently viable seed before it, too, died. This does, in fact, tell us where the answer lies. If the stigma looked receptive and pollen was shed or, better still, if you obtained pollen from another plant of the same species, grow the plant on for seed in the best possible conditions of feed and, above all, high humidity, and you may obtain side-shoots and seed. If the aim is to select good plants from a large batch of, say, *M. betonicifolia* or *M. grandis*, be patient and de-flower as early as possible in the first year and grow on to flower multi-rosetted plants in the second year. Really good strains can flower themselves to death if an adverse summer or poor feeding occurs. The only safe method is to have a continual succession of big, healthy plants propagated into new ground, well supplied with both organic and inorganic feed.

The habitat

I intend in the second part of this article to discuss each species in turn, and what follows are two particular habitats I use which are the basis of my cultivation. The first is the general peat bed, which is enriched as often as possible with very old, dried cow dung and both pine and beech leaf mould, plus a dressing of grit and slow-release fertiliser in spring. Large plants of polycarpic species are split up every three years, and much manure and leaf mould dug in, and the same is true for the large, rosetted

monocarpic species after they have died. I originally used a professionally compounded Rhododendron fertiliser which was good as an inorganic feed and lately used Enmag, but I suspect this is affecting flower colour of the blue species and will revert to Rhododendron fertiliser. This year I tried straight balance NPK Growmore with quite excellent results. I doubt if soil acidity is all that essential, providing the ground is very rich in humus, but it may again affect flower colour in the blues. The humus is clearly essential with such greedy and moisture-loving feeders, but it serves another function, and that is insulation in the winter. Meconopsis that are evergreen and polycarpic species without a major tap root, such as *M. grandis*, hate a soil that goes sticky after frost. A really light, airy leaf mould/peat top dressing with a generous amount of coarse grit for drainage, is a marvellous protection in hard weather. A sticky clay or a sodden, decomposed peat will cause a high winter mortality. A deep bed dug in ordinary soil, with a ten-inch layer of farmyard manure underneath and top dressed with new peatmoss and grit and given generous inorganic fertiliser in spring, would grow a marvellous bed of *M. nepaulensis* hybrids, or *M. grandis* and *betonicifolia* forms and hybrids in a dry climate with built-in mist nozzles.

The second bed is more specialist; mine was recently named the North face of Annapurna by a colleague from the Geography Department. He is actually a social anthropologist, which may explain his inadequate knowledge of monsoons. I would have forgiven him if he had called it the South face of Annapurna, but then it faces north, which probably confused him! The aim is to reduce sunshine in summer and provide saturated humidity from April to August. This is why it faces north, and there are fine mist nozzles built in to it which are turned on for an hour night and morning unless it is actually raining. It has a 45° slope with savage drainage underneath, and the top layer is composed of smashed-up rotten sandstone and black sedge peat and nothing else. It is covered from October to March, and individual plants are covered from late July in a wet year. It is fed with slow-release fertiliser, but I am still coming to terms with this. I grow all my difficult Himalayan plants in this, including some of the AGS Sikkim plants. The only failures so far have been plants actually killed by me (too much insecticide), attacked by blackbirds who have fought through the maze of cotton, and a plant of *M. discigera* that had its winter hat on too late. Even the blackbirds taught me something, since having failed to root *Androsace globifera* in a mist frame in spring I found several torn-off rosettes rooted on their own in the 'monsoon'. If you are honest, you will admit that the average UK summer and winter are the opposite of those in the Himalayas. This bed is an attempt to keep them saturated in the growing season and dry while ripening and dormant. The essential truth in grow-

ing Meconopsis is that no amount of water at the roots can compensate for a dry atmosphere and, if drought is prolonged, fungal infection sets in and the plants will probably disappear the following winter. The toll of the 1959 dry summer well into 1960 is recounted by Cicely Crewdson, and I guess this was the beginning of the end for *M. punicea*. Mist nozzles are clearly the answer as 1984 taught me, and they are now built into the peat bed. I have no conscience about using water even during water restrictions. The Western world is generally very extravagant with water, and I never waste anything if I can help it, including water, and I do not see why I should not have my little bit when it is really needed for my Meconopsis. If your morals dictate otherwise, don't grow this genus, because you can't continue to be successful without humidity. I thought this discovery was new, but if you read many of Alf Evans' superb accounts of peat gardening, he long ago yearned to mist the whole Botanic Garden in Edinburgh. This is the great advantage of East Coast Meconopsis, the sunshine is (usually!) there and you can create the humidity. The reverse is really rather more difficult!

Hardiness

I doubt if any species in cultivation is not hardy given the right winter conditions down to at least −15°C and probably −20°C. Small plants from an autumn planting can well be lifted out by frosts in a light peat and dehydrate to death. Frozen wet crowns of both herbaceous and evergreen species can lead to losses. A sticky or a sodden soil will greatly aggravate this. I only cover *M. superba, sherriffii* and *discigera* and have rarely lost others. Your cover should be open to let the wind blow through and, if dried leaves accumulate under the cover, so much the better. The wetter the winter climate, the more species need to be covered and, if in doubt, a tent cloche of glass certainly won't hurt. I lost a whole batch of high altitude *M. horridula* left uncovered, but, as I still have no idea how to grow this form, their death may have had nothing to do with lack of cover. A mild winter will develop the buds in some species as early as December, and these are destroyed by a frost of −5°C or more. This can happen, of course, with frosts right up to May. If your beloved rosettes of evergreen monocarpic species suddenly develop horrid narrow, twisted leaves in the middle and an aborted flower stem after three or four years of patience, it is not, as I used to think, a virus, but frost damage. *M. integrifolia* and *M. sherriffii* are worst, followed by *M. superba*. A good, thick cover on any night of severe frost may save them. A frosted and later rotten flower bud on *M. sherriffii* would probably kill the whole plant. A dry bud is less susceptible than a sodden one, but not immune.

Chemicals

The straight answer is don't use chemicals; Meconopsis seem unduly sensitive to most. Try not to use any systemic insecticide including Dimethoate. The symptom is leaf scorch often followed by a gradual and irreversible rot; if this happens, cut the leaves off near the base, but don't hold out too much hope. The anti-moss Algofen and colloidal copper fungicide can kill seedlings. I believe benomyl (Benlate) to be safe, but am not sure of its value as a fungicide. Drought conditions will lead to mildew and sick plants going into winter. I believe some of the modern systemic fungicides only available to farmers can cure this, but the real answer is to keep them humid and avoid the infections. There are at least seven fungal diseases recorded for Meconopsis, but generally by the time major infections are diagnosed it is too late to intervene. The answer is correct growing conditions. The most difficult time I find of all is mid-August. Species like *M. sherriffii* and *M. discigera* appear to stop growing and need to ripen. I suppose this is equivalent to the end of the monsoon and the onset of clear, dry autumn weather. I now cover such plants with an airy tent of glass and hope the wind blows through. Plants are more vulnerable to this in their second year, and really good plants apparently in marvellous health can have the whole heart become a purple-black fungal mess in a day or so; first-year plants seem less vulnerable because, I think, they continue growing longer.

Conclusions

I hope later to write details of cultivation species by species and, before I do, another growing season should provide some sounder evidence for difficult species. I have aimed to be detailed so that the many experts who grow these plants may perhaps find something new or perhaps know the answers to my problems. I don't wish to put beginners off. Some are easy from seed and will respond to a bed of rich humus and as much water in summer as is available. A single mist nozzle uses very little water and can look unobtrusive and will let you grow a few square yards of Meconopsis even in very dry summer climates. If your growing environment is very wet, put a foot of drainage material under the rich compost and use covers in winter and you, too, will be charmed by this genus.

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Some notable high alpines introduced from the Kashmir Botanical Expedition 1983

C.A. CHADWELL

Collection numbers are given in parentheses.

Paraquilegia cf. anemonoides (syn. P. grandiflora) (44) (58) (241) 4,000-5,000m; rock crevices. Flowering: June-July (August). Fig. 1 (p.358).

A very distinctive and highly variable small rock crevice plant, often forming large clumps of rather glaucous ferny foliage covered with delicate white, tinged with blue, blooms. Flowers solitary, cup-shaped, 2-3.5cm across. Leaves all basal, long-stalked, ternate, with leaflets 1-2cm across which are further divided into deeply-lobed segments. Rootstock tufted and covered with the bases of old leaf-stalks.
Germination: generally good in first and/or second year.
Situation: scree bed or alpine house.
Flowering: can be expected to form buds and flower in third year.

Aquilegia nivalis (syn. A. vulgaris ssp. jucunda) (47) (162) (219). 3,350-4,250m; alpine slopes, screes, rocks. Flowering: June-August. Fig.2 (p.359).

Flowers deep purple with almost blackish-purple inner petals; spurs usually short, incurved. Leaves few, ternate, divided into broad kidney-shaped 3-lobed leaflets. Stem unbranched 10-20cm with 1-2 leaves.
Germination: excellent in both first and second years; vigorous growth.
Situation: scree bed or alpine house; some moisture in soil is probably advantageous.
Flowering: erratically in first and second years.

Oxygraphis polypetala (syn. Ranunculus polypetalus) (45) (236). 3,650-4,500m; open slopes recently cleared of snow. Flowering April-June. Fig. 3 (p.360).

A tiny early flowering alpine plant with solitary or several yellow or bronze flowers with many narrow petals, and small somewhat fleshy entire or lobed, rounded to heart-shaped leaves. Flowers 1-2.5cm across. Leaves all basal, stalked, blades 0.5-5cm; flowering stem 2.5-10cm.

Germination: fairly good.
Situation: scree bed or alpine house.

Androsace aff. mucronifolia (222) (230) (296) (347)
3,500–4,300m; rocks, screes, alpine slopes; common on mountain tops and high passes. Flowering: June- August. Fig. 4 (p.361).

A lax, mat-forming plant, with usually pink, or less commonly white, scented flowers, and distinctive oval leaves with marginal bristles, otherwise hairless. Flowers several, in a short-stemmed (c. 1cm) compact umbel, rarely solitary; corolla 6-8mm across. Leaves 2-4mm; rosettes 5-8mm across.
Germination: fair.
Situation: scree bed or alpine house; an exposed situation with an impoverished soil may encourage prolific flowering.

Corydalis crassissima (syn. C. crassifolia) (269).
3,350–4,800m; screes/gravel slides. Flowering: July-August. Fig. 5 (p.362).

A striking plant growing in otherwise barren screes, with rounded, deeply lobed, fleshy, conspicuously glaucous leaves, and a dense cluster of relatively large violet to pinkish-white flowers succeeded by large globular, inflated capsules. Flowers 2-2.5 cm, with a slightly down-curved spur. Leaves with rounded to kidney-shaped 3-lobed blade 5-10cm across. Fruit inflated, balloon-like, 1.5-2.5cm.
Germination: poor; one of the few species of Corydalis from the area which is believed to retain its viability when seed is dried.
Situation: scree.

Primula elliptica (143) (168) (221) (235).
3,350–4,250m; rocks, alpine slopes; common on high alpine meadows. Flowering: June-August. Fig. 6 (p.363).

Flowers pinkish-purple to mauve, 3-10 in a lax umbel, with individual flower-stalk 5-10mm and linear bracts as long or longer. Leaves nearly erect, with rounded to elliptic, sharply-toothed blade usually 1-3cm, narrowed to a broad hairless leaf-stalk as long as broad; flowering stems 5-5cm.
Germination: fair.
Situation: scree or alpine house; some moisture in soil an advantage.

Primula macrophylla (syn. P. nivalis var. macrophylla) (68) (339) (344).
3,650–4,800m; open slopes, damp places, common and gregarious in stony alpine stream beds. Flowering: June-August. Fig. 7 (p.364).

A rather robust plant with narrow lanceolate or strap-shaped leaves, usually with white farina (powdery covering) and with a moderately dense head of 5-25 purple, violet or lilac flowers with usually a darker eye. Leaves erect, 10-30cm, entire or toothed. Plants very variable, with some having the appearance of a separate species (var *moorcroftiana*).
Germination: fairly good in both first and second years.
Situation: exposed bog-garden or alpine house (constant supply of water).
Flowering: var *moorcroftiana* (163) flowered in the second year under normal rock-garden and alpine house conditions.

Anemone rupicola (233) (335).
2,750–4,500m; rocks, open slopes. Flowering: June-August. Fig. 8 (p.365).

Flowers usually solitary, large showy, white, sometimes pinkish outside. Stems several, c. 20cm. Petals 2–4cm long, oval downy outside. Leaves deeply lobed and toothed.
Germination: poor (probably as a result of the quality of seed gathered).
Situation: scree bed or alpine house.

The altitudinal ranges, habitats and frequency refer to Kashmir only.

Germination and flowering details refer to seed collected during the expedition.

Many individual growers and small nurserymen have successfully raised these species and other choice alpines from the seed collected in 1983. K.B.E. (or alternatively C., H., P. & W. [Chadwell, Howard, Powell and Wright]) numbers will be appearing on show benches in the years to come. SRGC members should look out for plants offered by specialist nurserymen.

Illustrations by Joan Bacon (Botanical Artist)

Fig 1 *Paraquilegia anemonoides*

Fig 2 *Aquilegia nivalis*

Fig 3 *Oxygraphis polypetala*

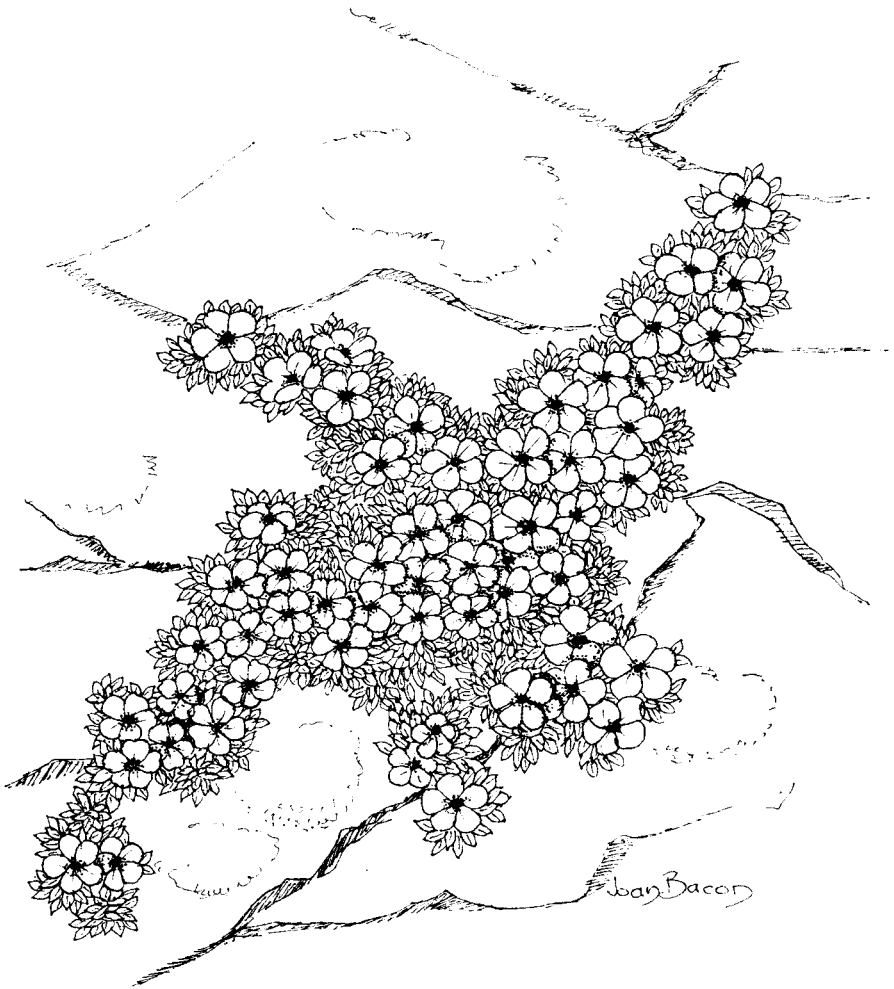


Fig 4 *Androsace mucronifolia*

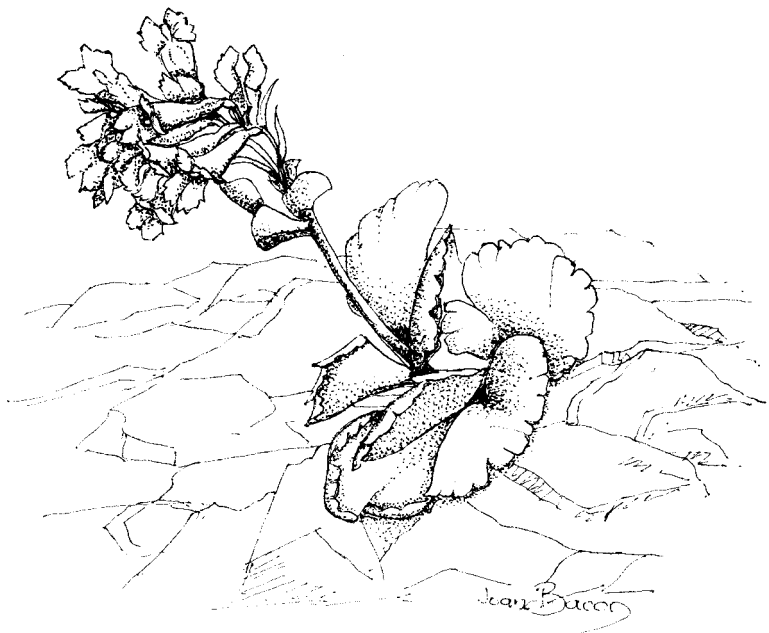


Fig 5 *Corydalis crassissima*

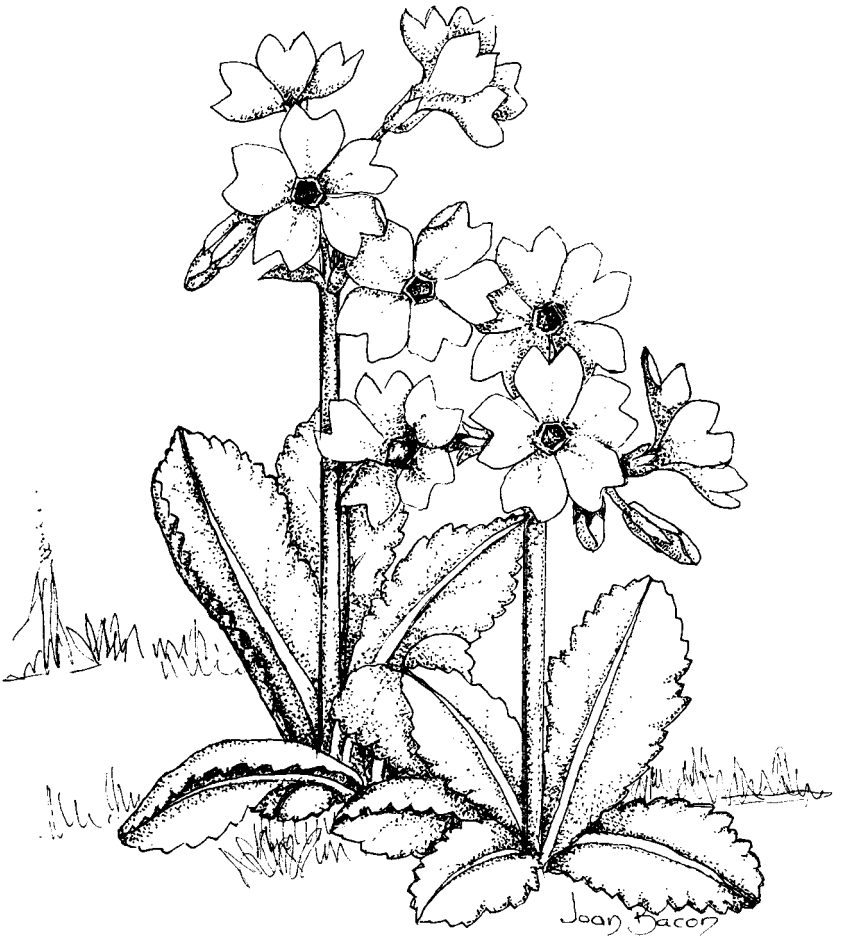


Fig 6 *Primula elliptica*

Fig 7 *Primula macrophylla*

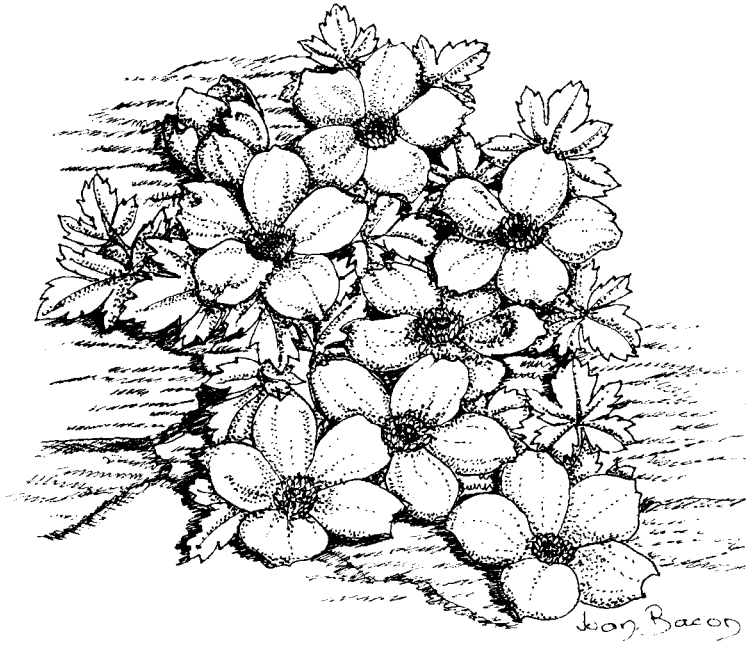


Fig 8 *Anemone rupicola*

A glimpse of Kosciusko

FORBES W. ROBERTSON

EARLY IN January 1985, my wife and I had the chance of a flying visit to the Australian alpine area of Kosciusko National Park in the south of New South Wales. The trip was sandwiched in between our return from New Zealand and the flight home, but was well worth the rather hectic car trip from Sydney and back. We had the best part of two days in the Park, just long enough to give us an introduction to the flora and the delight of finding some of the most characteristic species.

The Kosciusko National Park includes the most elevated and hence botanically the most interesting area of the Snowy Mountain Region. Successive periods of uplift and weathering have produced a rather featureless peneplain dominated by granites, but also with outcrops of slates, shists and quartzites. During the Pleistocene glacial period Kosciusko was also subject to moderate glaciation, evident in localised areas of ice-polished rock, cirques and more extensive evidence of frost-shattered rock. Mount Kosciusko at 7314 feet is the highest peak in Australia, named after a famous compatriot by the Polish explorer Strzelecki, who reached the top in 1840. There are several other tops almost as high, so it hardly dominates the scene. From the mid-nineteenth century until quite recently virtually the whole area was exploited by stockmen for grazing, and this has left its mark on the flora. Strenuous and successful efforts have been made to restore the original communities although a number of introduced species have gained a foothold.

Botanically the area is of great interest. Many of the plants are confined to the Snowy Mountain Region while the alpine area of Kosciusko boasts some 20 endemic species, according to Costin, Gray, Totterdell and Wimbush, whose admirable "Kosciusko Alpine Flora" (CSIRO) is the authoritative reference. A number of species have taxonomic affinities with South America, South Africa and New Zealand, probably due, in part at least, to their descent from ancestors which occupied the old Antarctic continent before continental drift broke it up. But whatever their origin there is no doubt about the alpine quality of the flora, which displays the characteristic growth forms associated with wind exposure, snow cover and extreme temperature ranges. Certainly we had variety during the short time of our visit. The first day was unpleasantly cold, with a clammy mist which occasionally lifted enough for rather frantic photographic sessions, while, on the following day, although the sun shone with blistering inten-

sity, the wind was piercing cold, making the lea of a rock a welcome relief.

At that time of year, the most distinctive source of colour on the gentle slopes was provided by great drifts of the silver snow daisy, formerly referred to as *Celmisia longifolia* (Fig. 148, p.376), although Costin et al are not committed to a specific name, as is so often the case for members of the Australian flora which offers plenty of challenge to the taxonomist. In places, these daisies are so abundant that the colonies do look like snow at a distance. There are plenty of other composites in the area, including the alpine sunray, *Helipterum albicans* subsp *alpinum*, a smaller species with dry, everlasting-type flowers with orange-yellow centres, preferring the sunniest dry sites. In heathy areas, one of the smaller daisy-bushes, *Olearia phlogopappa*, was in bloom, easily recognisable by the characteristic flowers and densely hairy leaves.

Another striking member of the alpine field, just coming into flower, was a robust species of *Craspedia* with yellow-orange drumstick heads (Fig. 149, p.376). There are some half-dozen species of this genus, differing in stature and colour of the flower heads, which range from white to rich orange. This is another group whose evolutionary history and ecotypic diversity will make a fascinating story. Many of the other composites we should like to have seen were still in bud.

Another group with attractive representatives is the genus Ranunculus. There are several low-growing species with buttercup-like flowers which prefer growing in short, moist turf, often near melting snow patches. *Ranunculus muelleri, R. graniticola* and *R. niphophilus* were the species we found, at first sight rather alike in appearance, but most easily recognised by the leaf shape, entire in *muelleri*, incised in the other two, especially so in *niphophilus*. But, of course, the star of the genus at Kosciusko is *R. anemoneus*, an impressive, tall Ranunculus with frilly white petals above a collar of deeply divided leaves. This species likes very moist places and all the ones we found had been only recently released from snow cover. It has obvious affinities with the even larger and more spectacular *R. lyallii* which we had admired a week earlier in the mountains of Arthur's Pass in New Zealand's South Island.

One of the commoner plants which took our fancy was a very fine eyebright *Euphrasia collina* subsp. *diversicolor* which grows erect to about nine inches and bears quite large flowers which vary in colour from white through subtle shades of lilac and pale purple. It makes our eyebright look very modest by comparison.

The heath flora in Australia is well known for its rich variety of species, and the Kosciusko heath proved no exception. Among the more abundant species, in well-drained sites, we admired a representative of the huge tribe of Grevilleas, *G. australis* with creamy yellow flowers. Nearby was

Phebalium ovatifolium endemic to Kosciusko although quite abundant there. Another genus which is particularly well represented in the Australian heath, Epacris, has several species at Kosciusko, adapted to sites which differ in exposure and moisture. *E. glacialis* is a small, prostrate species, often found in exposed sites. *E. paludosa*, also with white flowers, prefers damper, boggy parts of the heath. Also abundant in and about the heath sites is the delightfully fragrant alpine rice flower, *Pimelea alpina*, with white to pink flowers borne profusely on tough, semi-prostrate, twisted stems.

In localities with sufficient moisture to sustain fleshy herbs, the mountain celery, *Aciphylla glacialis*, with conspicuous, white umbels and elegant, finely-divided leaves, produced a rather unexpected touch of luxuriance. Often growing nearby we found patches of *Richea continentis*, the candle flower, distinguished by sharp-edged, pointed leaves, and spikes of ivory flowers set off nicely by the dark stems.

One old friend we were glad to see was *Viola betonicifolia*, already familiar from damp sites in northern New South Wales and New Zealand. This is a species with an immense distribution from eastern Australia through South-East Asia. The intensity of purple striping on the corolla varies a great deal, and I should think this species would be a promising candidate for horticultural development. Another charmer, trailing down a rock near the summit, was the pink form of *Chionohebe densifolia*, a plant with a lot of New Zealand relatives as its name suggests.

It was very evident from our brief visit that the Kosciusko area embraces a number of different ecological conditions, which include the most extensive habitat, the alpine herbfield, dry and moist heath, sphagnum bog, dry windswept ridges, feldmark and south-facing slopes where the snow lies long. It would be a rewarding experience to have time enough to run down the subspecies and ecotypes adapted to these different habitats which are so easily accessible in the course of a day's expedition. Although the Kosciusko Park does not offer peaks and precipices, the snowfields, boggy rills and rolling, rocky terrain confer a truly alpine impression, nowhere more evident than at Blue Lake, home of an endemic shrimp, where the steep, glaciated rocks, snow patched until quite late in the season, dip into the cold waters. I am sure the shattered rocks at the head of this lake would prove botanically rewarding.

After our long day's walk, as we splashed across the Snowy River and climbed the short, steep hill to Charlotte's Pass, we felt sorry to leave, but also deeply satisfied at having realised a long-held ambition. At the top of the hill we paused to admire the sturdy, stunted snow gums straining in the wind, their polished branches glinting like steel in the clear evening sunlight.

Shuffling is good for you

MARGARET & HENRY TAYLOR

COUSIN JOHN started it. He's a solid sort of chap, the kind who sits in the correct spot in his room to listen to Mahler on his hi-fi. Though not to my knowledge a Fred Astaire fan, he sure is a conifer freak, and artistic with it. "That *Picea albertiana* conica of yours is a ghastly green, quite out of place beside its neighbours". Proud of our plant we naturally scoffed, but after John's departure, thinking that there might just be something in his suggestion, we shuffled the plant to another site. It hurt to admit it, but the conifer collection did look better.

Since then, whenever there is nice wet weather, we shuffle conifers and rhododendrons. We have a small garden, and plants have a habit of growing, when not dying! Either way they ask to be shifted. Choice plants gradually elbow each other around our garden. Drop-outs land in neighbouring gardens or into our local group raffle (but we swear we donate good plants, too!). Drop-outs tend to be deciduous, as these are steadily being edged out by the evergreens which give solidity and form all the year round. For the full length of every bed we now have a high proportion of evergreens, and not just any evergreens. Long ago, before propagation fever attacked Margaret, she attended floral art classes. There she was taught a rule that a balanced flower arrangement should contain rounds, flats and spikes. This principle is now used in our shuffling. Try spiky celmisias amongst conifers or round-leaved rhododendrons. Aciphyllas contrast well with domed hummocks on the scree.

Plants which are moved every few years do not put down long tap roots and are unharmed by shifting, provided a few precautions are taken. Non-gardeners enjoy sunny weather, but we shuffling addicts can glory in gorgeous rain. When there is a long wet spell, colleagues at work notice my smug expression and guess that the blighter has been at it again. Actually, we put on plastic coats and shift plants while it is raining.

If dry windy weather follows a shuffle, the repeated watering, essential to keep rhododendrons happy, tends to wash nitrogen, the most soluble of plant foods, out of the soil. So to ensure good vigorous growth, it is advisable to add a little nitrogen, but be careful – an excess of fertiliser can kill. Another way to keep a newly-shifted plant moist during dry weather is to cover it with butter muslin which has its tail in a bucket of water.

A useful hint was supplied by the late Mr Ewan Cox, when we mentioned the non-flowering of our plant of the *Rhdodendron williamsianum*

hybrid 'Moonstone'. He said that several dwarf rhododendrons need full sun to flower freely in Scotland. As he indicated, our plant has flowered regularly since its move to a sunnier site.

While shuffling we like to push the odd plant hard against its neighbour. This uneven spacing helps to avoid the garden looking like a nursery bed. Admittedly, such plants grow asymetrically, but we prefer the "natural" look rather than the perfect specimen.

Recently we were given a small rhododendon seedling and, in order to find a home for it, decided to shift a mature specimen of *R. roxieanum oreonastes* which was beginning to swamp its neighbours. Where to plant the big one? Another chunk of lawn had to go, so out came the garden hose to shape a pleasing curve on the enlarged bed. The cut-away turf was inverted and buried in situ and into this new bulge landed the *R. roxieanum oreonastes*. Now we can walk round our plant, admiring it from several angles, and get the pleasure of touching its leaves to see the felty underside; also the large plant justifies the bulge. Handling is not to be encouraged in the alpine house where cushion plants may be damaged, but is one of the pleasures of outdoor gardening. When we started our garden we fancied winding grassy paths after the manner of Branklyn, but ours looked rather contrived until the strategic placing of a large rock or evergreen plant, justifying each curve, contributed to a more "natural" look.

Another mistake pointed out by John was the siting of our tall *Erica arborea* on top of a mound. We thought it looked attractive, but when a hard winter eventually removed the shrub, its demise certainly improved the bed. Though it is a well-known precept to plant tall shrubs in low areas and prostrate plants on top of bumps, we had been too busy admiring our plant to notice the incongruous siting.

Between our shrubs we have many herbaceous alpines, and in cultivation these benefit from lifting, splitting and replanting every two years like herbaceous border plants. Choose a change of venue for replanting and dig in everything available, leaf mould, peat, fertiliser or farmyard manure. Lift and pull apart such plants as ranunculus, meconopsis, corydalis and gentians, then replant into the freshly enriched soil and these plants quickly show the benefit of the shift.

A further problem comes from having the wrong garden. *Vitis coignetiae* in the full glory of its autumn colour looked admirable at Westonbirt. But in our small garden against our small bungalow? Certainly it draped in Spanish-style over our doorway, though the leaves were so huge it was rather difficult to find the door. Sadly, in autumn these leaves turned to soggy black gunge with never a trace of gold. We replaced it with a small-leaved grapevine which looks more in proportion. This was bought as a wonder plant at a Chelsea show and it does actually produce

grapes in Scotland, though these are so sour that even the blackbirds can't face them. The scale of a plant must fit its situation. This lesson has taught us to be particularly careful to use small-leaved plants in our trough gardens.

Troughs are good candidates for shuffling; even the large ones can be shifted using rollers and levers. To begin with, our troughs were placed along the edge of a path like a row of mushrooms. A visit to the Royal Botanic Garden, Edinburgh, showed us the error of our ways. Their troughs look most attractive arranged in groups in association with large rocks and underplanting. This induced us to shuffle, unifying the scene by spreading the same type of gravel on the underplanted areas as that used on top of the troughs. Celmisias have been particularly useful for underplanting as they are evergreen with a wide variety of leaf size, colour and shape.

Grouping together several species and hybrids within one genus can add to garden interest. Our cassiopes were originally scattered around the garden as we gradually acquired them over the years. Later, when most had been propagated, they were collected together in a part of the front garden requiring rejuvenation. The new site is reasonably moist and sunny for part of the day, so the cassiopes flower well. Close grouping gives the opportunity to hunt for elusive distinguishing features. But after a few years in the new site, some of the plants became too tall, so these had to be shuffled downwards with rich potting compost sifted between the shoots. These plants have grown healthily and have provided a useful supply of "Irishman's" cuttings.

The dwarf conifers also tend to grow too tall. Perhaps it was a slight mistake to plant them in our heavily-manured ex-rose bed. As we don't fancy sinking them, we use the "candling" technique to dwarf our pines. In the spring when clusters of new brown candle-like growths elongate, some "candles" are pinched off entirely, and the remaining one or two from each group are nipped to half their length. This dwarfs the pine while still retaining a "natural" appearance. *Pinus aristata* is sometimes listed as one of the world's slowest-growing conifers. Some of the plants in the wild in California are reputed to be around 4000 years old, and these aged specimens could be slowing down somewhat, whereas each shoot of our young plant grew 20cm per year prior to "candling".

We created a further problem by planting heathers between our dwarf conifers. The genuine dwarfs were swamped, so out went the heathers to be replaced (Fig. 147, p.375) by the excellent evergreen ground cover of *Raoulia subsericea*, a low-growing golden thyme and the ever silver *Leucogenes leontopodium*.

During the course of a recent "bump" *Chamaecyparis* 'Ellwood's Gold' had a smaller pyramidal grey-leaved conifer placed slightly behind it

which has given a three-dimensional effect like painting a shadow in a picture.

One cussedness of gardening is the problem of the plant you desire larger actually dwindles, whereas the one that has attained perfect size insists on growing. Chamaecyparis and junipers are easily rooted from cuttings, and we have a constant supply growing on in our nursery bed to replace plants which have outgrown their allotted space. Every spring the nursery bed is rejuvenated. All the plants that remain after the winter are temporarily lifted on to a polythene sheet and kept moist while the bed is dug over, incorporating fresh compost and fertiliser or farmyard manure. This gives a constant supply of strongly growing plants, a delight to see, an essential constituent of a "living" garden and a handy source of gifts to visitors – one of the nicer conventions of gardening.

Shuffling provides lots of healthy exercise – try dragging a large rhododendron around on a polythene sheet.

It adds spice – "No, I don't like it, shift it over a bit and let's see the other side" – from my wife.

A static garden is as good as dead – shuffling prolongs healthy life.

The Joint Rock Garden Plant Committee

(Recommendations made at Scottish Rock Garden Plant Shows)

PERTH – 20 APRIL 1985

Awards to Plants

Award of Merit

To *Pleione forrestii SBEC/0206* as a flowering plant for the alpine house. Exhibited by Mr J. D. Crosland, Treetops, Torphins, Aberdeenshire.

Certificate of Preliminary Commendation

To *Ranunculus* x *flahaultii* 'Nou Fonts' (*R. parnassifolius* x *pyrenaeus*). Exhibited by Mr F. Hunt, 34 Morris Place, Invergowrie, Dundee, Angus.

Award to Exhibitor

Certificate of Cultural Commendation

To Mr H. Esslemont, 9 Forrest Road, Aberdeen, for a well-grown pan of *Soldanella carpatica.*

ST ANDREWS – 28 SEPTEMBER 1985

Award to Plant

Certificate of Preliminary Commendation

To *Phlox lutea* as a flowering plant for the alpine house. Exhibited by Mr and Mrs H. Taylor, Tantallon, Morris Place, Invergowrie , Dundee.

Award to Exhibitor

Certificate of Cultural Commendation

To Mr Eric Watson, 1 Ewesley Gardens, Woodlands Park, Wideopen, Newcastle, for a well-grown pan of *Gentiana ornata.*

Jubilee Salver

The Jubilee Salver awarded annually to an individual who has given outstanding service to the Club has been awarded in 1985 to Dr D. M. Stead for his long service to the Club, in particular his splendid work as Publications Manager from 1974–84.

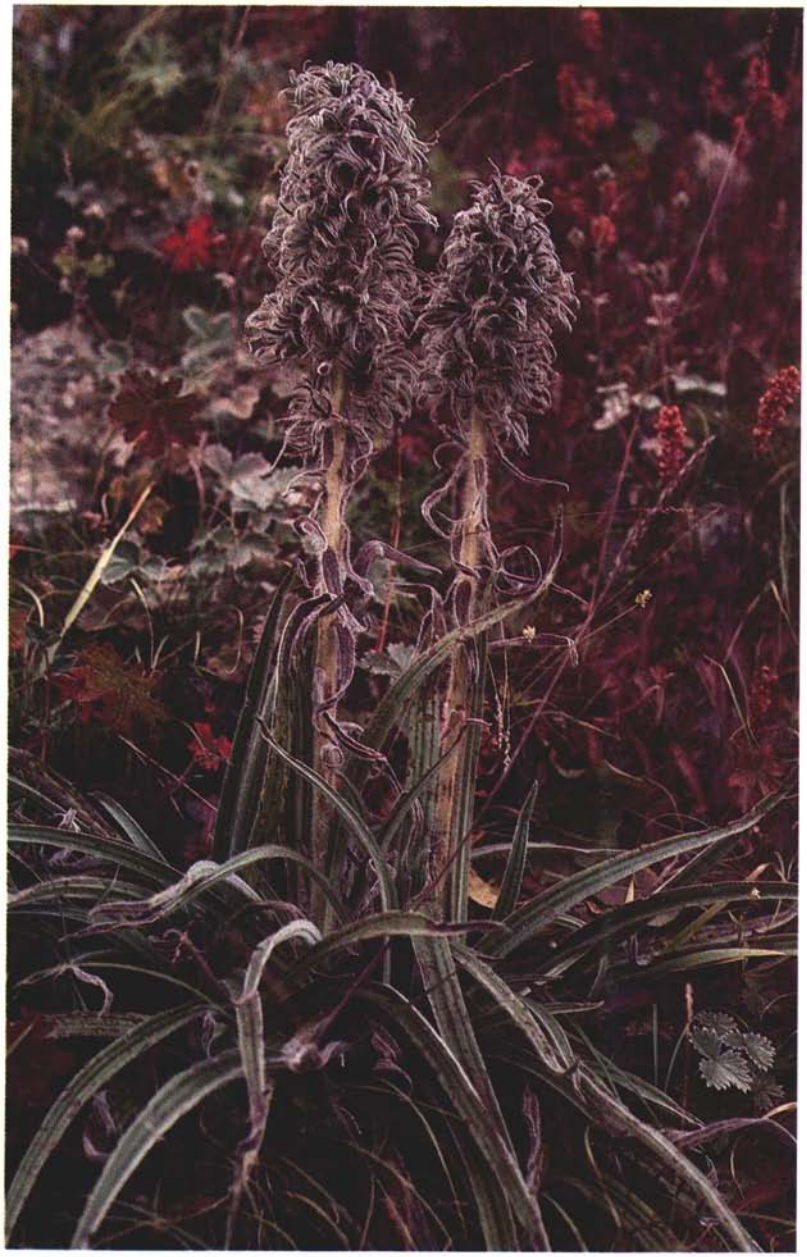


Fig 143 *Arnebia benthamii* (See p.382) Photo: H. Zetterlund

Fig 144 *Campanula morettianam alba* (See p.386) Photo: H. Esslemont

Fig 145 *Campanula raineri* (See p.386) Photo: J. Good

Fig 146 *Paraquilegia grandiflora* (See p.378) Photo: H. Esslemont

Fig 147 *New Zealand evergreens for underplanting conifers* (See p.370) Photo: M. & H. Taylor

Fig 148 *Celmisia sp.* (See p.366) Photo: F. W. Robertson

Fig 149 *Craspedia sp.* (See p.366) Photo: F. W. Robertson

The Swedish Botanical Expedition to Pakistan 1983 – Part I

HENRIK ZETTERLUND Botanical Garden, Gothenburg, Sweden

TO THE ALPINE plantsman, Pakistan might not sound too exciting, but if I mention Kashmir, Karakoram or Chitral, many of you will probably become alert. These areas, or parts of them, are incorporated in the young nation and host a wide range of plants of value for the alpine gardener.

By the end of August 1983 we, a party of five Swedish botanists and horticulturists, arrived in Rawalpindi. Three of us, Bjorn Alden, Kjell Jaderyd and myself, are part of the staff at the Gothenburg Botanic Garden, and our mission was to collect seeds from plants of horticultural merit. Another member, Roland von Bothmer, is a botanist from the Agricultural University of Svalov, and his main objects were the wild relatives of wheat and barley as well as the old, local, cultivated forms of these species. The fifth member, Gerhard Evald, is a medical doctor, keen amateur gardener and experienced globe-trotter.

At the airport we were met with by our trekking agency, Pakistan Tour Limited, which took good care of us from the beginning to the end of our stay. Its staff proved to be most reliable and helpful, and it is much to their credit that our stay was so smooth.

After a few days in Rawalpindi and Islamabad, we left for Gilgit, the ancient but still very important trade-centre of the North.

There are cheap, daily flights from Rawalpindi to Gilgit but, since we had heavy equipment and also wanted to see more of the country, we preferred to go by Jeep on the Karakoram highway, a "modern" tarmac road which follows the Indus River and continues to the Chinese border.

The Jeep ride was rather uncomfortable but most fascinating. First we travelled through the fertile, sub-tropical lowlands and later, as the road turned east into the rain-shadow of the Himalayan range, through a barren but beautiful semi-desert dotted with plants of *Capparis spinosa, Peganum harmala* and various Leguminosae.

After a night in Gilgit, we continued to Baltit, the centre of the ancient Hunza kingdom. On our way we did some botanising and secured the first three SEP numbers of which *Dictyolimon griffithii* (SEP 2) was the most interesting. This is a close relative of limonium, and has the most charming little rosettes of beautiful leaves patterned in silver and olive green. It is quite dwarfish and perennial. Later we were to collect another member

of the genus, *D. macrorrhabdos* (SEP 18), which has much larger leaves in rosettes up to 20cm in diameter. The leaf pattern of the latter is even more accentuated, and it will make a very good plant for foliage effect. Unfortunately, *D. macrorrhabdos* is monocarpic, so it ends its life with a coarse flowering stem up to 50cm tall. Both species inhabit the dryest situations; *D. griffithii* was found on the rocks at an altitude of 2,000m, whereas *D. macrohabdos* inhabited moraines and screes around 3,000m.

The following day our party decided to split into two. Bjorn and Kjell headed for the Chaprot Valley, where they were going to collect the beautiful Himalayan lace-bark pine, *Pinus gerardiana,* from its northern-most location and later their intention was to collect around the Minapin glacier.

The rest of us followed the Karakoram highway northwards past the villages of Gulmit and Pasu. As we travelled through the artemisia steppe in intense heat, we were provided with the most outstanding mountain views, everywhere around us sharp, snow-clad peaks were rising, most of them around 6,000m high.

The steppe is broken only by man-made oases that have been created wherever smaller streams are running down from the glaciers in the numerous side valleys. All settlements in the dry Indus valley depend entirely on these glacier streams that can provide water throughout the summer.

Foreigners are not allowed to travel the Karakoram highway any farther than Pasu bridge at the base of the enormous Batura glacier. This is really a pity since the road continues to the Khunjerab Pass at an elevation of 5,100m which is the only place in the world where you can be assured of spinning the Jeep wheels on the waxy tufts of *Paraquilegia grandiflora* (Fig. 146, p.375) and skid on the juicy mats of *Mertensia tibetica.*

Having this in mind, the steppe around Pasu bridge was quite depressing, and not even the bluish shrublets of *Ephedra intermedia* var *tibetica* (SEP 7) could change our mood.

However, after a few hours' trek up the side of the Batura glacier, the flora started to change. The first plant to cheer us up was *Corydalis flabellata* (SEP 8), an odd member of this interesting genus with beautiful, succulent, olive-green, adiantum-like foliage. Its flowers are disappointing, but it is certainly worth growing for the leaves alone. Inhabiting the same dry moraine banks were *Chesneya cuneata* (SEP 10), a low-growing legume with attractive bronzy foliage, and *Rosa webbiana* (SEP 9), most common and variable. On the lower rock walls of the mountains we found the leaves of another cordyalis, *C. pseudocrithmifolia,* a plant of great beauty, in leaf as well as in flower. The search for seed was fruitless, and it was obvious that, for some reason, no seed had been produced that year. Fortunately, the other party managed to collect six seeds of it near the Minapin

glacier.

Following advice from a local guide, we crossed the glacier after half a day's walk. This later turned out to be unwise, since the north side of the glacier was much hotter due to the south-facing mountains rising above. If you are looking for alpines in these areas, you will save at least 1,000m hard climbing if you choose the north-facing slopes.

The lower 15km of the glacier is covered with a layer of rough rock-debris. Quite a few plants were found to be growing on the glacier, but only one, *Epilobium latifolium* (SEP 13), could be referred to as garden-worthy.

After the crossing, as we were approaching 3000m, some new plants were found, *Saussurea jacea* (SEP 19), *Rheum tibeticum* (SEP 20), *Acantholimon lycopodioides* (SEP 15), *Clematis orientalis* f.*longecaudata* (SEP 14) and *Comarum salesowianum* (SEP 17) were abundant. The last, which is a most useful dwarf shrub for the rock garden with its rich, green, glossy foliage and white flowers, is called tapesk by the natives, and tea made from its leaves is used as an aphrodisiac.

In the early afternoon, our porters refused to walk any farther, so we had to do some collecting around the camp. The mountains on this northern side of the glacier consist of limestone, and so we expected the flora to be richer than that on the southern side where the mountains are schistaceous. But, as it turned out, most species were to be found on both sides. On our walk towards the cliff-faces, we could see the peculiar rosettes of *Dictyolimon macrorrhabdos* (SEP 18), a favourite that has already been mentioned. As we approached the cliff-faces we could spot the first two "real" alpines. One was a kabschia saxifrage (SEP 22) which was long since out of flower and had shed most of its seeds. The flowers had been produced singly close to its hard, limy cushions. We were to collect this species on several occasions, always at moderate altitudes, 3,000–3,500m. At the higher levels it was replaced by the smaller *Saxifraga pulvinaria*. Bjorn has put a lot of effort in trying to determine this species, and, if one is to follow the keys, one ends up with *S. lilacina*. However, our plants do not have the slightest resemblance to the *S. lilacina* in cultivation; whatever the correct name may be, it is a promising plant.

The other "alpine" was a sedum, and one of the few really good ones. *Sedum trollii* (SEP 23) is a mat-forming species closely related to *S. pachyclados*. Over its bright emerald foliage rise solitary, pinkish flowers of a good size.

The next day we continued towards a summer settlement called Yashbar. A few plants of the strongly aromatic *Ribes orientalis* (SEP 28) were growing by the path and, where a cool mountain streamlet was spreading over the otherwise dry screes, a few plants of *Androsace mus-*

coidea f. *longiscapa* (SEP 31) have descended from alpine altitudes.

The settlement was surrounded by a small wood of impressive Juniper trees, *Juniperus indica* (SEP 33) and *Juniperus sp* (SEP 32). The Juniper fruits are used by the natives to "strengthen" their wine. The use of alcohol is strictly forbidden in this Muslim country, but in the north they are still discreetly brewing the famous Hunza-water, a fruit wine. The wine is quite simple and not very tasty, but nevertheless very welcome after a day's collecting.

From Yashbar we crossed the glacier again, and on the following day we botanised the northern slopes of a nameless mountain.

The lower slopes were covered with dense growth of *Juniperus communis* ssp *nana* (SEP 34), and the rocks with *Bergenia stracheyi* (SEP 44), a very common plant in these areas. After a while we became utterly bored with this plant together with the even more common *Polygonum affine*, and we soon realised that wherever these plants were covering rocks and meadows there was little else of interest.

At higher altitudes, noteworthy plants were *Rhodiola wallichiana* (SEP 48) and *R. heterodonta* (SEP 62), *Draba oreades* (SEP 46, 68), *Tanacetum tomentosum* (SEP 49), *Leontopodium ochroleucum* (SEP 52) and *Saxifraga jacquemontiana* (SEP 54). *Waldheimia glabra* (SEP 50A) and its sister *W. stolitzkae* (SEP 50B) were still in flower. These chrysanthemum-like beauties were collected as one species, but the determination of the dried specimens revealed the existence of the two different species. *Waldheimia glabra* has, judging from the plants that I have grown earlier, proved very disappointing in cultivation, producing non-flowering, straggly shoots so different from the gorgeous tight mats it forms on its native ground. The white-felted *W. nivea* is a much better plant in captivity, and the glorious *W. tomentosa* will probably prove to be the best.

The highlight of the day was *Delphinium brunonianum* (SEP 53), which inhabited the shiny, blackish schist-screes. Its large, dark-blue flowers seemed quite out of proportion on the 20cm scapes, and the boss of black stamens looked like a bumble-bee sitting in the mouth of the flower. This species is very common in northern Pakistan, and whenever you are approaching the altitudes around 4,000m you can be certain to find it. It varies in height from 15 to 50cm, and the Batura plants were the dwarfest we saw. Growing in company with the delphinium was a strange rhubarb, *Rheum spiciforme* (SEP 51), with funny tail-like flower spikes branching at the soil surface under the large leaves that were tightly pressed against the ground. *R. tibeticum* from lower altitudes was rather similar but coarser with tails branching well above the foliage.

This was our first contact with the alpine flora, and the following day we had to leave this area. We made our descent to the south side of the

glacier through a sparse scrub of the ugly *Spiraea lasiocarpa* (SEP 40) and *Hippophae sp.* A few leaves of the strange *Corydalis crassissima* were secured, but no seeds. This species has been recorded from Kashmir and Chitral, but not earlier from between. After some hesitation we collected the spiny, horrid *Echinops echinatus* (SEP 11), not without pain. This is a common plant with large, white-flowered heads, compact and very ornamental at 3,000m altitude, but coarse and rather unattractive in the lowlands.

From Pasu bridge we went south to Minapin village, where we did some botanising and met with the other party. The village is situated on the northern slopes of Rakaposhi at an altitude of 2,000m. Here life has hardly changed during the last centuries, but will probably be most drastically changed during the next decade, mostly because of the Karakoram highway.

It was harvesting time, the cereals had already been threshed, and the only crops left in the fields were buckwheat and maize. Tomatoes and grapes were being dried on sun-heated rocks.

The natives of these areas are more or less obligate vegetarians, living mainly on cereals and dried fruit. Their food, mainly dried mulberries, apricots and apricot-almonds, proved to be superb nourishment for us while we were on our collecting treks.

In the village, *Iris lactea* (SEP 6)was plentiful by the irrigation ditches. In the shade provided by walnut trees, *Fraxinus xanthoxyloides* and *Ficus palmata* ssp *virgata* (SEP 77), we found the delicate, pink-flowered *Spiranthes lancea* (SEP 75) and *Epipactis royleana* (SEP 76) (syn. *E. gigantea*). Just outside the village we were surprised to find *Parnassia palustris* (SEP 74) growing by the ditches at this low altitude. The handsome, evergreen shrub, *Berberis lycium* (SEP 73), was growing on the dry banks of the Minapin river together with *Dianthus* cf. *crinitus* (SEP 72).

When we were preparing to leave the village, we met our friends as they were coming down from the glacier. They had been successful in finding *Pinus gerardiana* (SEP 79) in the Chaprot valley where they had also collected *Fraxinus xanthoxyloides* (SEP 78), *Ribes alpestre* (SEP 80), *Pinus wallichiana* (SEP 81) and *Juniperus excelsa* (SEP 85).

Around the Minapin glacier they had collected quite a few of the plants that we had seen at the Batura glacier. Apart from the six precious seeds of *Corydalis pseudocrithmifolia* (SEP 105), they had collected *Codonopsis clematidea* (SEP 88), *Androsace thomsonii* (SEP 106), the dwarf *Parnassia nubicola* ssp *occidentalis* (SEP 92) and *Aquilegia fragrans* (SEP 94, 112) for the first time. Their most remarkable find was *Clematis alpina* ssp *sibirica* (SEP 87) from one of its southern-most localities. A good number of trees and

shrubs such as *Picea smithiana* (SEP 101, 115), *Sorbus tianshanica* (SEP 113), *Lonicera obovata* (SEP 103), *L. asperifolia* (SEP 110) and *Colutea paulsenii* ssp *mesantha* (SEP 118) were also collected.

Safely re-united, we left the Karakoram mountains at that time with no intention of coming back, but, as it turned out, we were to return during the last week of the expedition.

For those who would like to read about Karakoram, I sincerely recommend the following two articles by Oleg Polunin: "Letter from the Karakoram" (AGS Bull, vol. 30, 1962) and "Plant Hunting in the Karakoram" (RHS Journal, vol. 87, 1962).

[*Arnebia benthamii* syn. *Macrotomia benthamii* (SEP 314) illustrated in Fig. 143 on page 373 was found in the lower meadows on Malik Parbat and will be described in part II – Ed.].

Seed exchange

We have finished recording seed for the current exchange and, while we have as many items as usual, many varieties are in very short supply, so be sure and fill in all the squares in the order form. Please note that we want you to fill in your name and address twice on the order form as we mean to cut off the second one and use it on your seed envelope.

Due to unprecedented demand, no further seed lists are available.

Conveners who wish surplus seed should apply by 28 February. Those wishing surplus and unpacketed seed must apply by the same date.

Miss J. M. Halley
16 Abercrombie Street,
Barnhill, Dundee DD5 2NX

Plant portraits

Crocus sieberi

Robert Brown

Crocus sieberi, which is illustrated on the front cover, is widespread in Greece. It is a variable species consisting of four subspecies. These are:

1. Subsp. *sieberi* – a distinct form from Crete with white flowers with purple markings on the exterior of the petals.
2. Subsp. *atticus* – a form from the mountains near Athens which has flowers which are entirely lilac-blue or violet.
3. Subsp. *sublimis* – a widespread form from the Peloponnese northwards to Bulgaria, with pale lilac-blue flowers with a pale yellow throat. A particularly striking form from the north Peloponnese is *tricolor* which has a deep yellow throat and deep lilac-blue petals with a white zone separating the two colours giving a tricoloured effect. This most attractive form is the one illustrated.
4. Subsp. *nivalis* – a form local to the southern Peloponnese which only differs slightly from *sublimis* by having a glabrous throat to the petals.

C. sieberi is an excellent garden plant which is easily grown, apart from the subspecies *sieberi*. The most striking subspecies is *tricolor*, but there are also a number of good garden varieties such as the deep purple 'Violet Queen', the white 'Bowles White' and the variety 'Hubert Edelstein', which is a cross between subsp. *sieberi* and subsp. *atticus*, having purple and white stripes on the outside of the petals.

These named varieties and the subsp. *tricolor* are available, with a little patience, in commerce.

Fritillaria rhodokanakis

Ray Johnstone

Fritillaria rhodokanakis is endemic to the island of Idra (Hydra) which is situated some 70km to the south of Athens and is easily reached by a fast hydrofoil service from Pireus. This Fritillaria is not frequently seen in cultivation despite the ease of access to Hydra. It only takes an hour or so to climb up from the picturesque harbour to where the Fritillaria grows at an altitude of approximately 200m on scrubby, rocky hillsides, preferring the shade provided by scattered pine trees and low bushes.

It is one of the more brightly coloured Fritillarias; the flower is yellow with a green veining inside and out (Fig. 150, p.409). Externally, the base of the flower is maroon with a greyish bloom which merges into yellow about half-way down, the maroon at the merging border being slightly tesselated. The trifid style is light green, yellow at the tip, the ovary dark green and antlers yellow.

The petals are slightly recurved at the mouth giving the flower a campanulate look. The flowers are about 2cm long by 2-2.5cm across the mouth and are carried singly on a 13-18cm stem. In the wild, stems lengthen up to approximately 25cm carrying seedpods above surrounding vegetation. The stem bears several lanceolate glossy green leaves arranged alternately, the lowest being the largest (10cm x 2cm). The leaves decrease in size as they ascend the stem; the top leaf, situated just below the flower, is 4cm x 0.3cm.

Coming from such a low altitude in the Greek Islands, it is doubtful that this plant would survive British winters. My plants are grown in pots, plunged in sand in an unheated greenhouse. They are removed to another greenhouse where the temperature is kept to a minimum of 1°C above freezing should frosts become too severe. Compost is a well drained JI No 2 with extra grit; liquid feeds are given when in growth and the bulbs are repotted annually. The plant is kept in full sun, no water is given from the time the foliage dies down in June until October although the sand plunge never completely dries out.

Propagation is by seed which sets satisfactorily; however, this is not easily obtainable. It is interesting to note that seed has only been offered in the last four years over the past twelve by the SRGC seed distribution and the AGS has offered it four times in seventeen years, none more recently than 1980.

The plant is not generally available from nurserymen as far as I am aware, although it is possible they may be able to supply small quantities if a "wants" list is sent.

Ranunculus paucifolius

Harold Esslemont

Ranunculus paucifolius or, as Fisher in "The Alpine Ranunculi of New Zealand" names it, *Ranunculus crithmifolius* subspecies *paucifolius* is a native of Castle Hill in the neighbourhood of Canterbury, its only known habitat.

It grows in a plant-protected area of about fifteen acres among limestone debris.

Around the year 1948, it must have been the world's rarest buttercup as

only thirty-two plants existed.

The warden was able to erect fencing to protect the plants from the ravages of sheep and rabbits, and by 1963 their number had increased to nearer 200.

It was then found possible to distribute a few plants and seed to selected Botanic Gardens and, later, from them to dedicated plantsmen. A good example of intelligent conservation!

The name paucifolius is probably a misnomer as it appears that the paucity of leaves in nature is probably due to rodents.

The flowers, up to 5cm in diameter (Fig. 153, p.410) are a splendid golden-yellow and are carried on a short scape and the leathery grey leaves are orbicular and deeply lobed. The extensive root system can be 30cm long and consists of a mat of thick wire-like strands.

The plant is deciduous and is completely hardy. This buttercup was grown for some years in the scree at the Royal Botanic Garden, Edinburgh, with the protection of a cloche in the winter months only.

Cultivation in Scotland, however, is safer in a cold alpine house and a long-tom pot is ideal for its long searching root system. Although calcophile in nature, it does not seem to object to a gritty, neutral mixture over good drainage.

Two cm of gravel (turkey grit) is placed round the neck of the plant which I find vulnerable to winter wet. The pot is plunged in moist sand and only bottom-watered when necessary. I find spring is a safe time to repot, as soon as the plant comes into growth.

Hand pollination will assist the formation of seeds which I sow green.

Be patient, as the seed may take two years to germinate, and be careful to avoid over-watering seedlings in winter. A sowing made in August 1983 did not germinate until June 1985.

Campanula raineri

John Good

This splendid bellflower (Fig. 145, p.374) from the Italian Alps is quite rare in cultivation. Impostors abound, however, most being hybrids between the true species and one or other of the several forms of *C. carpatica*, with which it hybridises freely. They are often listed under the doubtfully authentic name of *C. pseudo-raineri*.

Rainer's bellflower is a dwarf, saxatile plant, with small leaves which vary from bright green to grey-green depending on their hairiness. One distinctly hairy form has been offered by nurserymen from time to time as *C. raineri* f. *hirsuta*. The shoots arise from a persistent, sub-woody rootstock and may, as is customary in the genus, appear at quite a distance

from the centre of the plant. This character gives a clue as to the best means of propagation, which is by division in spring, just as the new growth is appearing. Seed germinates readily provided a cold period is given but, because of the plant's readiness to hybridise, should not be relied upon to produce true offspring. For the same reason, seed from open-pollinated plants should not be sent to the seed exchanges labelled *C. raineri*. Otherwise the confusion as to the characteristics of the true plant will be continued and increased.

C. raineri is essentially a rock crevice and rocky scree plant, and there is no doubt that its lovely, large lavender flowers look best against rockwork. Nevertheless, it can be grown in any well-drained soil, provided the site is sunny and protection is given against the marauding gasteropods who are its chief enemy. Most damage is done during the dormant period, when the buds on the dormant rootstock, and sometimes the rootstock itself, are destroyed. A good top dressing of coarse, angular chippings is probably the best deterrent, backed up by frequent baiting with a persistent slug-killer.

As well as the hirsute form already mentioned, there is a lovely, but alas extremely rare albino, which I have been unable to obtain.

Campanula Morettania alba

This rare gem from the South Tyrol and the Dolomites (Fig. 144, p.386) is seldom seen nowadays, but can be grown with care in soil or in tufa in a pot in the alpine house, or even in a frame with winter protection, as in the late Willie Buchanan's garden. The large white bells on 5cm stalks are truly astonishing. Every effort should be made, first of all to obtain, and then to grow, this lovely plant.

Buglossoides (Lithospermum) gastonii

Margaret and Henry Taylor

Those botanists have been at it again. Fancy bestowing such an ugly tongue-twister on an attractive plant, one which Farrer praised seventy years ago but is still uncommon in cultivation (Fig. 151, p.409). Imagine a mountain plant bigger than eritrichium, of a similar breathtaking blue, and you can understand Farrer's enthusiasm.

In the wild, *B. gastonii* is only found in a small area of the western Pyrenees. A few years ago we saw it growing plentifully above the treeline around the 2,000m level in rather difficult walking country where the limestone rock is weathered into a maze of 6m-deep gulches. In late June, these gulches were partly filled with snow of dubious consistency posing

problems, but you can imagine the excitement which led the travellers into this maze when ledge after ledge of the limestone held flowering buglossoides, some slightly purple tinged, others a most brilliant blue. The plant is rhizomatous, running along humus-filled crannies in the rock, putting up 15cm stems topped with clusters of flowers, 14mm across, considerably larger than the flowers of the popular *Lithodora (Lithospermum) diffusa*. The clusters of two to five purplish buds open to blue cup-shaped flowers each with a white star in the centre. In some places in the wild, the herbaceous spreading mats of buglossoides were up to 50cm in diameter.

After flowering it makes a neat dark dome of leaves, each 1cm by 4.5cm, edged with short hairs. The whole plant dies back to ground level in November. It is found on limestone in nature, but in cultivation dwindles on poor limestone fare and grows healthily in rich peaty soil. Though the rock crannies where we saw it in the wild contained humus, it is difficult to imagine a likely source as these rocks are too far above the treeline to collect fallen leaves, and there was very little little other vegetation on the rocks.

The plant can be slowly increased by careful division, but has never set seed with us; perhaps other growers have the same difficulty, which could explain its usual absence from the seed exchange.

The Genus Ranunculus Part I: Introduction

ALASTAIR McKELVIE

THE NAME Ranunculus which is Latin for a little frog, was applied to the genus of buttercups by Pliny in allusion to the wet places in which many of the species grow. There are around 300 species of Ranunculus depending on how much splitting of species the botanists indulge in. The species are widely distributed over the globe; they are most numerous in temperate and cold regions of the northern hemisphere, but are also to be found in the southern hemisphere, particularly in Australia, New Zealand and South America.

The taxonomy of the genus is complicated, and there has been much revision of names since Linnaeus first classified it. There are at least 25 synonyms for Ranunculus which have been used over the years, but nowadays all botanists have accepted the name Ranunculus for what is an obviously similar group of plants. As in most taxonomic problems, the easier it is to assign a species to a genus, the more difficult it is to classify and identify individual species.

Flora Europaea divides European Ranunculi into two sub-genera – Ranunculus with 20 sections and Batrachium with only one section. Batrachium contains the aquatic members of the genus, very often with finely-divided leaves. For the purposes of gardening it is not necessary to know to which section a species or variety belongs, and I do not propose to complicate the issue by so doing. It is instructive, however, to consider the general attributes of the genus before discussing particular species and varieties in detail.

All members of the genus are annual or perennial herbaceous plants. There are no woody or shrubby members. The leaves are either spirally arranged or distichous, arranged in two diametrically opposite rows. The stem (cauline) leaves are alternate and are often few in number. Leaves are often palmately lobed or divided, but are sometimes simple and more or less entire. Leaf shape can be a useful aid in diagnosis, as will be seen in the photographs and diagrams which accompany the description of species.

The flowers are solitary and terminal, or in a cymose panicle where the oldest branches or flowers are normally at the apex. The flowers are always hermaphrodite, containing both pistil and stamens, regular in structure and with a superior ovary with all the parts spirally arranged. In an evolutionary sense, it is a primitive family.

There are 3-5 sepals; the petals usually number 5, but are sometimes missing altogether. They are usually yellow or white, but occasionally red. The petals (or honey leaves as they are called in the Flora Europaea) have a nectar-secreting depression near the base. Stamens are always numerous, as are the carpels, each with a single ovule. The fruiting head, after the other parts of the flower have dropped off, consists of a head of achenes, or dry, indehiscent, single-seeded fruits. A diagram of a typical plant in the genus is shown on the opposite page.

As a genus of garden plants, Ranunculus has been strangely and unjustifiably neglected. As will be mentioned in detail in Part II of this series, *R. asiaticus* has been grown for centuries in the Middle East, and is mentioned by Parkinson in his "Paradisus", published in 1629, as growing in England. Apart from the Persian and Turban descendants of *R. asiaticus*, only a few other species, particularly double-flowered forms, have been grown at all widely. A handful of species have been grown in rock gardens and alpine houses, with varying degrees of success. Nevertheless, the gardening literature suggests that around 200 species and varieties have from time to time been cultivated. It is the purpose of this series of articles to look at these plants, describe them for identification purposes (with a photograph wherever possible), assess their garden worthiness and attempt to explain what growing conditions they require. If at the end, gardeners are a bit more adventurous about growing Ranunculus, that will be a bonus.

Germination

It would be pointless to try to give general guidelines to cultivation as species vary so widely; cultural conditions will be given as appropriate with each species. On the other hand, it is possible to give some general guidance about seed germination.

Ranunculus seeds are often notoriously slow and difficult to germinate. This is often due to the fact that embryos are immature when shed, a condition which is found in a number of primitive families of plants. Nevertheless, it is a good plan to sow seed as soon as ripe, and then be prepared to wait for up to three years for germination. Seed should not be allowed to dry out. In general, stratifying seed or keeping it just around freezing does not seem to help much.

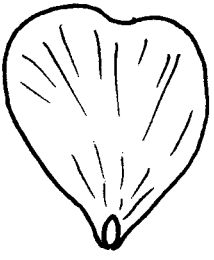
Some of the larger species for herbaceous borders germinate quite well, perhaps having been selected by gardeners for this ability over the years.

There has been a reluctance on the part of gardeners to grow ranunculus, whether in the rock garden or in the herbaceous border, perhaps because of the image of buttercups as pernicious weeds. Ingwersen wrote in the Gardener's Chronicle in 1966 – "Call a plant a buttercup and few people will buy it. It is understandable that gardeners who have wrestled

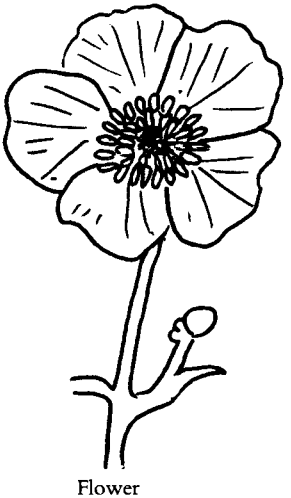
manfully with deep-rooted creeping or bulbous buttercups should be suspicious of any ranunculus". Farrer put it rather differently in his usual purple prose in the English Rock Garden – "In catalogues this race is far too fertile of unannotated names. In point of fact, the family is no less fertile of indistinguishable or worthless weeds, filling every wayside and pasture up to alpine levels all the world over, with a super-abundance of species, many of them annuals, some of them uglies, and a vast army of them not sufficiently distinct to rival the best. These are the low-landers; the alpine section of the family contains few that are not supremely beautiful, and solitary in their especial charm. We are yet strangers to many a white high-alpine buttercup from the Rockies and other ranges of America, that may some day threaten the secure thrones of *R. alpester* and *R. glacialis*".

Farrer lists 67 species, using some names that are not recognisable according to present-day nomenclature. Most of his species were not known as garden plants. Ingwersen in his "Manual of Alpine Plants" lists 55 species, many not currently in cultivation but all having been grown at some time in gardens. The Seedlist Handbook, that indispensable list of plants raised from seed, also presents 55 species, not necessarily the same species as in Ingwersen.

This present series of articles attempts to sift through the dross of the genus and to draw attention to well-known worthwhile species as well as to lesser-known species which would seem to be worth growing.



Petal with basal nectary

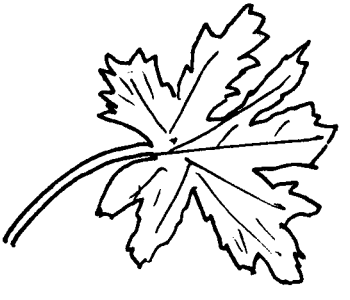


Flower

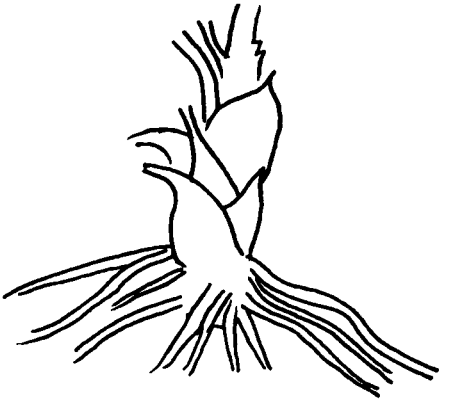
Fruit

Stamen

Achene



Leaf



Base of plant with roots

Structure of typical species of Ranunculus

The Pontic Alps

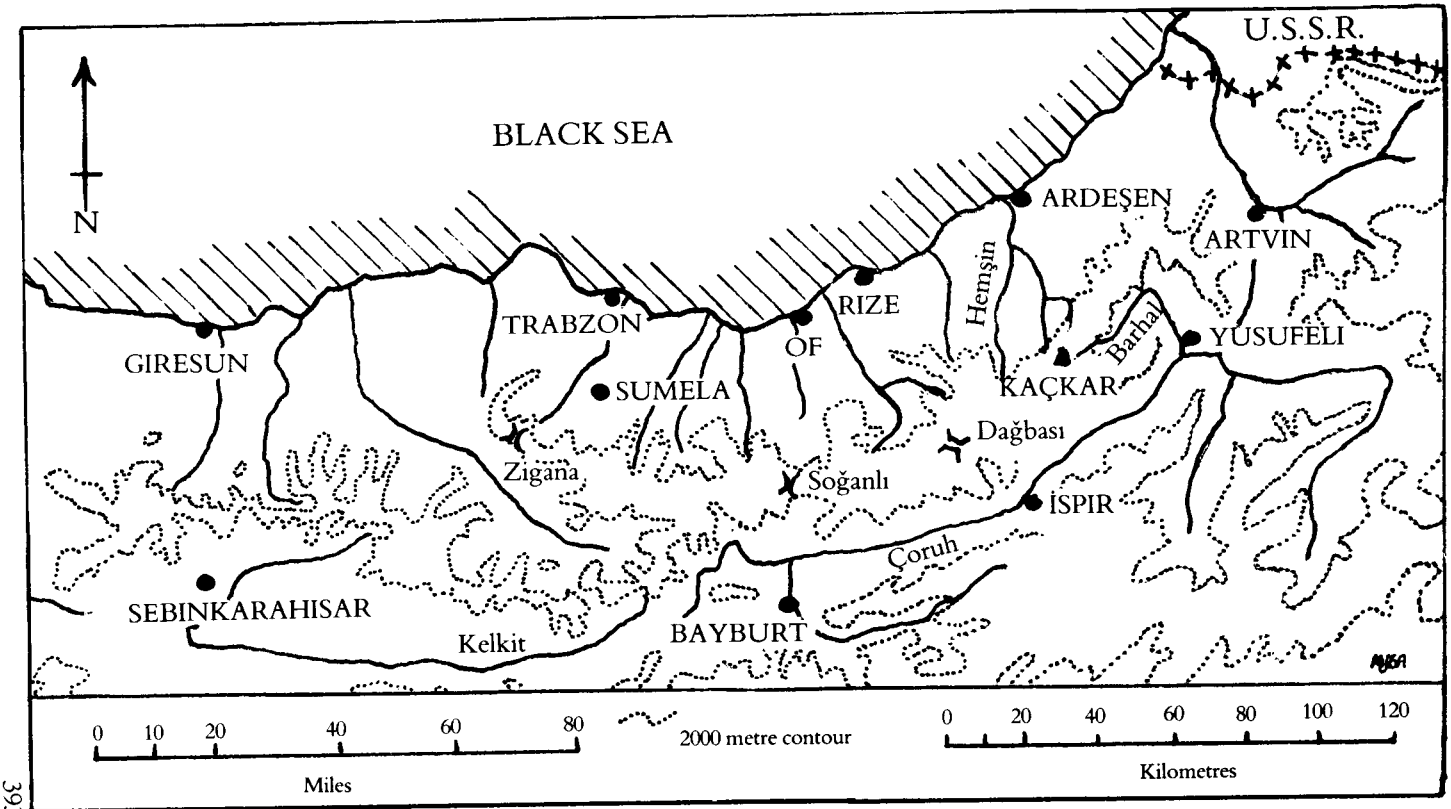
MICHAEL J. B. & LYNN A. ALMOND

PONTIC ALPS is the name generally given to the highest part of the Black Sea coastal range of north-east Turkey, between the Zigana Pass (or a little farther west) and the lower reaches of the Çoruh River around Artvin (see map p.393). This part of the range is also called the Kaçkar Mountains (after its highest peak), or sometimes the Little Caucasus, being by way of an extension south-west of the southern arm of the Caucasus. The mountains rise to a height of 3,937m and fall steeply to the Çoruh River in the south, and even more steeply to the Black Sea coast to the north. It is not an area to be visited without careful planning, and it is essential to speak at least enough Turkish to be able to ask the way. The best maps we found for our preparations were 1:200,000 Turkish and British Military Survey (the latter dating from the last war), which can be consulted in the map room of the National Library of Scotland; the former cannot even be photocopied, the latter can be copied if permission is sought from the Ministry of Defence, but the copies must not be taken out of the U.K. The difficulty about asking your way, even if you have mastered the language, is that the Turks delight in changing the names of villages, so that an enquiry about the next place on your route (according to the map you had to leave at home) may well be greeted with blank incomprehension. This article is the result of two brief visits to the area in July 1982★ and, more especially, in July 1984. We have been able, therefore, to see only a very small part of this beautiful, exciting and little-explored area.

The Zigana Pass has a good reputation as a plant-hunting area and is easy of access, being on the main road from Trabzon to Erzurum. By July, however, the season is too far advanced at this relatively low altitude (2,025m – at the same latitude as Madrid) for anything other than crocus, cyclamen and primula leaves and the remnants of some cowslips and some *Sedum pilosum*. In the forests at the roadside above Hamsiköy (at 1,700m) on the main road north of the Zigana Pass, *Rhododendron ponticum* and *R. luteum* (alias *Azalea pontica*) are shedding their last blooms. But there is still interest here in the shape of *Lilium szovitsianum* var *armenum* (a sweetly scented lily), *Aquilegia glandulosa, Geranium psilostemon*, a tall blue campanula and orchids (e.g. *Dactylorhiza maculata* ssp. *osmanica*).

Even lower, however (1,400m), on well-shaded, north-facing rocks

★See also The Rock Garden, no. 73 (June 1983), pp. 274–7 and no. 74 (Jan. 1984), pp. 382–7



THE PONTIC ALPS

such as those at the remains of the great medieval monastery of Sumela, overlooking a steep, wooded valley from its rocky eyrie about twenty miles south of Trabzon, you can still find *Campanula betulifolia* in flower, with large, white open bells. In the woods below the monastery we found leaves of primroses and *Cyclamen coum* but nothing in flower.

Further west, on the road between Sebinkarahisar and Giresun (a rougher but more interesting road than that over the Zigana Pass), we found *Paeonia mascula* ssp. *arientina* (with large, deep-red flowers, growing on loose, north-facing scree), *Lilium ciliatum* (with a smell of dirty washing), a field full of echium, an attractive sessile putoria, *Dianthus barbatus*, various orchids (including *Dactylorhiza incarnata, Gymnadenia conopsea* and *Orchis tridentata*) and acres of *Rhododendron luteum* (with a few flowers left) on the north-facing hillsides; also, in a shady pine wood, we found leaves of *Cyclamen coum*, both plain and patterned, and of primrose.

The Soğanlı Pass, on the road between Bayburt and Of, is (at 2,370m) a little higher and a little more interesting than the Zigana Pass in early July. Here it is still possible to find on its open flanks a number of species in flower that have escaped the ravages of the grazing sheep and cattle: *Campanula tridentata*, erigeron, scilla, gagea, *Gentiana pyrenaica, Ornithogalum balansae*, geranium, putoria, *Corydalis conorhiza*, potentilla, *Muscari aucheri*, pedicularis, *Draba polytricha, Viola altaica* and, with superb large, lemon-yellow heads of scented flowers growing flat against south-facing rocks right at the top of the pass, *Daphne glomerata*; also in the turf there were *Cyclamen parviflorum* leaves, and on the rocks a prostrate berberis.

The Dağbası Pass, on the road between İspir and Rize, is higher (2,750m), and the flora is still in excellent condition in early July in spite of the cattle which have already reached it. In July 1982 we drove up from the İspir side and back again the same way; the road was rough, but we had perfect weather. In 1984 we decided to come up from the coast, camp at the top and then continue to İspir. It was one of those days, cloud down to sea level and light but persistent rain, normal for Rize. In halting Turkish, we enquired of the desk clerk at the Turist Oteli the whereabouts of the road to İkizdere. After giving us directions, the clerk grasped us firmly by the hand and wished us, with too much feeling for our comfort, 'İyi yolculuk' – a good journey.

The drive up into the hills behind Rize, through the tea plantations for which it is famous, would have been quite pleasant but for our visibility being severely limited by the low cloud. At the small town of Kalkandere the road divided and, in the absence of any signposts (a common deficiency in Turkey), we asked a group of men the way. One of the three came with us as pilot, and it was just as well he did. The road deteriorated

rapidly into a cart track and we took several unmarked turnings; eventually we arrived at a brand new, asphalt road. Neither the latest edition of the road map nor the desk clerk had given the slightest hint that we could have driven ten miles along the coast road west from Rize to the end of this road which leads directly and painlessly to İkizdere.

But every cloud has its silver lining. Mustafa, our guide, was eager to extend us his hospitality. We drove up a narrow, muddy, ever-steepening track for about a quarter of a mile until the car refused to go any farther. We continued on foot up the slippery slopes along narrow paths between the tea bushes. After about fifteen minutes we arrived at a sturdy traditional wooden house, with a fine view over the valley. We left our shoes on the verandah and were ushered into the guest-room, complete with cast-iron wood-burning stove, carpet and sentimentalised photographs of Mustafa and his family. Mustafa's mother and children greeted us and took up positions on the couch in the corner of the room. A large bowl of hazelnuts was produced and Mustafa proceeded to crack them by hand against the metal frame of his chair. His wife brought in tea, bread, butter, olives and honey and we enjoyed a late breakfast. About an hour later, after taking photographs and swapping addresses, we slithered back down the hill to our car and went our way. After İkizdere, the road became a rough track, steep and tortuous, and the landscape became more impressive and the village houses more interesting: sturdy wooden buildings like old Swiss chalets, clinging precariously to the steep valley sides.

Much of the Turkish road network is (given the difficulty of the terrain) surprisingly good. But once they start 'improving' the road, things get a lot worse before they get any better. Our first obstacle was a very steep ramp, about a hundred yards long, consisting of churned-up mud, axle-deep and dotted with rocks the size of footballs. A mile or so farther on, the road was blocked by blasting operations and we were directed onto a temporary 'road' made simply by bulldozing the vegetation off the hillside. This was narrow, steep, deep in mud, rock-strewn and hair-raising – partly because lorries coming down the hill in the opposite direction tended to slide sideways towards us, and partly because we had to maintain an uncomfortably high speed in order not to get bogged down. After about three miles of this purgatory, we arrived back on the old road and chugged laboriously round its steep, rock-strewn hairpin bends up the last few hundred metres to the top of the Dağbasi Pass. All the time visibility was down to about a hundred yards, but we consoled ourselves with the thought that there would be sunshine and blue skies at the top, which was high enough to be well above the cloud.

We were disappointed, however. At the top, a bitterly cold northerly wind was blowing, and the cloud was as thick as ever. We parked next to

the roadmen's cabin, had lunch and then set off to explore the mountainside on the west side of the pass. In spite of the poor visibility and the need to navigate by compass (we knew the lie of the land from our previous visit), we were rewarded with a wealth of flowers to admire and photograph. The pass is overhung by rocky slopes, with frequent banks of melting snow feeding abundant streams, bogs and a sizeable tarn. On the western slopes above the Pass, we found: *Primula algida* (related to *P. farinosa* and growing in similar habitats), *P. auriculata, P. longipes* (and apparent hybrids between these last two), *P. amoena* (a purple or deep red form of *P. elatior*), *Campanula tridentata, Fritillaria latifolia* var *nobilis* (on the drier slopes), *Draba polytricha* (in clumps on the rocks), gagea, a small, purple-blue muscari, *Ornithogalum oligophyllum, Puschkinia scilloides*, brilliant blue *Gentiana verna* ssp. *pontica, Viola altaica* (in both the usual pale cream and also a deep yellow form) and the odd plant of *Rhododendron caucasicum.*

Late in the afternoon, as we walked back to the car, we considered where we could camp. Packing up all the gear to take it far from the car was just too much to contemplate in these conditions, but it was impossible to drive the car off the road with any confidence of being able to get it back on again. As we sat pondering, a gaunt figure padded across to us through the mist. He beckoned us inside the roadmen's cabin, and we followed him into the large, concrete, blockhouse-like structure. After passing through an outer store-room, we came into a room in which there was the smell of cooking and which, in spite of its open windows, was comfortably warm from the heat of the primitive wood-burning cooking-stove against the middle of one of its two long walls. Between glasses of tea we introduced ourselves, and our host, Mehmet İspiroğlu, foreman of the road-builders, and Mustafa the cook introduced themselves and made us feel welcome. Mehmet expatiated on the dreadful weather and on the virtues and equable weather of his home town of İspir, in the Çoruh Valley to the south. We were then fed generously – aubergine and mince stew, rice, tomatoes, cucumbers, yoghurt and bread; when we had eaten our fill, Mehmet tactfully indicated to us that we should withdraw while his men had their meal (Turkish men seem to find women particularly distracting at mealtimes). We were conducted next door to a small room with a kerosene stove and two beds (apparently where Mehmet and Mustafa slept) and were soon introducing ourselves over and over again as about a dozen roadmen arrived from their work and drifted in and out of the room. It is very difficult to explain to a Turkish roadman why you have driven over 3,000 metres up an atrocious road in order to gaze at small flowers in appalling weather – especially when your command of Turkish is fairly rudimentary.

After drinking more and more tea and raki with the men, we eventually

felt that we must get some rest. It was already pitch dark and the gale was still blowing as hard as ever. As we extracted our small light-weight tent from the car and started to put it up on the wasteland next to the road-men's cabin, Mehmet intervened. Clearly he felt that the rules of hospitality did not allow him to permit us to chance our luck in such a flimsy shelter in such weather. Back in the small room with the kerosene stove and the two beds, we were bidden to make ourselves at home for the night. After loud protestations (more for the sake of form than anything else), we gratefully did so, and Mehmet and Mustafa slept in the dormitory with the rest of the men.

Next morning dawned as inclement as ever. We rose early and sat by the stove drinking tea. Mehmet and his men bade us farewell and went off to their work. Back in the messroom we had a typical Turkish breakfast of bread, olives, sheep's milk cheese and plenty of tea, before we said thank you and good-bye to Mustafa the cook. Another couple of hours wandering round in thick mist on the eastern flanks of the pass (during which time we found nothing we had not seen the previous day except some *Dactylorhiza majalis* ssp. *caucasica*) persuaded us to cut our losses and head off south for İspir.

After about two miles we cleared the cloud, which was clinging only to the northern slopes and tops of the mountains. Alongside the stream we found *Caltha palustris, Primula algida* (much taller than at the top of the pass), *Gentiana pyrenaica*, a tall large-flowered erigeron, muscari, ornithogalum, dactylorhiza, gladiolus, fritillaria (in seed only) and, on the rocks at the side of the road, daphne. The road was no worse than might be expected of a Turkish mountain byway, and the drive, taken slowly, was pleasant. We stopped frequently to admire the view – in particular the hillside yellow with fennel and the picturesque summer dwellings of the herdsmen. In mid-morning we joined a group of itinerant bee-keepers (they ferry the beehives around the country on lorries to follow the blossom) for 'elevenses' of bread, tomatoes, cheese, halva and, of course, tea. As we continued through the rocky gorges down to the Çoruh Valley to the south, we stopped beside a row of cliffs overhanging the road, which were festooned with masses of white and blush-pink *Campanula betulifolia*. We saw it very frequently on roadside cliffs and rocks, sometimes in seed and sometimes in flower, but never in such profusion as here; the only other plant of interest we could find in the locality was a yellow eremurus.

The heart of the Pontic Alps lies between the Dağbası Pass and the Barhal Valley, and there is no road at all across the watershed for over 50 kilometres. The northern side is watered by the prevailing northerly wind, laden with moisture from the Black Sea, and is steep and rocky and

covered in dense vegetation. On the lower slopes the main crops are hazelnuts and tea; the deciduous forest of the untamed lower slopes gradually gives way to coniferous forest with rhododendron scrub beneath. This in its turn gives way to alpine meadows between 2,000 and 2,500 metres. The watercourses and valleys are all very steep and overgrown, and communications are difficult.

The southern side is drier and easier (relatively) of access. In the Çoruh Valley there is a Mediterranean type of vegetation, and the coniferous forests of the upper slopes give way to meadows of a dry alpine type at about 2,500 metres. The valleys are still steep but not quite as steep as the northern valleys, nor is the vegetation as impenetrable. The areas mentioned earlier in this article can be explored by car (provided you have a strong stomach and strong nerves), but in the heart of the Kaçkar range it is necessary to walk some distance (and camp) in order to penetrate to botanically interesting areas. Our explorations in July 1984 were confined largely to two almost contiguous areas: the Balakçor Valley (a tributary of the Hemşin Valley – see map) north of the watershed, and the Barhal Valley south of the watershed.

The approach to Balakçor is made by turning off the main coastal highway just before the bridge over the Hemşin river on the western outskirts of the little town of Ardeşen, and proceeding up the valley to Çamlıhenşin. After passing through Çamlıhemşin, you turn left over a bridge as you leave the village and climb up a side valley. The valley is steep and densely wooded; the only patches not covered in forest are the fields cleared for the local crops of maize and other fodder, across which you can see the sturdy local houses, usually with stone foundations and chimneys and with their superstructures made of tree-trunks fashioned into thick planks. The houses are decorated by carving and display fine workmanship, as do the many narrow hump-backed stone pack-horse bridges across the torrents raging down the valleys. We left our car at Ayder Kaplıcası, but it might be possible, with good ground clearance, to drive a few miles farther up the track.

The main track continues in the direction of Kavron, and the path to Balakçor turns off left up the second tributary valley above Ayder. The climb is very steep, through coniferous forest and rhododendron scrub. On the walk up from Ayder to Balakçor, we passed orange poppies, mimulus, silene, *Geranium sanguineum* and masses of *Rhododendron ponticum* and *R. luteum* – but very little of it was still in flower. We were, however, lucky enough to see sufficient flowers on one bush to identify it as *R. x sochadzeae*, a natural hybrid between *R. ponticum* and *caucasicum*, which grows into large bushes like *ponticum* but has white flowers like *caucasicum*. Just below the village of Balakçor, near the rough plank bridge

over the raging torrent of a stream and at a height of about 2,100m, we found a beautiful, large, cream-coloured paeony, *Paeonia wittmaniana* ssp. *nudicarpa* (only described for the first time a few years ago), and in the same area *Aquilegia glandulosa, Pyrola rotundifolia, Lilium ponticum* var *artvinense* (a single delicate stem about three feet high with only one or two flowers on each plant) and a large-belled, purple campanula rambling through the low *Rhododendron luteum* scrub.

It is worth pausing to introduce yourself to the inhabitants of Balakçor. They will undoubtedly be fascinated by you, on your insane venture to look at (not even to pick!) flowers in the mountains, with your heavy pack and your peculiar clothes. Equally, you will be captivated by their winning smiles, their colourful home-made clothes and their sturdy wooden houses. They will happily pose for your photographs, and you may, as we did, see two of the women churning butter in a wooden barrel suspended from the roof of the verandah of one of the houses by sturdy ropes.

Above Balakçor, we passed several patches of *Daphne glomerata*, growing in the short grass and varying in colour from yellow to a burnt orange, and also some *Pinguicula vulgaris* and veratrum. At about 2,500m, we finally got above the low cloud through which, along with its associated drizzle and rain, we had been travelling since before we left the coastal highway. At last we had a view to admire – and what a view! Beyond the top of the valley rises Kaçkar itself, and all round the head of the valley craggy mountains tower up to 3,500m or more. There is a considerable amount of snow left on the upper slopes in early July, and many of the snow-free slopes were running with melt water and carpeted in acre after acre of *Rhododendron caucasicum* (Figs. 140 and 141, p.339), a stupendous sight in the suddenly bright sunlight. The bushes grow low, like heather, to a height of only 30cm or so, and have large, white – occasionally pink – flowers, spotted brown or crimson at the throat. On wading through the rhododendron fields, we found that they gave off a delicate, apple-like scent, although the individual flowers did not seem to smell.

Although there were cattle grazing just above the village of Balakçor, up at 2,600m by our campsite, there was not a beast to be seen in the whole valley. On the valley floor we found *Gentiana verna* ssp. *pontica, G. pyrenaica,* gagea, *Androsace albana, Arabis caucasica,* veronica, *Corydalis conorhiza, Primula algida, P. amoena* (both the usual magenta colour and a few flowers in pure white), *P. auriculata* and *P. longipes* (mostly growing in running water in the middle of the stream). A little higher up, beside a small tarn, the gently-sloping greensward appeared to contain no grass at all, but was composed entirely of the leaves of alpine flowers, a majority of which seemed to be potentilla, providing a yellow haze over the green. Above the tarn and below the great snowfields, at the top of which we

could see half a dozen ibex making good their escape from the sight of us intruders, we found a deep pink form of *Rhododendron caucasicum* together with *Daphne glomerata* (more compact than that near the village below) and some scilla in seed.

On the crags to the north-west above our campsite and between the extensive fields of *Rhododendron caucasicum* below tthe crags, we found *Primula amoena, P. elatior, Corydalis conorhiza*, a large, red pedicularis, *Trollius ranunculinus* (with wide-open, buttercup-yellow flowers an inch or so across on stems a foot or so high), *Potentilla rupechtii* (with clusters of large, vivid yellow flowers almost 3cm across on stems 5 to 8cm tall), a fine large erigeron, an aquilegia still in bud, *Anemone narcissiflora, Daphne glomerata, Campanula aucheri, Androsace villosa, A. albana* (like *villosa* but with groups of up to half a dozen or so flowers growing on stems an inch or two long), sempervivum and saxifrage. The view out north-westwards from the top of the ridge across the top of the clouds towards the Black Sea was marvellous – exciting and yet at the same time calming.

On the eastern ridge (the opposite side of the valley from our campsite and, in fact, the watershed ridge), there was far less *Rhododendron caucasicum*. In spite of the fact that much of the way to the top of the ridge was over loose scree, however, there were many choice flowers: *Gentiana verna* ssp. *pontica* (a good, rich blue, but not quite as rich as those we had seen on the valley floor and at the Dağbası Pass; at the same time these flowers were larger, some almost two inches across), cushions of *Draba polytricha*, majestic red pedicularis, yellow saxifrage, and most of all the primulas – *P. auriculata* in serried ranks, *P. longipes* in massive clumps on the loose scree (dry as dust on the top but running with melt water less than a foot below the surface), and *P. amoena* colouring the hillside red below patches of white *Rhododendron caucasicum*. The top of the ridge, which afforded us a superb view of the Balakçor Valley, of the headwaters of the Barhal Valley to the south-east and of the gaunt and central massif of Kaçkar to the north-west, lay at about 3,000 metres. In addition to a dazzling display of *Gentiana verna* ssp. *pontica, Primula amoena* and potentilla in the grass, and rocks covered in *Androsace villosa*, we were pleased to find some good specimens of *Corydalis alpestris*. This is a much more robust and handsome plant than *C. conorhiza* and has large, sky-blue flowers, which looked even more striking against the lichen-covered rocks. It was growing in the soil between rocks and small boulders, and, although the surface temperature of the rocks was high, the roots of the plant were in cold, damp earth beneath them.

The Barhal Valley, one of whose upper tributaries runs down from the other side of the col, is approached by turning off the main Artvin-Erzurum highway at the confluence of the Oltu and Çoruh rivers and con-

tinuing up the Çoruh Valley to the little town of Yusufeli. You continue straight through Yusufeli and take the road signposted to Sarigöl. Drive straight through Sarigöl and bear left at the fork after the bridge at the end of the village. The rough, narrow road then winds up through the gorges of the Barhal Valley, past the village of Alti Parmak with its magnificent medieval church (still maintained as a mosque in 1984 but, unfortunately, about to be replaced by a new mosque), until, about 50 kilometres after leaving Yusufeli, you reach the village of Yaylalar, within sight of the high peaks. Here the road ends, and it is a good half-day's walk up the valley, through the village of Meretet and a deserted village whose name we did not discover, to the alpine pastures on the north-eastern flanks of Kaçkar. The streams appear as full as on the northern side of the watershed, but the area is much drier, the ground itself is drier and the season is more advanced. The differences in the flora also demonstrate the change in climate on the south-facing side. We are now virtually in a rain-shadow; the air is drier and most of the water comes from the melting snowfields on the high peaks.

At about 2,800m in the head of the valley above Yaylalar grows an alpine flora similar to that in the Balakçor Valley, but the plants flower earlier and there is no sign of the moisture-loving *Rhododendron caucasicum*. We found *Primula longipes* growing here only on the stream margins, in running water; also we found *Gentiana pyrenaica* in profusion, *G. verna* ssp. *pontica* (the large, lighter-coloured form), *Anemone narcissiflora* and erigeron; there was also scilla and *Fritillaria latifolia* var *nobilis* in seed. Flowers here which we had not seen in the Balakçor Valley included *Arnebia echioides* and a yellow sempervivum. A little lower down, as the valley became hotter and drier, we found *Geum coccineum*, two different and very fine large-flowered geraniums, a beautiful, bright orange-yellow dwarf chrysanthemum with finely-divided silvery leaves, *Campanula tridentata, Daphne oleoides,* helichrysum, a delightful, large-flowered but squat yellow centaurea, probably *Centaurea balansae*, with thick woolly leaves (which we had seen, without flowers, up to about 3,000m), and a large-flowered, purple, ground-hugging thistle-like flower, very striking but so far a complete mystery. Near the village of Meretet we passed by fields of tall blue campanula, orange poppies, *Trifolium badium* and *Lathyrus grandiflorus*; the rocks were covered with sedum and onosma and festooned in places with dog-roses.

The high mountain villages on the southern slopes of the Pontic Alps are also built of wood, as sturdily as those to the north but in a different style. There is more open space between beams, particularly in the out-houses and barns, as befits this drier climate. As you travel up or down the Barhal Valley, you pass picturesque hamlets by the side of the river, or

glimpse them perched high up on a distant wooded ridge, anywhere where there is sufficient cultivable land to support a little agriculture. In July the cereal crops are being harvested or drying in the fields, but the mills are not yet in action. In this land of plentiful mountain streams, each family has its own mill and you can see dozens of them around any village of any size. Typically they consist of a sturdy wooden hut about two to three metres square, inside which are the horizontal millstones. The hut is built on stilts (often only on the downward side on the steep hillside), and through the floor projects the wooden shaft that drives the upper millstone. To the bottom of this drive-shaft is fitted a carved wooden turbine, about 1½ metres in diameter. The motive power is provided quite simply by directing a convenient nearby stream onto the turbine blades by means of a chute which may consist of a steel pipe, but is more commonly simply a tree trunk carved into a channel.

The lower slopes of the Pontic Alps, both north and south, are in fact of considerable interest botanically, although in general it would be necessary to visit them earlier in the year than July in order to see many flowers. In the course of the most enjoyable picnic in the woods on the ridge above Artvin (at a height of only about 1,000m or so but in an area intermediate in climate between the very wet coast and the dry interior), we saw flowers of *Lilium ponticum* var *artvinense* (which takes its varietal name from the town of Artvin), *Rhododendron* x *sochadzeae* and *R. ungernii*; this last was a magnificent unexpected treat, with its very large leaves, the undersides of which are covered in rich brown indumentum, and its large white flowers decorated at the throat with vivid green spots. *R. ungernii* is only found in this small corner of Turkey up against the Soviet frontier, and it really belongs to the Caucasian flora. In fact, it looks as if it had wandered there from the foothills of the Himalayas or south-west China.

We were taken for this picnic by our good friend, Süleyman Bağlamaç, and his sister-in-law, Nilgül, and were accompanied by her two children, Ceneat and Nuray, who disconcerted us by picking any flower we betrayed an interest in and presenting it to us as a gift. We had the pleasure of staying for two days in Artvin with Nilgül and her husband, Mustafa, Süleyman's brother, and relaxing after our exertions in the mountains. We met lots of their and Süleyman's friends and relations and Süleyman's fiancee, Yaşar, and her friends and relations. It felt as if we were introduced to half the population of Artvin, and everywhere we went we experienced once again the great warmth of interest and hospitality which the Turks show towards guests and travellers. It was a fitting end to a memorable holiday.

Tree stumps for rocks

NORA HITCHMAN

MY GARDEN is in Shakespeare's country.

It lies on the rim of the shallow vale of the River Avon gouged out by a glacier millions of years ago. Looking southwards across the vale, I see the spur of the Cotswold Hills on which Hidcote Garden was created. My garden is on similar soil, but only a third of Hidcote's age, hence the continual battle with soil conditions.

When the glacial avalanche carved out our valley, it left a good deposit of gravelly, friable soil over the riverside areas, but on the higher banks exposed the heavy lias clay which is a feature of our Midland counties. And this is the kind of soil on which I have struggled for a quarter of a century to make a garden.

The heavy nature of a strongly alkaline soil imposes limitations as to what plants will grow in such soil however much one loads it with peat, ash and soot. One advantage is that I need never want for real terra-cotta pots which a local potter has made, and will make for me, out of this clay which fires to a beautiful, warm red.

Membership of the Alpine Garden Society, the pleasure of their tours abroad as well as the learning opportunities of local meetings, has introduced me to many of the peat-loving or lime-hating plants which will not flourish in my soil.

A longing to possess and to grow some of these small plants of peaty habitat persisted; then, observing how beautifully certain ferns, saxifrages and sedums clad the old tree stumps of cottage gardens, an idea took shape. Instead of a peat-filled trough, I would try peat blocks and logs of wood. By luck, I acquired some fantastically-shaped oak-root stumps; old and gnarled, they were arranged and rearranged in trial formation, then gently eased into the clay of a high-standing ledge above a little sunken garden. (The whole area of tree-root is not much more than two metres long by one metre across.)

They looked, then, incredibly like a range of miniature Himalayas, or the fabled mountains of the 'Lord of the Rings'. Upstanding peaks of broken trunks softened into the shoulders of hillsides making mossy 'glens' and hollows, and even some 'caves' in the eroded roots where surely some small alpine would find a home.

The thick clay was removed from all the bays and hollows to a depth of at least 45cm and the space filled with peaty compost. On the 'northern'

face backing onto a lawn, the space was also cleared and compost filled. In this spot, a choice plant of *Saxifraga fortunei* has settled with handsome, red-backed rounded leaves, a rewarding plant when late in autumn it lifts its lacy white florets over the grey ridge of the stumps, when all else seems past flowering.

As a first furnishing, fairly ordinary, easy-growing plants were used to see how they would stand conditions of almost complete winter-shade, from the house – for this is a miniature garden to have close at hand. The smaller encrusted saxifrages, which love to settle into the crevices of tree-bark, were well suited. The spider-web saxifrage (*S. arachnoides*), S. *cochlearis* 'Whitehills' and *S. burnattii*, red-stemmed with starry white flowers, and several of the commoner cottage garden kind of saxifrages have grown well.

Ferns took most readily to the tree-stumps; *Blechnum penna-marina* from New Zealand has obliged by running along the root-base, clothing the junction with the ground level. In another bay on the northern side, *Adiantum aleutica* has taken root, raising beautiful radiating fronds of fresh green, yet as hardy as nails. These two are especially good, being of the right scale for this tiny garden. The oak fern has dropped its spores from a nearby planting and has filled a 'cave'; lovely as this plant is, it may prove too large.

The central bay facing the house is filled with *Andromeda polifolia* with a profusion of pink bells, urn-shaped and crimped-edged. *Primula farinosa* and *Lithodora oleifolium* are also tucked into this space, a consortium of pinks, soft blues and grey-green leaves. (Here I must also plant Cassiope, for in Greek mythology she is the mother of Andromeda, though not botanically!)

In front of this group there is a small *Polygonum vaccinifolium* which last year showered its pink spikes over the little wall of the sunken garden. Here was once *Primula flaccida* with powder-blue 'temple-bells', unfortunately difficult to keep, being a biennial.

Tucked into another niche is *Primula cortusoides*, while over the ridge is the very similar *Cortusa matthioli*. Dark-leaved *Primula* 'Guinevere' holds on to an outlying flank (along with a beautiful, large, white violet of unknown variety), and *Primula altaica* (presumably from the Russian mountains of that name) is a real beauty and excellent 'doer'.

It would be quite impossible to grow most of these plants in any other part of this clayey, wind-swept garden.

The birds have also found shelter in the tree-stumps; a robin slipped into one of the innermost cavities and hatched a brood. The stumps, instead of being committed to the bonfire, have given me great pleasure by making a habitat for some of the smaller lime-hating plants – never could I otherwise have had the joys of Andromeda.

TREE STUMPS FOR ROCKS

Spring flowers of Rhodes

CHRIS and MARIE NORTH

RHODES – RHODOS OR RODOS IN GREEK – is sometimes styled as "The Island of Roses". Since Rosa species do not seem to grow wild there, could this be an allusion to the rock roses – the Cistus species? If this is so, perhaps the main reference is to *C. parviflorus* which is common there but not so frequently seen elsewhere. It forms a neat rounded bush covered with rather small flowers whose rosy-pink colour would have suited the ancient Greeks, for they evidently expected their roses to be red as the name "rhodon" – a rose – implies.

Although this is the most easterly of the Greek islands, it is fairly accessible through its own international airport. Another advantage it has for the plant hunter is that, being not too large (approximately 73 x 28km), it can be examined by scooter or car from a single base. Furthermore, it is noted for the reliability of its sunny, warm spring weather and it has a number of interesting wild plant specialities. Unfortunately there does not seem to be an easily available treatise on the flora of the island, but Huxley and Taylor's (1977) book on the flowers of Greece is helpful.

We were there between 23 April and 7 May, stationed at Rhodes town in the extreme north of the island. The town is especially popular with sun-seekers from Scandinavia, and many of the local shopkeepers and hoteliers speak as good Swedish as they do English. But the sun is not the only asset to be enjoyed; the town with its extensive Crusaders Castle is truly fascinating.

Though we made several sorties, mainly by scooter but also by bus and by boat from Rhodes port, for brevity these will be treated as two trips – one each down the east and the west sides of the island. The road down the east side took us past Afantou to Epta Pigai – Seven Springs – where there is lush, well watered ground and the maidenhair fern *Adiantum capillis-veneris* was plentiful. We also saw *Orchis italicus* which seems to favour moist situations. Further, by the side of the road to Arhangelos, there were extensive groups of serapias with dark stems and bracts which were difficult to identify exactly, though they were obviously a *S. vomeracea* type with a small lip, possibly the species *S. parviflora* or *S. orientalis*. With them grew quantities of the rather uncommon holy orchid *Orchis sancta*, a species confined to the eastern Mediterranean region. It is similar to the common bug orchid *O. coriophora*, but has larger flowers with a toothed margin to the lip which is generally unspotted and ranges in colour from

a bright red to a strange pale, smoky pink or mauve. There were a few plants of a particularly fine, tall form of *Ophrys fuciflora* and the rare but dull *Ophrys orientalis*. The latter has been placed as a sub-species of both *O. fuciflora* and *O. scolopax* and the books (Sundermann 1975 and Williams *et al* 1978) record it from Cyprus and western Turkey but not, apparently, from Rhodes. Around here there were some very large and imposing specimens of the smelly *Dracunculus vulgaris*.

Off a side road to Cape Vagia there were many plants of a Campanula species growing on the rocks. It varied considerably, and some plants had impressively large, bowl-shaped flowers – probably a form of the group classified under *Campanula repestris*. Alongside grew another campanula with three, instead of five-lobed stigmas, possibly a form of *C. rupicola* – but this is a difficult group to identify. On rocks by the sea was the tiny *Asteriscus maritimus* and the rayless Camomile *Anthemis cretica*.

Arhangelos is a well-kept small town with a white church tower that looks like a many-tiered wedding cake. Just outside here we saw a form of *Ranunculus asiaticus* with so brilliant red flowers that the poppies growing alongside seemed quite dull by comparison. There was also the annual *Adonis cupaniana* which has alternating yellow and red perianth segments. The road leads to Lindos, which all visitors came to see, and the path to the classical site was choked with tourists and little girls selling their hand-made lace doilies. Escape by a back street and one finds an interesting and relatively empty small town. On the rocks and walls between the houses grew *Campanula rupestris anchusiflora* – a speciality of Rhodes with rather long, bell-shaped flowers.

Going out along the western coast road, one passes Rhodes town's main sandy beach which, when we were there, had become invaded by the hottentot fig *Carpobrotus edulis*, a kind of mesembryanthemum with large, straw-coloured flowers that give rise to edible fruits occasionally seen in the markets. It is less common than the similar brilliant red *C. acinaciformis* that often graces hotel flower beds throughout the Mediterranean region and has become naturalised in a few places on the south coast of England. Here in Rhodes, the hottentot fig was being laboriously dug up from the beach and burned. With it grew the showy horned poppy *Glaucium flavium* which suffered the same fate. Just out of the town amongst rocks by the roadside there were plants of *Cyclamen persicum* and another Cyclamen which produced huge tubers like those of a maincrop potato, some of which had been rooted out of the ground by an animal; they may have been *C. graecum*. In scrub nearby, where there was much *Styrax officinalis*, we watched bee-eaters and saw our first flowering plant of *Limodorum abortivum*.

Some 15km out of Rhodes town, one has a choice of forking left to

Psinthos or continuing along the coast road to Fanai. Taking the left-hand route one comes to Petaloudes, the so-called "Valley of the Butterflies". These are not true butterflies but a species of tiger moth, and, although they occur in thousands during the summer they are not apparent in April and May. Continuing along this road to Elousa, we came to a field which had once been cultivated but was now neglected and taken over by *Anchusa azurea*. It was a magnificent sight, especially as it swarmed with swallowtail butterflies – *Papilo macheon* – and the contrast of blue flowers and yellow butterflies was breath-taking. Continuing along this road or coming off the coast road at Kalavarda, one comes to Profitis Ilias, the 900m mountain noted for its floral treasures. It is not as high as Mt Attavyros (1,215m), a few kilometres to the south-west, but that peak is relatively inaccessible and of less interest plant-wise. The road goes practically to the top of Mt Profitis Ilias which is tree covered – mainly with pines. Here, amongst the pine-needles, grew carpets of *Cyclamen repandum rhodense*, a form confined to Rhodes, with delicate white flowers. With it grew another indigenous species, the white-flowered *Paeonia rhodense*. These were enjoyed accompanied by the call of an irritating cuckoo which stuttered.

We saw more species of plants on Rhodes than are recorded here, but unfortunately our detailed notes were stolen from a locked hired car on a subsequent holiday – not, we hasten to add, on Rhodes. It is to be hoped that the thief may have profited by our hard-won records. Some other species to be seen on the island are described by Johnstone (1978), but undoubtedly there are more treasures to be found there. In 1980 Mr Ray Johnstone (1981) discovered and photographed a flowering plant of the very rare orchid *Comperia taurica* – the first record of its occurrence on Rhodes and one of the very few sightings in Europe.

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Fig 150 *Fritillaria rhodokanakis* (See p.384) Photo: R. Johnstone

Fig 151 *Lithospermum buglossoides* (See p.387) Photo: M. & H. Taylor

Fig 152 *Leucogynes leontopodium* (See p.370) Photo: H. Esslemont

Fig 153 *Ranunculus paucifolius* (See p.385) Photo: H. Esslemont

The delights of descent, Zillertal Alps, Summer 1985

RICHARD C. SIMPSON

JULY IN the Alps at first sight is the season of Campanulaceae and Compositae, but many of the high alpines are at their best. One of the pleasures of Austria is the accessibility of high alpine lands without hours of climbing to attain such heights, since cable-cars and chairlifts whisk one steadily upwards to such grounds. The Zillertal Alps, which form the border with the Alto Adige of Italy, are dissected by numerous side valleys (grund), any of which should prove to be a rock gardener's dream. I investigated three particular areas; the Tuxer valley above the village of Hintertux; the high plateau between the Stillupgrund and the Zillergrund at approximately 2200m, but leading to the Ahornspitze at 2976m; and the Pfitschergrund, leading to the Pfitscherjoch Pass into Italy (2200m).

The highest level reached was below the Olperer peak (3476m) at about 2600m where the snow line commenced. This particular mountain and other peaks around form the rims of cirques which contain the Tuxer Glacier, the snows of which make possible all-year-round ski-ing. The Tuxertal was the only valley with permanent snow in July at the heights reached.

July in the Zillertal Alps is the month of the highest average temperature, but downpours are not infrequent and are liable to fall as snow above 2000m. Above 2500m, snow and ice still lie in the cirques and on the ridges and on peaks. These high temperatures result in a great deal of meltwater which pours into the valley streams and rivers via numerous waterfalls, some of considerable height. The highest waterfall in Europe is located at Krimml in the neighbouring Speichergrund.

Perhaps a comment about this in relation to cultivation of alpines would not be inappropriate. From the deep snows (2-3m) which still lie on the upper ridges in June, the sudden melt of July brings an abundance of water; this coupled with the July high temperature leads to the 'wilderness' bursting into flower. The high alpine flora requires a soil which is free-draining, and this is often provided by fine glacial debris, which is either deposited by glacial melt or blown into fissures amongst the rock and scree. However, this finely-divided material must be nutrient-rich since it supports a profusion of species, both in number and in diversity. A more structurally developed soil is present in alpine meadows; nevertheless, this

must also drain relatively freely since marshy conditions are infrequent. Such drainage is facilitated by the frequency of streams and the structure of the soil itself. Nevertheless, the meadowland soils because of the free drainage must be subject to leaching of mineral salts, and this nutrient deficiency is revealed by the presence of semi-parasitic, but very colourfully-flowered, plants such as yellow rattles, louseworts and eyebrights. These species can photosynthesise, but supplement their nutrition by attaching feeding organs to the roots of other species,

How does all this relate to the cultivation of alpines? It is usually suggested that low temperature is a necessity for germination, but might it be that high summer temperatures are equally important to seed set and to inducing the correct physiological state within the dormant seeds? Again free drainage is seen as a paramount need. However, there is certainly an abundance of water in the soil at seed set time, and one can grow certain species in the garden quite successfully on a far-from-free-drained, clay-based soil. Perhaps the meadowland species are not so demanding as the high alpines. Does one need those precisely 'scientific' composts closely regulated as to ingredients?

A nutrient-deficient, free-draining soil might be advantageous. This suggests that a poor loam should be one of the ingredients. But perhaps leaf mould, sharp sand and grit would prove best.

It is usual to describe vegetation zones as one ascends, but, since my quest began on the 'tops', I should like to reverse this trend. In the Zillertal Alps the snow line commences at about 2500m, but aspect, degree of insolation, and slope all modify this figure . The snow line is several hundred metres above the tree line, and between the two is an extensive area of tundra and alpine meadowland. Vaccinium heath and alpine scrub may also develop, the latter often dominated by large tracts of alpenrose (*Rhododendron ferrugineum* (Fig. 139, p.338) and *R. hirsutum*). In some areas, prostrate tree cover is a feature of the landscape, forms such as mountain pine (*Pinus mugo*) and prostrate juniper (*Juniperus communis nana*) predominating. Such communities lie between the alpine and sub-alpine meadowlands. Below these meadows the valley sides are clothed with coniferous forest (*Picea abies*) which extends right down to the valley floor at 600-750m. One is struck by the paucity of the flora in this forest compared with the exuberance of the meadows and the high ridges.

The high alpine zone at 2000-2500m in the Tuxertal consists of fractured rock fragments which eventually erode down to a free-draining debris of uniform particle size, which still remains subject to flushing away and erosion by heavy rain or meltwater. Through this primitive soil bare rock protrudes and extensive scree beds are developed. These conditions provide the 'foothold' for two species of rock jasmine, the pure white yellow-

eyed flowers of *Androsace helvetica* and the equally lovely pink flowers of *Androsace alpina*. Great and small cushions grow in the talus against rock ledges; one's senses soar when one thinks of the difficulties attendant on their cultivation at low altitudes. Where a little more 'soil' accumulates, masses of the blue trumpets of *Gentiana verna* appear mellowed by the range of whites of *Cerastium alpinum, Hutchinsia alpina* and the glowing white of *Ranunculus glacialis*. On more exposed rocks, *Saxifraga aspera* and *S. paniculata* grow; in the shelter of the rock one finds the white-blue florets of *Erigeron uniflorus*. Screes are vibrant with the glowing yellow flowers of *Geum reptans* and *Doronicum columnae*. Everywhere the red runners of the geum are seeking out fresh grounds, and here and there its silky seedheads are apparent. In the meadows the presence of *Geum reptans* was revealed only by such seed heads. Where a shallow soil supported a simple turf, this was vibrant blue with *Myosotis alpestris*, and the quieter blue of phyteuma accompanied by the ever-present alpine daisy, *Leucanthemopsis alpina*, and the yellow-oranges of Crepis spp., including *Crepis aureas*.

Other species were dominant in the Pfitschergrund sward such as Campanula spp., *Jasione montana* and *Arnica montana*. On the pass below the Pfitscherjoch an eroded stony turf supported *Gentiana verna*, and scattered groups of *Dianthus alpina* and *Dryas octopetala*. The yellow flowers of *Viola biflora* twinkled from the shade of boulders. Beside the track those delightful purple-orange flowers of *Linaria alpina* coloured the debris, and in grassy places the cream-yellow hoods of *Pedicularis tuberosa* were spotted. An association of miniatures developed where turf was short and sparse – silver-leaved *Achillea nana, Omalotheca supina* and *Senecio incanus* were set against the blue of phyteuma, with the less colourful flowers of *Oxyria digyna* and *Polygonum viviparum*, the latter already relying more on the vegetative mode of reproduction by bulbils borne amongst the flowers.

On deeper soils in alpine meadowland the yellows and oranges of composites provided a backdrop for *Achillea nana, Leucanthemopsis alpina*, Campanula spp., and *Phyteuma betonicifolia*. Height in this array was afforded by huge white drifts of bladder campion, *Silene vulgaris*, and, where drainage was less good, the blue flowers of alpine sowthistle, *Cicerbita alpina*, and pink heads of *Adenostyles alliariae*. Here also were the spray heads of the white-flowered *Ranunculus aconitifolius*, whilst beside the path the yellow buttercups *Ranunculus montanus* and *R. thora* were quite common. A rare find, but a diminutive treasure, was *Gentiana nivalis*.

Meadows between the Stillupgrund and the Zillergrund were the home of the bearded bellflower, *Campanula barbata* (Fig. 142, p.340), which grew in profusion from the high tops down to the forest edge, increasing in stature as one descended. Specimens of several shades of blue and the white

form were noted throughout the range.

As one descended, the meadows became spattered with alpenrose and the yellow-green heads of the thistle *Cirsium spinossima* so typical of alpine lands. In the Tuxertal, alpenrose was in full bloom, but in the other localities it was mostly at the seed stage with only specimens in some degree of shade remaining in flower.

Vegetative spikes of *Veratrum album* dotted the scrubland habitat at about 1200m; no flowers were found. On shaded banks, *Saxifraga rotundifolia* grew, also occasional patches of the golden yellow globe flower, *Trollius europaeus*. One stand of grass of Parnassus, *Parnassia palustris*, was seen in the Pfitschergrund, a plant which Grey Wilson records as rare in the Alps. In this same locality grew the lovely *Callianthemum anemonoides*.

The saxifraga flora was interesting both for its diversity and for the variety of form with altitude. Compact cushion species occurred at higher altitudes, more open forms beside streams and in wet flushes, and the tallest forms in scrubland at the lower levels. Typical of the high mountain forms were *Saxifraga aspersa* and *S. paniculata*: the wetland forms were *S. aizoides* and *S. hirculus* and a plant tentatively identified as a form of *S. stellaris*. The scrubland species was *S. rotundifolia*. *Saxifraga oppositifolia* was also present on the high tops, but had long since finished flowering

Unlike upland habitats in the U.K., few birds were apparent, but the insect fauna was most interesting. Much more colourful species of butterflies were seen flitting about the alpine meadows as compared with the valley floor grassland. Red admirals, fritillaries and coppers were noticeable. The smaller moths all appeared to be very dark in colour: burnet moths were common. Tiny moths of black colour did however reveal a striking orange flash when they took off. Large ants, but seemingly solitary foragers, moved across the stony trails. Ponderous weevils picked a passage across the stones. The interesting bloody-nosed beetle was also observed.

I hope these brief impressions have conveyed something of the excitement of a summer in an alpine habitat made possible with a modicum of effort, but more enjoyable through ease of access. Any valley in the Zillertal Alps is likely to prove rewarding, but my impression is that each has its own particular fascination. The Tuxertal was exhilarating for the high alpine flora: the plateau between the Stillupgrund and Zillergrund made beautiful with the abundance of the bearded bellflower; and the Pfitschergrund notable for alpenrose and the variety of saxifrages.

So often the Mediterranean lands appear parched and brittle in the summer heat, their floral display being at its best in the spring. My advice is to follow the high alpine trail, for July and early August is not too late to sample its delights. The welcome afforded a traveller by the hospitable Tyroleans is only exceeded by the delights of the descent!

Diapensia lapponica L.

PETER J. SCOTT
Memorial University, St John's, Newfoundland, Canada

DIAPENSIA LAPPONICA (Figs. 137, p.337, and 138, p.338) is a circumpolar arctic-alpine species that extends south to Scotland, where it is found at Glenfinnan in Inverness-shire, and it occurs in Newfoundland and New England. This species belongs to an ancient and senescent family that has thirteen species and one hybrid. The genus, *Diapensia*, consists of three species in the Himalayan region, and *D. lapponica*. *D. lapponica* has two subspecies which have distinct distributions. Subspecies *lapponica* occurs in the Keewatin District of the North-West Territories of Canada, and in eastern North America from Mt. Washington (New Hampshire, USA) to Ellesmere Island and in Greenland, Iceland, Scotland, Scandinavia, and the western Soviet arctic and subarctic. Subspecies *obovata* is found in eastern arctic and subarctic Siberia, Kore, Aleutian Islands, Alaska and the Yukon. There have been no reports of *D. lapponica* from between Bathurst Inlet and the east bank of the Mackenzie Delta in North America, nor from the western part of Siberia. These two breaks in the circumpolar distribution separate the two subspecies. I have studied many specimens from all parts of the range, and the only way to distinguish the two subspecies is by leaf shape. Subspecies *obovata* has obovate leaves, while those of subspecies *lapponica* are narrowly spatulate. The shapes are best determined by measuring the leaves – the length/width ratio for subspieces *lapponica* is 2-2.5, and for subspecies *obovata* it is 2.75-2.8. Pink flowers have been reported in both subspecies, and double and normal flowers were found together on a plant on Mount Monroe, New Hampshire, USA.

Several aspects of the growth pattern of the plant make it interesting to gardeners. In exposed, windy conditions the plant forms a dome, while at lower elevations it grows as a recumbent mat amongst the other plants. The dome shape causes problems for cultivation of this species at lower altitudes or latitudes because it acts as a solar heat trap, and our studies have shown that on a sunny spring day the leaf surface of the Diapensia dome exceeded the temperature of any other object in the environment by as much as 8°C at 8.00 a.m. and by lesser amounts later in the day. Diapensia undergoes an annual cyclic colour change from dark burgundy in the winter to an olive green in the summer and this adds to the attractiveness of the species.

Given a favourable growing season, a number of arctic-alpine species, such as *Silene acaulis* and *Rhododendron lapponum*, bloom twice. In *D. lapponica*, however, we have found that individual plants in Newfoundland either bloom in June (May 19 to June 20) or in August (July 29 to August 29 or later). We discovered that up to forty per cent of the seeds set by the June bloomers are destroyed by a fungal infection, and so it would seem that August-blooming is an adaptation to a more temperate location. June-bloomers disperse their seeds in late summer while the August-bloomers release their seeds in the winter when they can be dispersed by blowing over the snow crust. Seeds collected in late December from August-bloomers germinated in eleven days. Caution is indicated as the seedlings are quite sensitive to heat.

This is a lovely plant for the rock garden, as are other members of the family, Diapensiaceae, such as *Shortia* x *intertexta* 'Wimborne' FCC/RHS (1981).

Broadwell Nursery closedown

IT IS WITH some sadness that I announced that on Saturday, 28 September 1985, this nursery would close down.

It is now nearly forty years since I started this nursery. I have enjoyed every minute of those years and am most grateful to the many customer-friends who have made it so rewarding. But I now feel that at the age of 70, I would like to enjoy my own garden, in my own time and without ties, whilst I am still active enough to do so.

I am giving this announcement as wide a publicity as possible, but inevitably some of the many people who have come to the nursery over the years may not hear of the closedown. I would be most grateful therefore if you would tell any of your friends who might want to pay me a visit that business ceased on 28 September.

JOE ELLIOTT

Show reports

Newcastle-upon-Tyne – 13 April

Winter temperatures in the north of England were generally less severe than those experienced in the south, although the spring was cold and often slow. The outcome of this climatic cocktail produced at Newcastle yet another show of quality with a record number of exhibits and exhibitors.

In Section 1, the R. B. Cooke Plate was won by E. G. Watson from Wideopen with such notable and rare plants as the recently discovered New Zealand *Raoulia eximia x hectori* and the yellow spring gentian, *Gentiana oschtenica* from the western Caucasus, a gentian which appears to open its flowers in succession rather than in one full display as with *Gentiana verna*. This gentian gained the E. G. Watson Trophy for Class 41 (New and Rare in cultivation, in flower), and the Roger Smith Cup for six pans grown from seed was also awarded to Eric for a superbly presented entry of *Fritillaria crassifolia, Iris vicaria* (seed from Tashkent), *Haastia pulvinaris, Dionysia bryoides,* a very short *Paraquilegia grandiflora* from Eric's own seed, and *Primula stirtoniana* from seed collected in the recent McBeath Himalayan Expedition.

The Farrer Medal was contended between a very large flowered form of *Fritillaria tubiformis* shown by Paul Matthews, *Primula* 'Margaret' (Duncan Lowe), and *Primula marginata* 'Shipton form' (Alan Furness). The medal finally went to the last plant, with the others being awarded Certificates of Merit.

The A.G.S. medals for the Six Pan Classes went to Mrs R. Fuller of Whitby and Mr R. A. Hodgson of Stokesley, for some fine plants including *Saxifraga georgei* and the natural hybrid between *Primula marginata* and *P. allionii, P.* x 'Miniera'.

In Sections B and C, the Gordon Harrison Cup and the Cyril Barnes Trophy were won by Mr J. Mullaney and Mr D. Walker. In Section B, many fine plants of the blue *Corydalis cashmeriana* were shown. *Helichrysum ambiguum* won the silver foliage class, and Mr P. Matthews showed an attractive plant of *Fritillaria reuteri*, grown from seed from the Botanical Institute of Iran. The flower colours of yellow, orange and brown were most attractive. Mr Ray Fairbairn of Allendale gained eight firsts in Sections A, B and C, the most memorable being the fine pan of

Androsace alpina shown in Class 30.

As always, the competition and standard of plants shown in Section C was high. Mrs A. Watson produced a fine three-pan entry of *Trillium rivale, Shortia uniflora* and *Primula hirsuta* var 'Nivea' to win Class 70. In Class 80, Mrs J. Livesey showed a very fine and compact plant of *Salix myrsinites jacquinii* covered with its characteristic red catkins. It is always very pleasing to report entries by young members, and this year Angus Davidson won Class 73 with a beautiful plant of *Soldanella carpatica alba*, and Helen Furness won Class 81 with a hard, tight bun of *Celmisia argentea*.

No report of this show could be complete without comment on the fine display mounted by the Royal Botanic Garden, Edinburgh. A Farrer Medal was awarded to a truly venerable plant of *Draba mollissima*. All of the plants exhibited were of considerable interest. Significant were three forms of the recently-collected, new to cultivation *Primula stirtoniana*, a very well flowered *Calypso bulbosa* and a prostrate *Ranunculus crithmifolius*. In nature the grey foliage of this plant mimics the Greywacke screes, which are the habitat of this plant in New Zealand.

As Ray Johnstone retires this year after thirteen years of Show involvement, we offer him our grateful thanks for all his hard work.

ALAN FURNESS

Perth Show – 20 April

Despite a decrease in the number of entries, the quality of the exhibits was superb and must have convinced the large audience that spring had, at least, arrived in the alpine house.

The Alexander Caird Cup, awarded for the Six Pan Class, was won by Mr F. Hunt, Invergowrie, his exhibit consisting of *Viola albanica, Paraquilegia grandiflora, Ranunculus* x *flahaultii, Ranunculus asiaticus, Primula* 'Mrs J. Wilson' and *Primula* 'Beatrice Wooster'. The well-flowered and brightly-coloured *Ranunculus asiaticus* was awarded the Major-General D. M. Murray-Lyon Trophy for the best plant exhibited by a member residing in the Tayside Region. With keen competition in the Three Pan Class, some excellent plants were on view and provided the judges, Mr R. Masterton, Mr A. Evans and Mr J. B. Duff, with considerable deliberation. With their outstanding entry of *Primula aureata, Ranunculus asiaticus* and *Corydalis transsylvanica*, Mr and Mrs Taylor were the eventual winners of the Dundas Quaich, so that more silverware returned to Invergowrie. To complete this 'Invergowrie dominance', the L. C. Middleton Challenge Trophy, awarded to the member with most points from first prizes in Section I, was won by Mr F. Hunt.

The E. H. M. Cox Trophy, for the best dwarf rhododendron in the show, was won by Mr and Mrs Chambers with a large specimen of the

white-flowered hybrid, 'Dora Amateis'. The Forrest Medal went to Mr J. Crosland's superb *Pleione forrestii*, the yellow flowers of which were in immaculate condition. A Certificate of Merit went to Mr H. Esslemont for a pan of *Muscari macrocarpum*. The Perth Trophy was retained by Mr M. Constable.

In Section 2, competition was keen, with the bronze medal being won by Mrs Lynn Almond, Dundee, who has waited patiently to win this prize. Non-competitive Certificates of Merit were awarded to Mr L. Greenwood for the exhibit of his latest flower paintings and to Dr Almond for a splendid photographic display. A Trade Gold Medal was awarded to Mr R. Russell of Gardencare.

J. GAULD

Aberdeen Show – 27 April

In spite of the wintry weather, there was a splendid display of plants, many from growers in the south of Scotland.

For the first time in its history, the Walker of Portlethen Trophy, for the most points in Section I, went outside Aberdeenshire, to Mr F. Hunt of Invergowrie. Among his many successes was the six-pan class with *Gentiana verna, Primula* 'Linda Pope', *Ranunculus asiaticus, Armeria caespitosa, Paraquilegia grandiflora* and *Fritillaria pallidiflora*. Other splendid plants in this class were *Tecophilea cyanocrocus, Muscari macrocarpum* (a yellowish scented species), *Pulsatilla vernalis* and *Viola zoysii*. Another interesting viola was *Viola albanica*, with mauve flowers, in Class II. The Taylors showed an unusual plant, *Polemonium chartaceum*, from North America, with rounded heads of blue-purple flowers. In the class for new, rare and difficult plants, Mr J. Crosland won with the true *Pleione forrestii* while the Taylors were second with a splendid plant of *Clematis marmoraria x paniculata* with serrated leaves and creamy green flowers. *Helichrysum virgineum* was first in the silver-grey foliage class, with lovely grey felt leaves and pink flower buds.

Mrs J. Wyllie won the Forrest Medal with an immaculate dome of *Androsace vandellii*, 20cm across. She was also awarded two Certificates of Merit with *Pulsatilla patens* showing ten wide-open white goblets with yellow stamens over bright-green, feathery leaves, and with *Lewisia brachycalyx*. A Certificate of Merit also went to Mr H. Esslemont for *Primula aureata*, from seed. The unusual *Brachycome melanocarpa*, 10cm tall and with 5cm-wide mauve-pink daisies, won the Composite class.

There were two unusual crucifers: *Draba longisiliqua*, with which Mr Sprunt won Class 13, was a 15cm cushion with yellow flowers on 10cm stems, while *Degenia velebitica* was an attractive yellow wallflower with grey leaves. Rhododendrons and dwarf ericaceous shrubs were almost non-

existent due to the cold weather. Tulips refused to open for the judges, but there were some attractive pans of narcissus, fritillaries and iris.

The class for pleiones was won by Mrs Kent with the attractive white-flowered variety 'Clare', but the judges refused to be impressed with a gorgeous variety, 'Muriel Harbord', with a deeply-fringed yellow lip and pink-flushed sepals. Two outstanding Asiatic primulas were a deep pink-purple *P. petiolaris* LS 19856 shown by Mrs J. Wyllie, and a *P. macrophylla* from Mr J. Crosland.

A plant to catch the eye in Class 45 was *Oxalis magellanica* with glistening white flowers.

The Bronze Medal in Section 2 was won by Mrs L. Almond whose winning plants included a lovely *Rhododendron pemakoense*. Other noteworthy plants in this Section were Erigeron 'Canary Bird' from Mrs J. Lawrence, *Cassiope lycopodioides* from Dr G. Dixon, and *Primula petiolaris* with which Mr R. Maxwell won the Aberdeen Quaich for the best plant in Section 2.

Gold medals were awarded to the Cruickshank Botanic Gardens for a display of peat and semi-shade plants, among which were some excellent specimens of *Stylidium graminifolium*, and to Aberdeen District Leisure and Recreation Department for a built-up rock garden. A Certificate of Merit went to Dr A. Anderson for a non-competitive display of rhododendrons, outstanding amongst which were *R. cephalanthum* (dwarf with white daphne-like flowers), *R. mucronulatum* (a pink-purple low-growing form from Cheju Island), and *R. uniflorum* KW5876 (a floriferous deeper coloured relative of *R. pemakoense)*.

Judges in Section 1 were Mrs S. Maule, Dr D. Stead and Mr R. Rutherford.

A. McKELVIE

Glasgow Show – 11 May

However many grumbles we may have about this spring in the garden, the Shows have been quite superb, giving pleasure and inspiration to all who saw them. Glasgow was no exception, with a lovely array on the benches. No less than 5 Certificates of Merit were awarded by the judges. The Forrest Medal was awarded to Mr Fred Hunt's male form of *Clematis marmoraria*, a New Zealand plant, fairly new to cultivation, closely challenged by *Daphne petraea* 'Grandiflora', *Orchis morio, Ranunculus parnassifolius* Pink form, and an outstanding clematis, *C. marmoraria x paniculata*, belonging to Mr and Mrs Taylor.

Other striking plants in Section 1 were Mrs Wyllie's *Shortia soldanelloides* (reminiscent of the beauties shown by the late David Livingstone), Mr and Mrs Bezzant's *Androsace alpina* (not one of the easy ones), and a charming *Alyssum ovirense*, a dwarf in creamy yellow, instead of the strident colour of so many alyssums. Mr Fred Hunt's well-

-flowered *Eritrichium nanum* was a revelation to those who have struggled with its recalcitrance over the years. It was partnered in the Rare, New or Difficult class, by *Aquilegia nivalis*, a dusky dwarf from Kashmir. Among the fritillaries were *F. recurva* (whose bulbs so often split into rice grains, just when one hoped for a good show of scarlet flowers), and a charming *F. lusitanica*.

Gentian classes were well filled, and included *G. oschtenica* (Mr Leven), and *G. pyrenaica* (Mr and Mrs Bezzant), well flowered but obstinately refusing to open its flowers properly on the day.

Another spectacular plant shown by Mr Hunt was *Cypripedium formosanum*. It had one attractive pink flower, but would be worth growing for the leaves alone, like elegantly-pleated Japanese fans.

Dr Semple showed *Dionysia involucrata*, with its white-eyed pink flowers, and Mrs Stevens, *Townsendia formosanum*, both from seed.

Having served her apprenticeship as a schoolgirl in Section 2, Miss Shirley Brown won the Bronze Medal, following in the footsteps of her grandmother, Mrs Jolly.

Section 4 was not well filled, and the schedule could well be reduced. In contrast, the Rhododendron section has never been so well filled, and gave the judges a long, hard morning's work with its colourful exhibits.

Trophy winners were:

Dr W. Buchanan Memorial Rose Bowl (6 pans) – Mr and Mrs R. Bezzant; Henry Archibald Challenge Rose Bowl (3 pans) – Mr and Mrs R. Bezzant; W. C. Buchanan Challenge Cup (3 pans, rare, new or difficult) – Mr F. Hunt.; E. Darling Memorial Trophy (3 pans, dwarf rhododendron) – Mrs Kissen; I. Donald Memorial Trophy (Best Scottish native) – Mr A. Leven; Crawford Silver Challenge Cup (most 1st prizes Section A) – Mr A. Leven; Wilson Trophy (most points in Section 2) – Miss S. Brown; Rhododendrons: Urie Trophy (SRGC member with most points) – Mr and Mrs Thornley; Rhododendron Challenge Trophy (most points) – Arduaine Gardens; Stirling Maxwell Trophy (best individual truss) – Arduaine Gardens.

The judges in Section I were Mr A. Evans, Mr R. McBeath and Mrs M. Taylor.

J. S.

Edinburgh Show – 25 May

The principal awards at the Edinburgh and Midlothian Show were:

George Forrest Memorial Medal – Mr J. Crosland, Aberdeen – *Cassiope selaginoides* (LS 13284); Bronze Medal (highest points in Section II) – Mrs Edith Armistead, Edinburgh; R. E. Cooper Bhutan Drinking Cup (best species primula) – Mr K. East, Edinburgh – *Primula deorum*; Reid Rose

Bowl (highest points in Section I) – Mr A. Leven, Dunblane; Midlothian Bowl (best plant in Section II) – Dr C. J. Morris-Mancor, Edinburgh – *Lewisia* 'Sunset Strain'; Midlothian Vase (Best Rhododendron) – Dr D. C. Graham, Edinburgh – *Rhododendron tsangpoense curvistylum*; Henry Tod Carnethy Quaich (Best Bulb, Corm or Tuber in Section 1) – Dr D. Stead, Glasgow – *Calochortus amabilis*; Henry Archibald Rose Bowl (Class 1, 3 Pans Rock Plants) – Mr F. Hunt, Invergowrie – *Shortia soldanelloides illicifolia, Orchis morio, Convolvulus cneorum*; Elsie Harvey Memorial Trophy (Class 2, 3 Pans, New, Rare or Difficult) – Dr P. Semple, Glasgow – *Viola cotyledon* (JCA 129) – Sisyrinchium sp *JBA* (from Chilean Andes) *Lupinus lepidus lobbii*; A. O. Curle Memorial Trophy (Class 6, 3 Rock Plants from Seed) - Mr A. J. Leven, Dunblane – *Androsace hirtella, Iberis pruitii, Lewisia cotyledon*; K. C. Corsar Challenge Trophy (Class 22, 2 Pans Primula) - M. S. & A. Bremner, Langbank – *Primula reidii* var *williamsii, Primula cortusoides*; Boonslie Cup (Class 50, Miniature Garden) – Mrs Edith Armistead, Edinburgh; Kilbryde Cup (Class 51, Arrangement of flowers and Foliage) – Mrs Jane Martin, Scotlandwell; Certificate of Merit – Mr A. J. Leven, Dunblane – *Asperula nitida puberula* (exhibited in Class 49).

J. T. AITKEN

Stirling Show – 30 March

As usual, the Stirling Show was held on the last weekend in March. As we all know, the weather at this time can vary from year to year. This March the whole of Scotland and northern England was blanketed with snow. Several exhibitors and judges had to drive in difficult conditions to reach Stirling, and we are indebted to them for making our show the success it was.

The Forrest Medal and the Institute of Quarrying Quaich for the best non-European Plant were awarded to a magnificently flowered and presented plant of *Saxifraga lilacina* exhibited in a 9-inch pot by Mr Duncan Lowe. *Saxifraga lilacina* was introduced from the western Himalaya in 1900 and it is important to note that it is a native of acid soils. Its lilac flowers raised just above the foliage completely hid its leaves. Many people probably grow one or more of its hybrids – 'Myra', 'Jenkinsae', or 'Cranbourne', which are a bit easier to grow in the garden. *Saxifraga lilacina* has rarely been exhibited in such superb condition at an SRGC show. The carefully set stone which dressed the pan complemented the plant perfectly.

The Ben Ledi Plants Trophy for the best European Plant in the show was also won by a saxifrage. This time it was a glistening *Saxifraga oppositifolia alba* exhibited by Mr T. G. Sprunt. Unlike some forms, its flowers were of a true fresh white, untinged with grey, and again hid the foliage.

The Spillar Quaich for the best primula in the show was awarded to Dr Evelyn Stevens' perfect *Primula allionii* in tip-top condition, which filled a 6-inch pot to the rim with its dome of large, mid-lilac, white-eyed flowers.

Certificates of Merit were awarded to *Pulsatilla slavica* and *Cyclamen libanoticum* exhibited by Mr Harold Esslemont. The pulsatilla had been grown by Mr Esslemont from seed collected in the Pirin Mountains in Bulgaria by Dr Kazbal. The whole plant was covered in glistening hairs, which were a perfect foil for the large cup-shaped, rich purple flowers. Equally magnificent as a foliage plant with its nicely marbled leaves, *Cyclamen libanoticum* is one of the most beautiful of its genus when in flower.

The class for the three rock plants of different genera was won by Margaret and Henry Taylor. Their entry conjured up a vision of an Easter holiday in Crete with its blue skies and sunny beaches as well as the snows of Mount Ida; two orchids, namely *Barlia robertiana*, a tall-growing spike with lovely lilac labellae, Ophrys speculum and snow-white *Ranunculus asiaticus*, whose stamens form a maroon cone in the centre of the flower.

Also in this class, Mr F. Hunt exhibited a spectacular pan of *Tecophilea cyanocrocus* with at least twelve gentian-blue flowers. Although extinct in its wild Chilean home, it is good to know that it thrives in Invergowrie.

Dr J. L. S. Cobb won the Carnegie Dunfermline Trust Trophy and the Fife County Trophy for the most points in Section 1 and Section 2 respectively, as well as the Bronze Medal in Section 2. Exhibited among his plants was the rare *Corydalis persica*, a tuberous rooted species with white, maroon-spurred flowers. In East Central Scotland the plant normally flowers at the end of February, cultivated in an alpine house in which it is kept just moist until growth appears. During the summer, it is kept in a frame but not dried off.

Mr David Mowle exhibited several pans of interesting bulbs. Seen for the first time at Stirling was the enchanting *Colchicum kesselringii*, whose flowers are of a warm ivory white with striking yellow stamens. It is a delightful subject for a pot. Mr Mowles' *Narcissus watieri* had fifteen flowers of pristine white.

Another unusual bulb was a Gagea species exhibited by Mrs Bette Ivey. This plant had almost luminous greenish-yellow flowers, and in the wild, according to Bill Ivey, is at its best when growing through a cow pat.

Thankfully, Bette exhibited the plant more tastefully dressed. It does show, however, that it is important to feed bulbous plants.

This year we seemed to have fritillaries in all colours of the rainbow, if you count the sheen on David Mowle's prize-winning *Fritillaria caucasica* as blue, and in a whole range of heights from Mr Harley Milne's *F. sewer-*

zowii at ten inches down to Mrs Joan Stead's tiny *F. minima*. Also a prize-winner was an exceptionally well-presented pan of *F. michailovskyi* grown from SRGC seed by M. and H. Taylor. This pan showed the variation that can be got in growing from seed. Some were taller than others, there were varying amounts of yellow on the petals and some had more reflexed bells than others.

The reward of growing bulbs from seed was seen again in Dr Don Stead's excellent pan of *Narcissus bulbocodium citrinus* hybrid, which again showed seedling variation. Some flowers in the pan were truly magnificent. Dr Stead's notes accompanying the pan were particularly helpful and concise.

'Seed C.A.G.S. 1979 sown, peat/sand/soil I/I/I and germinated outside 1980. Then potted 8/82 into peat/sand/J I base I/I/I and in 1984 peat/sand/Chempak. Grown in a bulb house kept where possible above 28°F.

One of the most spectacular plants in the show was Joan Stead's *Tropaeolum tricoloratum* growing up a small trellis. Its flowers are carmine red with black closed mouths and yellow lips. They have long red spurs.

In Section 2, local exhibitor Miss A. Maclaurin won with a nice pan of *Iris reticulata*. Mrs Edith Armistead showed a promising plant of *Kalmiopsis leachiana*, and Mrs Heather Salzen's two-pan entry of *Anemone coronaria* and *Muscari tubergenianum* added a fresh, cool touch to the benches.

We would like to thank our judges, Mrs Bette Ivey, Mrs Margaret Taylor, Mr Jim Jermyn, Mr Duncan Lowe, Mr David Mowle and Dr Don Stead.

St Andrews Show – 28 September

The discussion weekend show was generally considered to be a success. Despite the poor weather in the preceding months, there was a satisfactory entry in most classes. The principal prize-winners were:

East Lothian Trophy – Mr and Mrs H. Taylor; Peel Trophy – Mr and Mrs V. Chambers; Logan Home Trophy – Mr B. Russ; J. L. Mowat Trophy – Mr R. P. Robinson; Wellstanlaw Cup – Mr B. Russ; Mary Bowe Trophy – Mr B. Russ; East Lothian Cup – Mr S. R. Piggin; Forrest Medal – Mr A. R. Spenceley; Bronze Medal (Section 2) – Mr J. Forbes.

Forrest Medals

Because some Show Reports were not fully reported in the Journal, we do not have full records there of the various Forrest Medals awarded. For the record, here is some missing information:

Edinburgh 1984, *Saxifraga cebennensis* – Dr P. Semple; Discussion Weekend 1983, *Haastia pulvinaris* – Mr E. Watson; Discussion Weekend 1985, *Cyclamen graecum* – Mr A. R. Spenceley.

The Forrest Medal at the 1984 Discussion Weekend appears to have been won by a cyclamen. Would whoever won please contact the Editor with details?

Letters to the Editor

Greenacre, Idmiston, Salisbury, Wiltshire SP4 0AN

Dear Sir,

I have just been re-reading Lawrence Johnson's article 'Thirty years with perennials' (The Rock Garden, vol. XVIII, part 3, p. 231) and note his remark on *Helleborus foetidus*. This is one of my more common weeds! I found it growing wild on one of the local 'ranges' and acquired some seed many years back. It grows on the edge of woods and copses on very poor chalky soil* and will tolerate a good deal of shade. It will also tolerate seed-suppressing quantities of simazine and comes up among my strawberries. I do not know what moves the seed around, but it is an efficient process! The plant itself just showers the seed on the ground. So if anyone is really keen on acquiring a specimen, perhaps they would let me know (with a s.a.e., of course). Another common weed is *Verbascum nigrum* . . .

Yours sincerely,

H. A. Druett.

*When leafmould has accumulated.

The Old Rectory, Winterborne Houghton,
Blandford, Dorset DT11 0PD

Dear Sir,

There are other names than those in the seedlist which become wrongly perpetuated, and one of these is Frank Kingdon Ward. As the years go by, the hyphen is being used increasingly by a generation which did not know him.

We were privileged to know Frank and Jean well in the years between 1947 and the great Assam earthquake of 1950 – which revealed Frank as being (from the Indian point of view) on the wrong side of the Assam-Tibet border, thus causing him to become persona non grata in India. His Assam headquarters were at Jorhat, 30 miles from us, and we had the pleasure of exploring our local Naga Hills with him and Jean.

The surname was Ward. From very early in his book authorship days, he wrote under the name of Kingdon Ward (rather than Frank Ward, which sounds very commonplace!), just as the Fleming brothers wrote under the names of Ian Fleming and Peter Fleming whatever their other Christian names may have been. He himself never used a hyphen, and I do

not ever remember seeing it used in his lifetime. It is certainly incorrect, so it was with sadness that I saw it being used by Robert Mitchell.

While I am writing to you, I would like to tell you what a lot of pleasure and interest 'The Rock Garden' brings to my wife and myself.

Yours sincerely,
T. Norman.

Ashford House, Talybont-on-Usk
Brecon, Powys LD3 7YR

Dear Sir,

Having read 'Alpines from seed' by Barry McWilliam in the June 'Rock Garden', I was amused to read that we had lychnis coming from seed labelled *Petrocallis pyrenaica* – this is exactly what has happened to me this year from A.G.S. seed – perhaps the same donor? In which case I hope they study your photograph and check their labels!

Yours sincerely,
Mrs E. Anderson.

Book Reviews

Hardy Geraniums
by PETER F. YEO
Croom Helm Ltd. ISBN 0 7099 2907 2, £25, 1985

Despite the growing interest in the wide range of hardy Geraniums, both for use in borders and in the rock garden, it has been difficult for the amateur gardener to find detailed information covering the genus.

Peter F. Yeo, Taxonomist at the Cambridge University Botanic Garden, has now produced an excellent book, the result of years of research on the Hardy Geranium (Cranes bill). He does not include either Pelargonium or Erodium. The scientific aspects of Geranium such as nomenclature, chromosome number and structure are dealt with in detail. The author also gives advice on propagation and mentions the, fortunately few, pests and diseases which may affect plants in this genus.

Mr Yeo then moves on to the important subject of identification. He has devised two keys to enable the reader to track down any species of Geranium, a multi-access key and a dichotomous key of which the former would appear to be less complicated. Nevertheless, this multi-access key, planned by an expert in taxonomy, is liable at first to puzzle an amateur horticulturist with only a modest knowledge of the mysteries of botany.

However, once the system is mastered, it leads on to an excellent and detailed chapter giving the description of every known species and the hybrids raised therefrom. There are 44 beautiful illustrations in colour and a number of clear botanical drawings. Particularly helpful are the silhouette drawings of leaves showing the vast range of leaf patterns to be found in this widespread genus.

It must be stressed that in order to make the most of this very fine book, the reader does require to have some knowledge of botany and a very good lens. The price may seem high, but is fully justified by the skill and experience required to produce such an excellent publication. K.S.H.

Sulcorebutia and Weingartia – A Collector's Guide
by JOHN PILBEAM
Batsford, 144p, £25, 1985

This book is a worthy addition to the author's two previous Collector's Guides, Mammillaria 1981 and Haworthia and Astroloba 1983 which were received with great enthusiasm by growers of cacti and other succulents. This, the first book in English on these mainly Bolivian members of the Cactaceae, should prove to be just as popular.

Approximately 100 species are described in detail, and there are sections on cultivation, classification and geography, and discovery and collection in the wild along with a checklist of species with synonyms. This list is extremely useful, as the Cactaceae in general seem to suffer frequent name changes, and new species are being discovered all the time, particularly in South America.

The 104 colour photographs are of excellent quality, as are most of the black-and-white illustrations.

A first-rate, if somewhat expensive, publication and a must for every keen 'cactophile'. R. B. R.

Obituary

IT IS with sadness that we record the death of James Davidson, M.B., Ch.B., F.R.C.P. He died on 17 May 1985 in his 90th year. It is a little time since he was seen at Club meetings for, regrettably, he had been unwell for some years. However, those of us who remember him and his enthusiasm and enjoyed his friendship and company can recollect a very special character whose presence added colour to the assembly.

He was President of our Club from 1964 to 1967, and during the time he held office he worked hard to increase the membership while at the same time make it a more closely-knit fraternity. His dedication and energy did much to move forward these objectives.

The Doctor loved plants. He loved to see them on show benches, in the garden, or simply on the screen, but possibly more than any one of these he loved to see them growing in nature. Along with Connie, his equally enthusiastic and knowledgeable wife and gardening partner, he journeyed to Mount Olympus to see *Jankaea heldreichii* in its only station, and to the Karawankens in Slovenia to see *Campanula zoysii*, and that was at a time when travel was less easy than it is today. Connie even maintained that they slept alongside brigands in the mountains when in Greece.

James was a plantsman who grew all manner of plants at his home, Linton Muir, West Linton, Peebles-shire. He had a particular liking for saxifragas, sempervivums and ferns, and his garden, at 1,000 feet elevation on the south side of the Pentland Hills, would seem an ideal situation at which to cultivate high alpines. Those that flourished were usually exhibited at our various shows. He lectured to groups, and it is surely positive to think that the instructions and encouragement he gave then are being practised today by some of our very successful exhibitors and growers.

A. EVANS

Tasmanian cushion plants

BRIAN HALLIWELL

A CUSHION PLANT can be described as a much branched evergreen sub-shrub whose stems grow very close together so that their leaves are touching; the leaves which are hard textured are crowded, often overlapping, and with their broad bases clasping the stems. On the upper parts of the stems, the leaves act as photosynthetic factories manufacturing sugars and starches. Lower down where leaves are shaded, the oldest die and decompose to produce the humus which becomes the packing in the cushion. The branches of the framework may produce adventitious roots which ramify through the humus. Stems which grow at different angles to the same length produce a plant with a domed surface. The enthusiast who specialises in growing cushion plants aims to produce a hemisphere which in outline is a perfect circle, and we non-specialists can admire their efforts when we see plants on the show bench. In nature, cushions have no symmetry, for they expand slowly outwards between or over other plants or rocks.

In Tasmania there are five plants which make cushions: *Abrotanella forsterioides, Donatia novae-zelandiae, Dracophyllum minimum, Phyllachne colensoi* and *Pterygopappus lawrencii*. They occur on mountain moorlands, rarely below 1,300m, on wet screes where snow lies long and late. It is only occasionally that a single plant can be found in isolation; usually there will be a number of the same or different species, which will eventually grow together to coalesce and form conglomerates which can cover extensive areas. In addition to wet screes, they can be found on soggy peat banks, and even in bogs where they flow over or around rocks and dead tree stumps; very often they follow the banks of streams, and there can be channels of water running under the cushions. The undulate surface is quite hard, and it is possible to walk over it in hob-nailed boots and even to jump up and down and leave no imprint. There is a rough surface which holds wind-blown seeds which can germinate in the humidity of these high altitudes, with the radicle penetrating between the close packed branches to eventually produce a root system in the humus beneath the living surface of the cushion. As these seedlings take hold and begin to grow, they will provide shade, which causes patches of the cushion to die, and this in its turn will decompose to add to the organic matter.

Very often the cushions are the earliest colonisers of inhospitable screes and, as other plants come in, vegetation begins to establish. Some of the

plants found growing in these cushions are: *Ewartia meredithae, E. planchonii* (handsome silvery carpeting plants), *Drosera arcturi* (insectivorous), *Sprengelia incarnata, Prasophyllum alpinum* (orchid) and sedges and rushes.

In the conglomerate cushions it is impossible to identify four of the five plants when not in flower, because they have the same type of olive-green foliage; the exception is *Pterygopappus lawrencii*, which has light grey-green leaves.

Few, if any, Tasmanian cushion plants are in cultivation, and it may be some years before they are. All are difficult to cultivate even in Tasmania, and few people have persevered long enough to find out their requirements. Seed is set only infrequently in the wild, and little seems to have been gathered to offer in seed exchanges. Only one nursery as far as is known offers any of the plants for sale. Even if one is lucky enough to receive a living plant from Tasmania, in Britain it can take up to two years before it has readjusted to the change in seasons between the two hemispheres. If and when material becomes available, growing conditions will have to be different from that given to the European and Asiatic cushions at present in cultivation. All the Tasmanians will need to be grown in a compost of equal parts of moorland peat, gravel and lime-free soil, and while in a glasshouse it will be beneficial for the pot to be stood permanently in a saucer of water. When plants are ready for planting out, they should go into a peat garden, preferably in shade in those gardens in the East of Scotland or in much of England, but for gardens of the West, with their high annual rainfall, a peat or rock garden in full sun will be suitable.

Abrotanella forsterioides is a Tasmanian endemic which belongs to the Compositae. This plant has not proved difficult to grow at Kew as a pan plant (stood in a saucer of water), in a peat gulley in the alpine house or outside in light shade on a peat garden. In 1981, a plant was shown before the Joint Rock Garden Committee at the RHS in London, for which it gained a Preliminary Commendation (an illustration appears in the 1982 December issue of the AGS bulletin). There are olive-green leaves in a cushion, more often bun-shaped than hemispherical, through which inconspicuous greenish flowers protrude. Seed has not been set, but some of the lower shoots detached and treated as cuttings have not proved difficult to root. Beware of visitors with umbrellas or pencils who prod and unruly children (and their parents) who poke the cushions and ruin them.

Donatia novae-zelandiae, as its specific epithet suggests, occurs also in New Zealand. This plant has been transferred to the family Donatiaceae, which contains the one genus of two species of which the other, *D. fascicularis*, is confined to Tierra del Fuego. The cushion is composed of leaves of the usual olive-greeen, but hairy at their bases with white flowers which appear to sit on the surface of the cushion. These are about 1cm in

diameter and made up of five petals, which taper to a point, around a cruciform arrangement of pairs of stamens and stigmas at right angles to each other. Plants at Kew, collected in 1984 from both Tasmania and New Zealand, are still in the period of readjustment.

Dracophyllum minimum, another Tasmanian endemic, belongs to the family Epacridaceae. Like so many plants in this family, this is difficult not only to grow but also to obtain germination from seed. As with the other cushion plants, there are the olive-green leaves and on the cushion sit the largest flowers of these five plants. They are also white, about 12mm in diameter, made up of five petals with five stamens around a central stigma. At Kew, previous introductions have failed to establish, but new stock may be found amongst the other cushion plants collected in Tasmania in 1984.

Phyllachne colensoi, which belongs to Stylidiaceae, also occurs in New Zealand and, like the others, has the usual olive-green leaves. It, too, has white flowers, but these are the smallest of the showier species at about 5mm in diameter. These are made up of five petals with rounded or flattened ends, and there is a central column to which is attached two prominent purplish anthers. Plants both from Tasmania and New Zealand at Kew are still in a period of readjustment.

Pterygopappus lawrencii, another member of the Compositae, is also endemic to Tasmania. It differs from the other four by having grey-green leaves and there are tiny greenish-white flowers which protrude above the surface of the cushion (these are not showy). Whilst none of the cushion plants has great vigour, this has the least and, in conglomerate cushions, can be seen as stripes or bands of a lighter colour. A plant sent to Kew in 1981 by Ken Gillanders is no more than 50mm in diameter after four years.

Here are five plants which will tax the skills of the most dedicated growers. When or if they become available in Britain, it will be those dedicated gardeners from the West Coast of Scotland who are most likely to succeed with them.

The use of home computers for keeping plant records

R. J. BEZZANT

WHENEVER I THOUGHT about the Editor's request to write something about using home computers to keep plant records, into my mind came Mr Punch's advice to those about to get married. "Don't". If I end the article at this point, it will be admirably succinct but hardly very informative, so perhaps I had better expand the advice by way of explanation.

If you want just a simple alphabetical list, then your needs are met by a "trial box" and a set of 4″ × 5″ file cards. One box will hold about 400 cards in comfort. Consider the process of consulting your records; you have just rushed in from the potting shed to consult your notes on repotting from last year. With a card index, it goes something like this. Find the box (2 minutes; in the more disorganised houses where this takes 2 weeks, records would not be kept anyway), open the box (⅕ of a second) and find the card (2 to 5 seconds), giving a total of 2 minutes 5 seconds. Now, the same process with records kept on a home computer would follow a rather different course. Finding the box corresponds to setting the computer. This may be ready and waiting, in which case it is dedicated to your use and you don't need my advice. More likely, your second eldest is using it to play "space invaders", or the rest of the family is watching the latest episode of "Rambo" on TV. Nevertheless, you need to consult your records, so you pull rank as head of the household and assemble computer and TV ready for action. I guess this would take a minimum of 10 minutes, and you've upset the whole family into the bargain. Now you have to open the box, which means you find the tape with the program on it and load it. Let's assume for the sake of simplicity that this goes according to plan. It doesn't always. Time for this step, then, is 30 seconds to 2 minutes. Now you have to find the card, so you type and enter "FIND ERITRICHUM"; the computer clicks and whirrs and comes back with the message "NOT FOUND". After you simmer down, you look at the screen again, castigate yourself and type and enter "FIND ERITRICHIUM", and lo and behold your record is displayed on the screen in 2 to 5 seconds. The total time for this operation was 10½ to 12 minutes. Which method would you choose?

You may regard the above as somewhat exaggerated, but it does convey some of the flavour of using computers, and illustrates their main

characteristic. Computers will do exactly what you tell them to do, neither more nor less and, if they cannot do it, will tell you so and then wait, forever if necesary. If you had originally entered "ERITRICHIUM" as "ERITRCHIUM" without realising it, then you would never find it again. Maybe if you want something more than a single alphabetical list, there would be a job for a computer to do. In that case you either need a knowledgeable person to devote time to your requirement or you must be prepared to acquire this knowledge yourself. Once you have done that, you will be in a position to purchase the appropriate system, join the local users' group and your plants will be looking awfy neglected.

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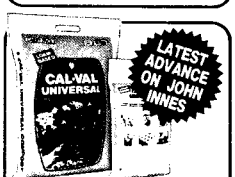

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