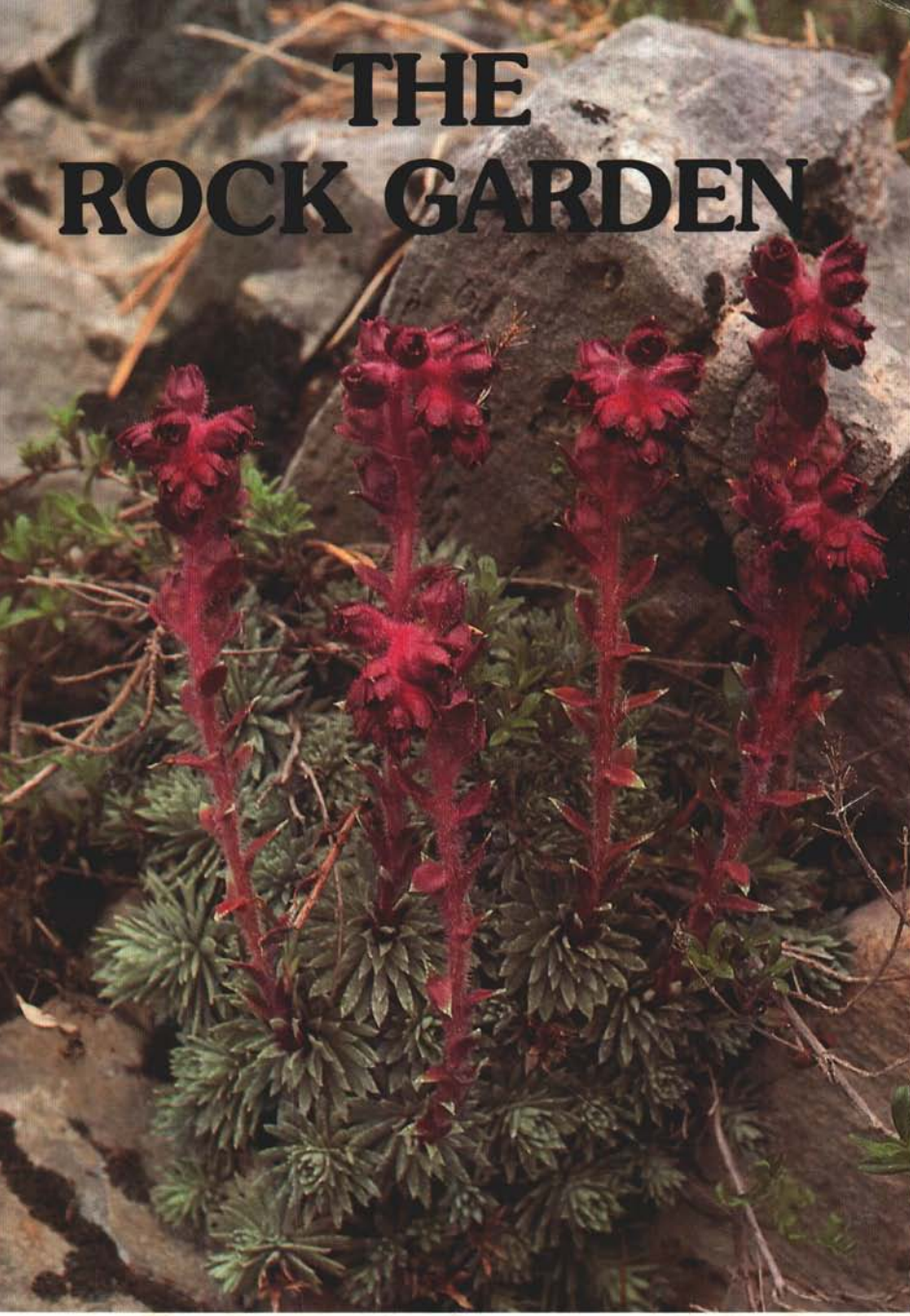
THE ROCK GARDEN



THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XXIV Part 1 Number 94

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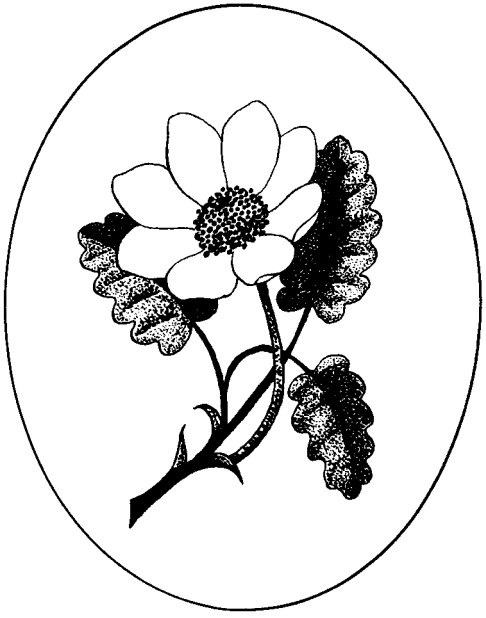
THE ROCK GARDEN



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June 1994

ISSN 0265-5500

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

Front cover: *Saxifraga sempervivum*, Mount Olympus. (p24) B. & E. Anderson

Back cover: Below Mount Olympus. B. & E. Anderson

THE ROCK GARDEN

The Editors would greatly welcome contributions to **The Rock Garden** on any aspects of alpine and rock garden plants and their cultivation. Articles should follow the format of previous journals, with colour slides and line drawings if appropriate. They should preferably be typed, double spaced, or on a 5.25" floppy disk in Microsoft Word.

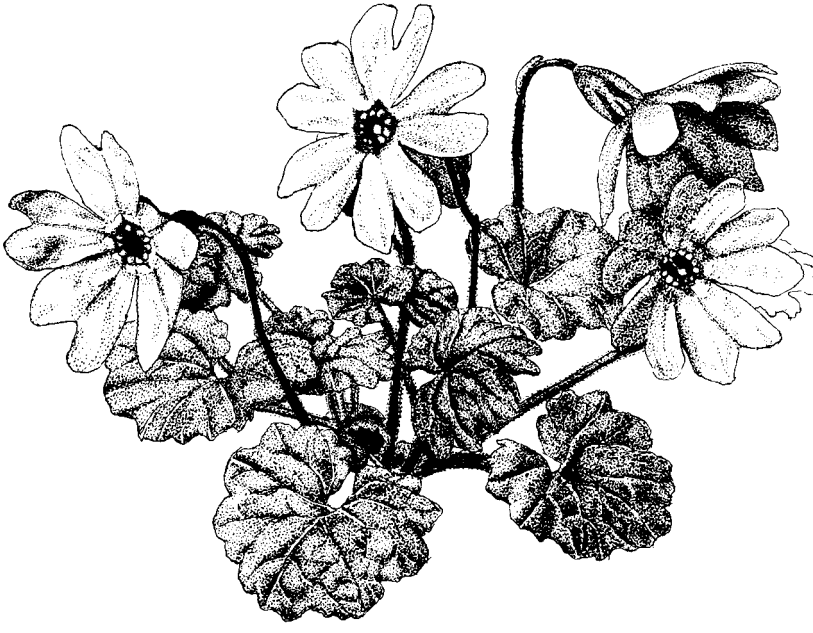
Pen and ink drawings and vignettes are also welcome, especially in a horizontal format to fit a part page. Articles and drawings should be sent to the Editors.

We also require cover photographs for **The Rock Garden.** Anyone with colour slides for consideration as cover plates should contact the Editors. An article to accompany the cover plate pictures is strongly preferred.

The Rock Garden is published twice yearly by the Scottish Rock Garden Club, on 31st January and 30th June. Any queries about the Journal should be addressed to the Editors.

The views expressed in this Journal do not necessarily reflect those of the Editors or of the Scottish Rock Garden Club.

Contents



Primula reinii Lionel Bacon

Editorial

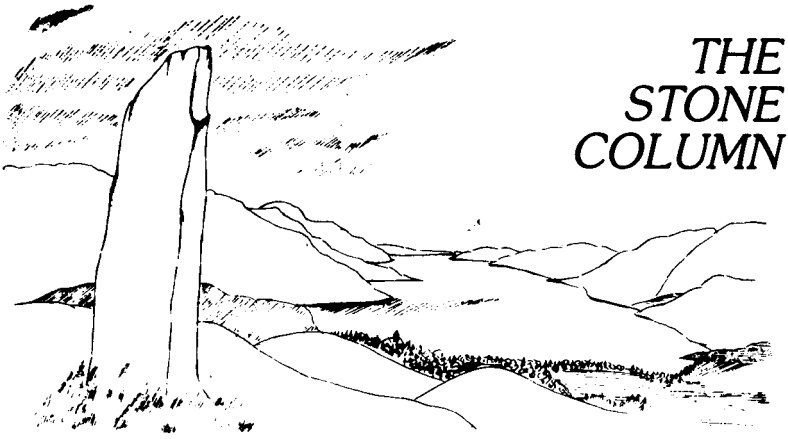
Doesn't time fly when you are enjoying yourself? Here we are on our last editorial for **The Rock Garden**, ten issues and five years on. It only seems like a few months since we first set out on this particular adventure with Alastair McKelvie's warnings of forthcoming plant neglect ringing in our ears.

So, how have we fared in juggling editorial commitments, the garden and the alpine house? A lot of plants have come and gone, but in the June sunshine the garden is looking reasonably tidy and full of colour. Work has continued, with the cheap and cheerful plants of the early years up the hill being replaced with more interesting goodies from the seed exchanges and specialist nurseries. The last areas of wilderness have been transformed into peat and alpine beds, two bulb frames are now full to overflowing and we are ready to start tearing the first rock beds to pieces and starting all over again. We might even have time now!

Being editors of **The Rock Garden** has been great fun, and has given us most satisfaction when the finished journal has dropped through the letterbox. We hope that it has also given pleasure to all of you. Retirement is a time to thank all those who make the journal a success. Many people have helped us over the years with the invisible jobs such as dealing with the advertising, year book and show schedules, the proof reading, colour illustrations, indices and sourcing of articles. Many more people (would you believe one hundred and twenty-five of them from around the world?) have willingly had their arms twisted and put pen to paper, producing articles, plant portraits, reviews and drawings for the benefit of the Club. Thank you all, producing the journal would have been impossible and less fun without you.

By the time that you read this, we will have escaped with friends to the Pyrenees, our last editorial finally done. We will be enjoying the things which bring us all together; the alpine plants and the mountains. After all, that is what the Club is all about, the plants, the friendship and the sharing of experiences enjoyed. Maybe the new editor will persuade us to share these with you, when both we and our plants have had time to recover.

Carole and Ian Bainbridge



THE STONE COLUMN

Interesting times

With this contribution we pass two minor milestones on the often rocky road of our Column: we have actually reached number 25, which says something of the tolerance, not only of successive editors, but also of the readership as a whole! Secondly, I am facing a computer screen rather than a blank sheet of paper. It is said that word processors, which render alterations so easy, can have a marked influence on writing style. I have never gone in for extensive rewrites, preferring to work out what I am going to say in my head, sometimes with the aid of notes, before committing anything to paper. Occasionally additional points come to mind on re-reading a piece. In the past these were scribbled in the margin, adding to Poll's difficulties in deciphering my handwriting, but now can be simply inserted directly into the text. Although Poll can touch-type, it was clearly an inefficient use of her time, especially at this time of year for the summer journal. The short growing season at our relatively high latitude means that almost all our potting and repotting is carried out from April to July; during which time Poll virtually lives in her potting-shed. Thus I was given an ultimatum, and responded by spending wet days, and there were certainly more than enough of these this past winter, learning to type by putting our seed-records into the computer. Seed-raising has long been the chief driving force behind the development of the garden and plant collection at Askival. With the number of taxa in cultivation here now into five figures, accurate records are essential in order to keep track of what we have and where it came from. This is particularly important in the case of plants raised under collectors' numbers from the many expeditions which have explored the world's mountains seeking alpines worthy of introduction into our gardens. With the privilege of having such seed to raise goes the

responsibility of looking after, and keeping track of, any resulting plants. We feel here, on this scale, that it is more important to try and keep our labels up to date than remove every last popper and pearlwort. To this end I have been steadily increasing the number of engraved aluminium labels in use, following myself around the garden updating each bed after its winter clearance. This is a suitable task for a showery day; one can nip out during the dry intervals to make lists of names and then, when driven indoors again, engrave the labels and attach them to stalks. We are fortunate in still having a considerable stock of unused 'Hartley' anodised aluminium labels, in two sizes with blades 75×15 or 60×11mm. I also recycle any non-engraved ones taken up either because the plants are no longer with us or for indelible replacement. Solvents can help with the removal of 'marker-pen' ink, but a hard eraser is quite effective for pencil-lead. Faint traces remaining can simply be ignored and engraved over; they will fade away in time. As an extra provision for the future we obtained another 2000 labels of 70×11mm, with long tails similar to the old 'Hartley' shrub type, from a small firm in Oregon. They were only a fraction of the price of UK equivalents which are usually impossibly expensive. We have come to prefer the smaller size, they are less obtrusive when carried up on a stalk. It doesn't really matter if one has to rummage (gently!) for a label as long as it says something when one finds it! Bending the stalks to the design we described long ago (**Rock Garden** 75, p.115) from 2mm heavily galvanised wire is a gentle job, for after dinner in front of the TV. The alpine gardener's equivalent of knitting, perhaps?

The old Chinese saying "may you live in interesting times" was originally intended to be a curse. Be that as it may, currently these are definitely interesting times for the alpine gardener, as can clearly be seen by referring to the SRGC seed-list. We may belong to a fortunate generation of alpine enthusiasts. Technology, applied to transport, has made the mountain ranges of the world accessible as never before, but has yet to destroy much of the alpine habitat. We can travel to the alpines, either directly, or vicariously through the many seed collections now available, while they are still there! We can also share in, and learn from, the experiences of others through their writings, lectures and photographs. Looking back at the accounts of Farrer, Forrest, Kingdon Ward and many other travellers in China, we used to dream of being able to raise some of the fabulous alpines of the other 'Wild West'. Now *Solmslaubachia* and the like are no longer just legendary names in Clay's 1938 sequel to Farrer but living entities. Germinating them is the relatively easy part, we just wait for nature to take her course; the hard

work lies in the growing on. It is of paramount importance that they establish well enough to set seed in cultivation, and so can be widely distributed. Not for us the forcing on in heat to be first on the show-bench and up for that award. Grown slowly, hard and cold in the open, most true alpines will respond, as has *Meconopsis delavayi*, with a longer, more fecund life. This aspect is expanded further in the following item. Naturally the original seed has to be viable in the first place, and here, as always in gardening, we are in the hands of Boreas and the other Gods of the weather. It is also a matter of timing. In California, 1992 was a dry year; seed was set relatively early and so we were able to collect some quite interesting things not normally ready in July. The down side was that flowering was below par. It was exactly the opposite in Montana and Wyoming the following year of the Mississippi floods. The changeable, cool wet weather led to a superb display of alpine flowers, Poll used up 44 films, but there was virtually no ripe seed at the time of our visit. I do hope to write an account of this visit sometime, when my typing speed has improved sufficiently to make an article of the required length a practical proposition.

Meanwhile, back at home, all talk has still been of how wet was the winter past. Jokes about paddy-fields and cultivating rice in place of alpines were not confined to the weepy west, but extended to the far south-east of England. Wherever one lives, a heavy clay soil compounds the problems of cultivation especially in winter, as we found out when trying to plant a few things into our daughter and son-in-law's garden in Paisley. If we had such a soil, we should either be watching the rain, or waiting for it to dry out, for almost all the year. The only answer would be to largely ignore the native soil and put raised-beds on top of it. Come to think of it, we are doing that anyway, but at least we don't need to put in field-drains first on our gravel. In fact, although January and March were quite wet, but not exceptionally so, February was not 'fill-dyke' but 'frozen-ground'. Nevertheless, we did make some progress outside. Roughly half of the *Chamaecyparis lawsoniana* hedge, between our older frame-yard and the Old Convent next door on the south, was removed and replaced in January with a three-sided shelter, about 7.5m long. Built for us by a local self-employed joiner, this was constructed around six 15cm square timber uprights concreted 0.75m into the ground. We take the power of our gales seriously up here! About 3m high, the open long side faces north-east to the frames for convenient access. Intended to store our frame-lights when they are out of use in the summer, the top half consists of a giant 'toast-rack' in six sections. The lower half underneath will provide the sort of dry storage and general

parking area for odd items of which no garden can have too much.

Little outdoor gardening was possible, as is usual, in February; when snow permitted we did sortie up into the forest above the village to gather firewood. An extensive network of forest roads not only provides convenient access for walkers, cyclists and gleaners, but also wide views over the Great Glen and its lochs. Only the last category of visitor requires a permit. The most extensive outlooks are to be had from the cleared areas, which is just where one goes to collect wood. Clear-felling is not the evil it was once thought to be. There is no such thing as a climax forest, the term 'old growth' simply means that it has been a long time since the last burn. Nature regenerates her temperate forests with fire; given care, man can copy this technique using chainsaws. Returning to the garden, I did, however, manage to dig the foundation trenches for the second orchard frame, more in hope than expectation of any further progress so early in the year. They remained unused throughout the almost continuous March downpours, which fortunately did not erode the sides significantly, thanks to our gravelly soil. March was in fact no wetter than January, we did manage the odd hour here and there clearing herbaceous beds, but it always seems worse for one is expecting the weather to start improving. This year the first half of April was still winter, good for the alpines, but not for the propagator chaffing for her extra frame-space. When eventually reasonable weather did finally arrive in the middle of the month completing the frame had to take priority; which is why, as I write, our *Meconopsis* are starting to flower with last year's dead stems still protruding from many of the clumps. The irony is that the self-same long winter which inhibits clearing and tidying also gives rise to better than average flowering of many true alpines. Let but one example suffice, a small *Gentiana angustifolia* in an 8cm square long-tom has produced seven of its brilliant royal-blue trumpets! But it is the same story with our Auriculastrum primulas, ranunculus, and, from the US, polemoniums and synthyris.

Outwith the garden there was one other major change during March, the District Council decided to extend the pavement on our side of the A82. For thirty years I walked to school along a grass verge, as soon as I retire they build a proper pavement just for us and the four flats in the Old Convent next door! Still, we did get our gateway re-tarmaced. It was interesting to note that the same method was used to set the kerbstones as we employ for our concrete-block frames: dig a trench, put a layer of fresh concrete on the bottom, and set the kerbs straight on it. The only difference is that I mortar the joints. I'm certainly glad that I'm not handling those concrete kerbs, however, standard building blocks are

heavy enough! The pressure for space was such that this frame was occupied as soon as the base was complete. The wooden superstructure will have to wait for wet days, after this Stone Column is finished. After levelling and consolidating the soil inside the frame, we rolled out woven plastic ground-cover and covered this with a 3-4cm layer of sand. Many people simply stand their pots straight on the black plastic, but we prefer to add the sand for better capillary buffering especially of small pots. Admittedly roots will leave our containers for the sand, but, if the ground-cover does its stuff, can go no further. To put this frame in perspective, I recently came across an advertisement for all cedar cold-frames. The most popular size: 60×120cm was priced at almost £110. To cover the same area as orchard No.2 frame would require 26 of these. I leave it to the reader to work out the total cost for themselves! We estimate our material costs at around the price of two cedar frames only, and of course cement doesn't rot, an important consideration in this climate.

While I was laying concrete blocks in the old orchard, Poll was working at the entrance breaking in the ground to extend the trillium bed around the corner. This extension will be raised slightly to match the new lily bed opposite. As we worked the first flowers opened in the latter: *Fritillaria pallidiflora, Erythronium multiscapoideum*, and the recently described, rich orange-yellow *E. pluriflorum* which we introduced in 1992. To improve and bulk-up the soil we brought down a large half, about 4 cubic metres, of one of the upper garden compost heaps. We always share this job; I put the compost through our barrow sieve, made of expanded metal diamond security mesh, while Poll is trundling the other barrow. Breaking up the compost in this way makes mixing it in very much easier. Poll does this, then, following our standard pattern, it's over to me for the stonework. "Don't it always seem to go" that wherever we decide to construct a new bed, or remake an old one, the next compost heap to use is at the other end of the garden! At least barrowing from the newer heaps in the top garden it's downhill all the way; unlike last year when we were making the upper gentian bed using compost from the old heap right behind Poll's trillium bed site, separated only from it by the screening drystone dyke. The way we often do things would drive a time and motion expert mad!

Since many of the trilliums we intend to plant out are potentially quite large plants, given time, we have decided to use meconopsis as temporary fillers, including Peter Cox's mysterious *M. pseudo-integrifolia, M. punicea*, which had us worried for a while but now seems to be producing fertile seed here, and *MM. grandis* and *simplicifolia* from the EMAK collections in East Nepal. There is an interesting reversal of colour

in these new forms of the last two species. The *M. simplicifolia* is a good blue, whereas the *M. grandis* has red-purple flowers, actually a nice colour, not at all "meaty" in tone. This last also has interesting foliage, the cauline leaves narrow and upward-pointing like those of *M. sherriffii*. However, they are copiously coated in golden-brown hairs, rather than the silver of Sherriff's pink meconopsis. We have to say that *M. sherriffii* is unfortunately not satisfactory in the open here, and even with protection, the buds are often aborted by late frosts. This year it was held back by the long cold spring, and our largest pot plant has four buds just opening. (So is *Magnolia sinensis*, we must be due a frost!) Returning to *M. grandis*, while most of our plantings are generally true-blue, they do vary in reliability. "Early Sikkim" and "Narrow-leaved" can occasionally be somewhat purple, especially the first top flower, after a frost; "Mrs Sherriff's dream" and Bobby Masterton's "Mini-grandis" are seldom affected, neither are the hybrid forms grouped under *M. x sheldonii*. Until the arrival of the EMAK *M. simplicifolia* we had only one form in the garden: "Sherriff's perennial" which has lavender flowers. While still short-lived, most plants bloom more than once and so there is more chance of keeping this strain through a poor season. We used to have the sky-blue "Bailey's form", but this was definitely monocarpic, and so we lost it when a series of hot summers in the 1970s inhibited seed production. There is, for once, a simple and sure way of separating these two species: *M. grandis* has white filaments, in *M. simplicifolia* they match the petal colour.

Life should not be all work, and so we made a number of trips south this Spring either to lecture or attend an SRGC show. Many of the members we met enquired of us as to how our young red Lakeland terrier, Grizzly, was fitting in at Askival. In fact he is now fully integrated into the pack, so much so that they are now collectively known as "Cerberus" after the three-headed guardian of Hades. I always used to wonder whether it mattered to which head one gave the wheaten cake. In the case of our three, it must be fair shares for all. Even then there are occasional disputes, which, if they occur under my desk, can be measured on the aspidistra scale by how much the foliage trembles. Grizzly is now fully garden-trained, he knows where he is allowed to wander. All beds are out of bounds to dogs, and even if we go into one to weed ours are trained not to follow, but wait on the grass or path. Grizzly has also learned that while he may shred up a fallen stick or dead herbaceous stem, applying his gnashers to a living plant is absolutely "verboten". Stealing a dry iris stem from my barrow, he makes off with a cheeky twinkle in his eye; who says dogs cannot talk. Would that it were possible to teach him to recognise *Cardamine hirsuta*!

Climate and the energy of alpines

Many items in the Stone Column have their origin in some chance remark made in conversation with fellow gardeners. During the winter we drove over to Lochcarron to visit a very old friend, Mollie Harbord, whom we have known since we first joined the SRGC twenty years ago. Back then, Mollie gardened in Pitlochry, whence she moved to St Andrews, before ending up on the West coast. Wherever Mollie goes, her troughs must go too (see "Mollie's mobile garden", Stone Column, June 1983 Journal, page 209). In Lochcarron, however, she has found that her Kabschia saxifrages therein no longer flower. As I said at the time, I feel that the answer lies in the relatively mild west coast winters.

Constructing a plant is no different in principle from, say, building a house. The raw materials must be obtained, and then assembled, a process which requires energy, if only from human muscles. To successfully complete the house one must have *both* inputs. A plant obtains its raw materials for growth from the soil via its roots, but the energy to assemble these nutrients into shoots, leaves, flowers, or fruits, comes from the plant's carbohydrate reserves. No amount of extra fertiliser can produce flowers if the plant lacks sufficient energy to make use of it. A larger pile of bricks is not a house! As is well known, photosynthesis in the green parts of a plant produces carbohydrates from carbon dioxide and water, when there is an input of energy in the form of light. This fixed energy is transported around the plant to all the cells, including the roots. The reverse process, respiration, then "burns" the carbohydrate back to carbon dioxide and water, liberating the energy the cells need to live and grow. This requires an intake of oxygen, which fact has given rise to the suggestion that one should remove flowers from a sickroom at night, and is why roots must have an oxygen supply. Respiration is temperature-dependent, the warmer the plant, the higher the rate at which carbohydrates are used up. Alpine plants are adapted to function at low temperatures; moved to our warmer gardens their respiration rates must increase, over the whole plant including the underground parts. It should be stressed at this point that it is the mean temperature which is important here, not the peaks and troughs. Thus the relatively mild soil temperatures experienced by Mollie's saxifrages, coupled with the low light levels and short winter days, means that, come the spring, they lack sufficient energy to build flowers. Some plants get around this problem by having a special storage organ such as a bulb. This enables the plant to grow extremely rapidly by raiding this store of fixed sunlight.

The above, while somewhat oversimplified, can also help to explain why many true alpines not only flourish up here in the north, but flower

more profusely after a long cold winter, and why Arctic plants are often so difficult to cultivate. This spring the genus *Ranunculus* has provided a prime example of the former. The various snowpatch species such as *R. glacialis* usually grow where their roots are bathed in ice-cold melt-water, small wonder they are reluctant to perform in our gardens. Our experience of the American equivalents in the *R. eschscholtzii* aggregate is unfortunately rather similar. They will flower, but sometimes their blooms are undersized. This year, however, the Big-Horns representative of the group, *R.e. eximus*, has honoured us with full-sized flowers, up to 30mm in diameter on short stems. When they are bad, they aren't horrid, just no better than *R. repens*! Fully in character for once, they still had to give way to an even brighter star from the New World, which also shone for us this spring. Back in January 1989, Don Stead had passed on to us a little seed of *Ranunculus semiverticillatus* under the number P&W 6528. Only one germinated, and was potted up in June 1991. We can no longer say when it came up, since our seed records have been simplified. Only three entries are currently made, when we sow the seed, prick it out or first pot it up, and, should it survive, plant it out. The single plant acknowledged each spring by producing a single, umbrella-shaped, leaf of finest filigree. Probably helped by the long, cold winter, this year the stem was crowned by a solitary bud, subtended by a foliage ruff the colour of a stormy Highland dawn: a dark steely blue with just a flush of pink (Fig.1, p.14). On opening the white petals were externally tinged with pink. As the flower faded, the leaf expanded to a circle of brilliant glaucous blue, in colour rivalled only by *Dicentra peregrina* and *Aquilegia jonesii*. We obtained further seed of this superb species from Peter Erskine in February 1991. Sown fresh, it germinated freely and gave us enough plants to distribute. The five we kept are in strong healthy growth as I write. If all goes well and two flower together, we should get our own seed. Only then can we say that we have the plant established here at Askival.

In the case of Arctic-alpines it can be quite difficult striking the correct balance. They require cool roots but a good light during their short growing season. *Cassiope hypnoides* is a case in point. We first tried it in a trough on the north side of the house. Although the wall is white, and the site is not overhung, there was insufficient light to get it to flower. Thus we next put one into another trough in full sun, but on the north side partly shaded by a large rock. This does have the odd flower, but can hardly be said to be vigorous. A third placed in full sun on the Blue Ridge survived for several years, and bloomed, but eventually succumbed to scorch, drought, or a combination. We cannot say which, as we were

away for part of each summer. When planting up the Haze bed which faces south-south-west in the upper garden, we tried for a fourth time lucky. As this specimen was getting rather old and tired in its pot, there was little to lose. It was placed on the north side of a large *Rhododendron kaempferi latisepalum* moved from the old Azalea bed. Of open, upright growth this is fully deciduous here, and leafs late. Thus it only provides a respite from the sun in the middle of summer days. Liberated from its pot, the cassiope responded by an improved colour and healthy growth. This spring many of the shoots carried terminal rounded bells of snowy white carried on threadlike dark red pedicels. True cassiopes have axillary flowers, so we prefer the American terminology, transferring this species and *C. stelleriana* to the genus *Harrimanella*. *Diapensia lapponica* has a similar reputation for recalcitrance in cultivation, but we have found it much easier to please, especially the Japanese *D. l.* var. *obovata*. Grown with full exposure, the foliage takes on rich mahogany tones following the onset of frosts, returning to green with the return of warmer weather. One mat, mingling with *"Cassiope" stelleriana* and a native *Salix herbacea* hybrid in a trough, was decorated with over forty beautiful creamy crystalline blooms this April (Fig.2, p.14).

In their enthusiastic article on the western Himalaya for the last issue, the Taylors ask if *Gentiana tubiflora* ever opens its flowers. We cannot answer for the Rohtang form, but as Fig.3 (p.15) clearly demonstrates, the Nepalese plant certainly does. This slide, which was included in our presentation to the 1991 Warwick conference, shows a descendant of a plant given to us by George Smith back in 1976 (see AGS Bulletin, March 1980, p.51). We found that this species strongly resented too much shade, growing lax and prone to rotting off. On the other hand, while sun was required to open the flowers, growth was easily scorched. We kept the balance for almost ten years, but a series of hot summers in the mid 1980s inhibited seed production, and so this species, the nearest thing to a cushion gentian we have grown, was finally lost.

Although almost all the alpines we grow are perennial, they vary enormously in natural lifespan. Some, such as *Edraianthus serpyllifolius*, can be kept going by repeatedly taking cuttings, but we are often dependent on seed production to maintain the species. Think of how many Sino-Himalayan primulas have passed in and out of cultivation in the last fifty years! One can blame infertility, perhaps as a result of genetic impoverishment in cultivation, but it can simply be that in garden conditions the plant's energy resources are insufficient to manufacture seed. There are some things we can do to help; for example never let the sun shine on the unprotected side of a pot, fill the frame from the south side, and try not to leave gaps. Remember, cool roots waste less energy.

Seven Wonders of the Roof of the World

JOEL SMITH

Following my expedition to the Indian Himalaya in July 1993, I would like to introduce seven of the exciting plant species found in the area.

***Primula sessilis* – Pioneering spirit and humble beginnings**

After reading so many great accounts from the great plant-explorers, such as Kingdon Ward and Smythe, about the profusion of Asiatic primulas growing like cabbages in the damp forests of Nepal, I was somewhat surprised to find *Primula sessilis* growing on a rock-face at Kothi, on the approach to the Rohtang Pass. Beneath the towering *Cupressus*, a steep bank of hard granite rose, kept moist by a supply of running water flowing down the rock-face in the vital growing months of this petiolarid. With little other than the damp peaty moss, the primula seems to explore the narrow crevices for support, thriving in the dappled shade.

I should explain that alongside a small group of plant enthusiasts led by Alastair McKelvie I travelled to Manali, a beautiful hill-station perched below the mighty approaches to the Tibetan borderlands. Chandertal Tours arranged jeep transport to aid exploration of the passes and valleys of the upper Kulu Valley.

Primula sessilis forms loose rosettes of crinkled leaves, often mistaken for another western Himalayan beauty, *Primula edgeworthii*, except that the leaf mid-rib is richly tinged red. Even by the end of July the plants had largely shed their seeds, washed into the gullies by the ceaseless mist of fine droplets of water splashing from the sodden turf above, and many small seedlings were in evidence. Presumably, rapid sowing of the species would be rewarded by prolific germination of fresh seed. A visit in April or May to the site at 2500m would be rewarded by the spectacle of a sheet of the lilac-pink flowers, each bloom about 2.5cm across, almost stemless with an orange eye surrounded by the elliptical petals. How I wish that a visit to the Himalaya could combine the sight of such early flowering plants with the main high altitude alpines!

Polunin, in his guide, notes that *P. sessilis* is common throughout the Kulu district of the Himachal Pradesh, but, given the sparse number of herbarium records in the British Museum, collection has been very sporadic (Stainton collected around Kulu on 5.4.83 at 2,100m) and the species remains rare in cultivation. Hopefully, the seed I collected for the societies and others will prove a viable reintroduction of this worthy member of the Petiolares. (Fig.4, p.75).

***Primula reidii* – Jeep travel, a new dimension to botanising**

As the jeep sped effortlessly towards the Rohtang Pass itself, a flash of dazzling blue caught our eyes. Rather than pique my insatiable curiosity, further exploration was needed and the blue proved to be the newly-unfurled blooms of the local blue poppy – *Meconopsis aculeata,* still bejewelled with early morning dew, the flowers flushed purple as is common south of Ladakh. Yet this noble plant seemed to be positioned as if a sentry to something far more spectacular in this shady cave, overhung with rock. There, in such contrast to the cloying gloom, were the ivory-white bells of *Primula reidii* (Fig.4, p.15).

Growing on a flat-topped boulder, in a shallow peat and moss compost, was a colony of about fifteen mature plants, thronged by a nursery of plantlets from last season's seed. Above the densely hirsute and finely-toothed leaves rose a single stem, or more exceptionally a pair of flowering stems, about 10cm high. The icy-white farina on the stem and calyces was in stark contrast to the three or so creamy-white pendent blooms born above the loosely arranged foliage. Stunningly beautiful, this member of the section Soldanelloides scored further marks not just because of its grace but also the rich heady fragrance.

In the garden, the species often proves difficult and short-lived, but perhaps, as the number of fresh seedlings demonstrated, even the species in the wild is limited to two or three years' life, some consolation to the dispirited grower. The common factor to all the small colonies seen seems to be moisture: where the plants were growing on vertical rock-faces and even on this heavily-shaded boulder there was a source of running water on the surface of the rock, at least at flowering time at the end of July, tending to dry somewhat by mid-August when the plants seed and begin to die away. Any soil was either peaty or a gritty alluvium, washed into crevices by the dripping water.

Polunin describes the distribution from Kashmir to central Nepal, but given the six cliff sites found from the Rahla Falls upwards to Marri, on the approach to the Rohtang, the Kulu Valley would appear to be a rich

Fig. 1 *Ranunculus semiverticillatus*, P&W 6528 (p10) Polly Stone

Fig. 2 *Diapensia lapponica* var *obovata*, at Askival (p11) Polly Stone

Fig. 3 *Gentiana tubiflora* (p11) Polly Stone

Fig. 4 *Primula reidii*, Rahla falls, India (p13) Joel Smith

Fig. 5 *Arenaria festucoides*, Rohtang Pass, India (p18) Joel Smith

Fig. 6 *Saxifraga jacquemontiana*, Baralacha Pass, India (p19) Joel Smith

Fig. 7 *Gentianella moorcroftiana* , Satchu, India (p19) Joel Smith

site, especially given the high rainfall. Material collected by Ludlow and Sherriff in Kashmir in 1943 closely resembles the Rohtang form, but care must be taken to distinguish the very different blue *P. r. williamsii* form, endemic to western and central Nepal. The colony above the Rahla Falls at 3100m is a little lower than the normal altitudinal range recorded for the species.

I hope to re-create the conditions in my garden in a bid to flower and keep this exciting species in the drier south of Britain.

***Primula macrophylla* ssp. *moorcroftiana* – The research goal**

Crossing the turf of the alpine meadows of the Rohtang Pass (3976m), a wealth of high alpines, such as the cushion-forming *Arenaria festucoides* (Fig.5, p.16), is to be found with relative ease. However, the pass is rather cursed by variable weather and the propensity to attract thick swathes of cloud in an otherwise clear sky. So, it was with a philosophical attitude that I watched as a kiss-curl of cloud sank onto the pass as we wound our way up the hairpins from Manali.

For a confirmed "Primulaphile", one of the more exciting finds were the tiny flowers of this member of the section Eu-nivales. In the boggy areas of grassland at the head of the pass, close to the river, this high alpine form of *P. macrophylla* thrives in the peaty soil, saturated with water. Above the loose rosette of upright leaves a small umbel of indigo flowers is borne, with a prominent white eye in the best forms; the calyx, stem and undersides of the leaves are covered in a fine white farina (see p.84). Upon the cliff ledges above the river a more robust form is to be found, with larger leaves, stems up to 20cm and flower umbels of 5-15 flowers, but this still appears to be *P. m. moorcroftiana*. The type *P. macrophylla*, in contrast, is a much more robust plant, with rounded corolla lobes opposed to the obcordate, longer leaves, the bracts not exceeding the calyx in length, and favouring gravel beds close to the snowmelt in otherwise dry glacial valleys.

There is doubt whether the smaller form is a mere high altitude ecotype or whether it amounts to a separate and discrete species. The confused state of herbaria from 1820 onwards and the natural affinity of *PP. stuartii, macrophylla* and *moorcroftiana* to produce considerable natural hybrids and variation within species has contributed towards the problems of identification and taxonomy. The Rohtang form most closely resembles Sherriff's collection in 1939 made on the Rupin Pass, where he found the primula growing at 4400m in an open, wet rock situation.

The high alpine form still remains rare in cultivation, despite coming

readily from seed. The grower would probably be rewarded by either growing the plant in a damp bog outside, then allowing the plant to dry out in the winter by using a large piece of glass, or perhaps a pan watered liberally in early spring to re-create the effect of rapid snowmelt in the Himalayas. As ever with some of the more tricky primulas, care will be repaid by a flush of the exquisite blooms in June or July.

It was with a light heart that I left the pass imagining the barren approach to the pass that Father Moorcroft, after whom the delightful *Gentianella moorcroftiana* (Fig.7, p.17) is also named, must have had in 1820, past the mighty snow bridge and up onto the exposed flat of the pass itself, with none of the Ladaki tea tents to offer solace to the weary bones of the traveller, as there are today.

***Saxifraga jacquemontiana* – A warning to others**

Still further on my travels, the jeeps reached the dizzy heights of the Baralacha Pass at 4900m close to the borders of the disputed territory of Kashmir. The lush valleys yielded to desolate stretches of apparently lifeless screes, the monotony of colour only broken by the occasional boulder. Yet this superficial barrenness only served to magnify the impact of the panorama; circling the split pass were the most spectacular of frost-shattered peaks, laced with snow, backlit by the incredible intensity of the sky colour. Sitting alone on the pass, beside the shredded tatters of Tibetan prayer flags, I felt the unrivalled freedom, yet savage beauty of the spot.

In what can only be called a model scree bank, were the yellowy-green fleshy mounds of *Saxifraga jacquemontiana*, resiliently defying the aridity of so well-drained a habitat (Fig.6, p.16).

Above the hard rosettes the solitary yellow flowers nestled, the warmth of colour relieving the harsh terrain. A plant epitomising the xerophytic habit, it is clearly adapted to the dry soils and low rainfall in the rain-shadowed realm of Lahaul. With only a few centimetres of precipitation in the average year, it exhibited a tight rosette structure of glandular-hairy leaves and a hummock structure. All these factors help reduce water-loss from transpiration to a bare minimum in a climate where water is a precious commodity. Consequently, in cultivation, except for abundant moisture following the equivalent of snowmelt, the species would likely benefit from a well-drained granite or schist scree, kept on the dry side. One only hopes that when the species reaches these shores it will preserve its tight show-winning habit and not develop the lax growth of so many high alpines in response to the dank British climate.

Even at 4900m my energy and drive seemed to be ceaseless, but I should have recognised the calm before the storm. By the following evening, I suddenly developed chest pains, a cold seeping feeling in the lungs and an untreatable headache. From my reading, I recognised the effects of acute mountain sickness in all its glory, a condition caused by the appearance of fluid in the lungs and/or brain owing to the low tissue oxygen levels. I have never been in such agony and was forced to retreat by jeep as soon as possible next morning to the lower retreats of the mountains. I only warn others to take acclimatisation seriously and take heed of your body's initial warnings of dizziness, headaches and loss of appetite. Slow ascent is the answer to avoid the ignominy of a premature retreat, but should you develop the more serious symptoms then retreat is the only option to avoid risking pulmonary or cerebral oedema (potentially fatal conditions). Use of the drug Diamox and adopting sensible itineraries once over 3000m should give the trekker a trouble-free holiday in this respect.

***Aquilegia fragrans* – A sight for sore eyes**

Having taken a few days out of the trekking schedule to recuperate, I gradually returned to good spirits helped along by the indubitable optimism of Prem, our driver, a young man ever ready to promise fine flowers to be had "at next valley"! Visits to several joint Buddhist and Hindu monasteries along the Udaipur road aroused my awareness of the widespread religious tolerance of the area, despite the news stories of bomb attacks on Hindus by Muslims in Jammu.

Camping at Grammpu, just into Lahaul, my tent gazed across the line of peaks bordering the Spiti road. Although much drier, a fine meadow flora yielded further interest in the wet gullies where streams cascaded down to join the fast-moving Spiti River. In one of these gullies, the McGregor party spotted the pale nodding heads of one of the most graceful alpines – *Aquilegia fragrans*. Native to the western Himalaya, the tall plants (40-70cm) bore many pale lilac blooms, the inner petals fading to a cream colour. As the Latin name suggests, this species is blessed with an exquisite scent. Plenty of light, even hot sun will be rewarded with some fine stands in the border, provided the roots are never allowed to dry out. In the wild it was always near water or had its roots protected by rocks. Several forms are available now in Britain from seed collected by Chris Chadwell in the past few years.

***Corydalis thyrsiflora* – The answer to a question**

After an eventful night in a guest house, my bed being showered with sparks from the light fitting at periodic intervals during my slumber, I was positively yearning for the hardships of the tent again!

Camping below Marri, back on the Rohtang approach, we explored the pass again. From the campsite itself, the very peaks themselves were plastered in a bright yellow flower observable even from several kilometres away. What was it? Reaching the Rohtang, the answer lay in the vases of the jolly tea tents – *Corydalis thyrsiflora.* On the rocky-cliffs to the east of the pass, this majestic plant tumbled from the damp crevices, the sunny yellow racemes in marked contrast to the sombre black rock. Commonly found from Pakistan to Kashmir, I am sure the glaucous leaves would be welcome in any scree garden or alpine house and would probably seed readily if given a moist scree or rock-crevice.

***Androsace muscoidea robusta* – An unexpected reward**

Again on the Rohtang, I was shown that the most unlikely areas can yield exciting plants. Crossing the stream-bed of the River Beas, seemingly used as a refuse dump by the locals, I reached a bank of rocky boulders. Whilst admiring the nodding heads of *Cremanthodium ellisii,* I spotted a promising flattened boulder covered in plants. Upon reaching it, I had no eyes for the leaves of *Primula minutissima* or the blooms of *Androsace sempervivoides,* but only for the delightful woolly rosettes of *Androsace muscoidea robusta.* The lilac-pink flowers, borne in pairs on short 1cm stems, had yellow eyes, whilst the rosettes were covered in silver hairs. Again a lovely plant, although here not forming a dense mat, but worthy of a gritty dry position in a trough or pan. In the wild these rock-jasmines seem to thrive in arid baked soils without neck chippings, but given a wetter home climate, drainage around the collar of the plant would be crucial.

These are just some of the beauties seen gracing the majestic sweeps of the western Himalaya, but I hope that I have conveyed something about just how accessible these plants are given the use of a jeep. Admittedly, this year was blessed with a month of near clear sunshine even in the monsoon season, since most of the rain had already fallen with such catastrophic consequences for northern India, in early July. Despite the many landslides, the roads were opened very rapidly by the army, just days after the rains subsided. The Indian Himalaya, given their more northerly latitude, offer a wealth of plants hardy for the British

garden, and I cannot wait to be beneath their peaks again.

Finally, I would like to thank the following for their generous support: the Scottish Rock Garden Club, the Royal Horticultural Society, the Alpine Garden Society and the Merlin Trust.

Primula sessilis Joel Smith

A Wimp's Guide to Mount Olympus

BRIAN AND EILEEN ANDERSON

The screech roaring in my ears was not the cry of a buzzard circling impatiently above but the noise of my own breath rasping against the cold, hard rock. Groping for yet more purchase, I rammed my fingernails painfully into the crevice and with my other hand raised the camera to bring *Jankaea heldreichii* clearly into focus (Fig.8, p.34).

Stepping down six inches back onto the broad path, it occurred to me that with only a little licence and the right choice of words it would be easy to make Mount Olympus sound like a hunting ground for only the most intrepid botanist. And that would perhaps deter many from enjoying the delights of botanising on a mountain which is, apart from the very peaks, easily accessible and well within the capabilities of most good, fit walkers. It is not the impression I gained from reading previous articles on Mount Olympus but perhaps I was guilty of adding layers of hardship in my own mind because reward and effort are inexorably linked and the rewards here can be in excess of 500 species in a single holiday. The flora of this mountain has generally been well described so it is not the intention here to provide yet a further catalogue but to give a different perspective, to look at some of the more practical aspects and focus on the flowers in terms of altitude and flowering time.

Sparkling Litohoro at the foot of the mountain inspires comparison with an alpine village rather than a typical Greek village. It is an ideal base and convenient for the easiest and most frequently used route up the mountain. Its clean, flower-decked streets house equally clean hotels and Hotel Myrto is where we chose to stay. The view from the balcony was of a mass of grey limestone thrusting upwards to terminate in the snow-capped peaks of Olympus of which the highest is Mytikas, at 2917m. Although the peaks may hint at irresistible alpines, there are an awful lot of species to be found, in fact the vast majority, without venturing anywhere near them. Not unusually, there are many more species at the bottom of the mountain than there are at the top. According to Polunin (Flowers of Greece and the Balkans, Oxford University Press 1987), 900 of the 1500 species to be found on the mountain occur below 1200m and roughly 1250 species below 2000m. Happily for us wimps, the law of diminishing returns operates. The harder you toil and

sweat up the mountain, the less there is to find! Of course, true alpine enthusiasts can hardly wait now to deliver the crunch line . . . the only really interesting species are those found at the top. In the case of Mount Olympus, this is not entirely true. There is a very important factor operating in favour of reluctant walkers. Forming just below the summit peaks is a valley which rapidly cuts deeper as it descends to form the Mavrolongos Gorge. The influence of this gorge is very significant on the plant life. The frost, the snow and the cold winter air tumbling down from the peaks are funnelled very effectively down the gorge. Alpine conditions are brought downwards by this and re-created at much lower altitudes, down as low as 1000m. Very conveniently, the main ascent route up the mountain broadly follows the line of the gorge so walkers can start to enjoy alpines from a relatively low altitude and even wimps who prefer wheels to legs can drive this far and expect to see treasures like the already mentioned *Jankaea heldreichii* and *Saxifraga sempervivum* (cover plate).

The first stage in the three stage ascent, from the village to the spring at Prionia (1100m), can be the easiest or one of the most difficult. It is easy if you drive up on the good stabilised road which starts from the village and is asphalted for a third of its 18km length. There is room to park by the ramshackle, wooden tavern which is truly an oasis for thirsty travellers. Prionia is also the home of the mule station for those who want to ride the next stage on horseback but more of that shortly. Walking to Prionia from Litohoro along the waymarked E4 path is tough. It is quite a long section and the route, as well as ascending steadily, dips frequently in and out of the gorge significantly increasing the uphill work! The easier way to explore this section is to taxi up to Prionia and walk down. Taxis quite happily take fares up to Prionia. It is the best section for flowers in the early part of the season. The open macchie here, a mixture of evergreen and deciduous species, is very rich in annuals and geophytes. Picking out a few species to name, I suppose, simply reflects our own interests but there are two anemones, *A. blanda* and *A. pavonina*, *Fritillaria messanensis*, *Iris reichenbachii* and a fair number of orchids including the monkey orchid, *Orchis simia*, and the dainty *Orchis quadripunctata*. At the upper end of this section, between the Monastery of Ag. Dionisios and Prionia, there is a convenient little walk for which the adjective 'demanding' would be the last one to spring to mind. Leave the car at the side road to the monastery, reached about 2km before Prionia, and wander down this track. Ag. Dionisios was damaged during the war but some reconstruction is now taking place so it is worth a moment to look around. Continue past the monastery, to

join the river and the E4 path. Follow this up to Prionia and walk back to the car via the road, allowing around two and a half hours for the circuit. It's flowers all the way. This little diversion, on June 4th, unearthed an abundance of species including mouth-watering treasures like *Aquilegia amaliae* (Fig.9, p.34), *Pinguicula hirtiflora* flourishing in the damp places (Fig.11, p.36), *Geranium macrorrhizum, Centaurea pindicola*, the common twayblade, *Listera ovata, Pyrola chlorantha, Helleborus cyclophyllus*, and two surprises already mentioned, *Jankaea heldreichii* and *Saxifraga sempervivum*. Surprising because the altitude here is less than 1100m, although it must be said that the *Saxifraga sempervivum* was seen in much better form with tighter cushions at much higher altitudes. *Jankaea heldreichii* grows on rock ledges, mostly in shady sites, but we were lucky to find some almost within reach. Even when they are not in flower, their rosettes of felted grey leaves are distinctive and easily recognised. It was not in flower at higher altitudes at this time although it was spotted on high rocky ledges.

The next stage of the ascent is from Prionia to Refuge A, called Spilios Agapitos, at an altitude of 2100m. It is along a broad path with no sense of danger which is easily followed and leads in more or less steady ascent keeping well away from ledges or steep drops. Although the time for this section is signposted at two and a half hours, around three hours is more realistic and wimps interested in flowers will probably take very much longer! The refuge, run as a tight ship by Kostas Zolatas, offers hot soup and cold beer as well as other more substantial meals so just getting there can bring its own rewards. Anyone wishing to stay overnight needs to book in by phoning first and take their own sleeping bag liner. Of course there is a much easier way of climbing this section . . . on the back of a mule! These are for hire at a surprisingly reasonable cost which also includes a guide. With a fast film and a good telephoto lens, it might be possible to photograph the flowers on the way up from the back of a mule but it might be easier to abandon the animal at the refuge and walk down.

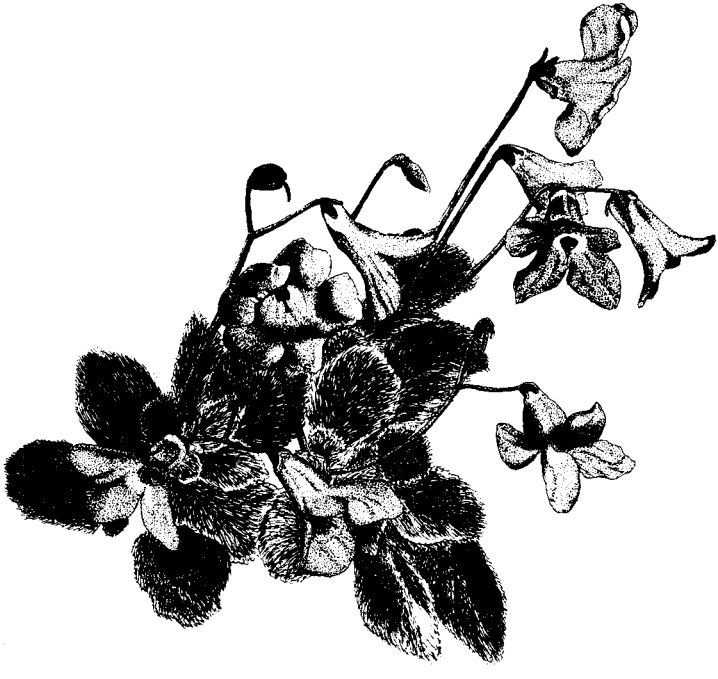
Open woodland provides some shade early on but this eventually thins with increasing altitude, although it does not entirely disappear until close to the refuge. We actually walked this section twice. The first time in brilliant sunshine, but when we were relaxing at the refuge preparing for our return, I thought that I had better check out a fear that the camera battery was fading . . . it was! The new battery was safely stowed back in the hotel room. There was some initial opposition when I declared that we would have to come up again to be sure that we had some worthwhile photographs. Eileen's eyebrows and some minor grunts suggested some unspoken suspicion! We did return a few days later, this time

setting out in bright sunshine but ending up enveloped in thin cloud. Of course, the first set of photographs turned out fine and Eileen still suspects it might all have been a ploy.

The open woodlands near the start of the walk yielded twayblade in fair abundance together with the bird's nest orchid, *Neottia nidus-avis*. There are two more saprophytic orchids here. The yellow bird's nest, *Monotropa hypopitys*, which grows around this altitude, and *Corallorhiza trifida*, found above 1500m; both of these flower in July. While the focus is still on orchids, three others were noted along the way, *Cephalanthera rubra, C. longifolia* and *Orchis tridentata*. An eye-catching pink milkwort, *Polygala nicaeensis*, fringed the path in the early stages, apparently it is replaced by *P. vulgaris* at alpine levels. A large patch of lily-of-the-valley, *Convallaria majalis*, in full blossom seemed like an intruder here especially since it was almost masking a small colony of *Fritillaria messanensis*. On our second visit, just about three days later, we were amazed to find that this fritillary had faded and to find fresh new colonies in bloom a few hundred metres higher. It demonstrated the speed at which spring moves up the mountain in this part. *Saxifraga sempervivum* occurred quite commonly on the way up sometimes at the bottom of banks where there wasn't too much competition but it was at its best when clinging to a rockface. The array of flowers seen without even straying from the path was enough to keep the camera almost constantly in action; *Viola graeca, Aubrieta deltoidea* (possibly *thessala*), *Iberis sempervirens, Veronica prostrata, Erysimum olympicum*, and *Achillea ageratifolia*. The display went on and on and didn't really change much in character until within hailing distance of the refuge. Here *Saxifraga scardica* now graced the rocks with *Corydalis solida* (*densiflora*), *Crocus veluchensis* and *Draba athoa* joining the display. Perhaps most eyecatching of all, at this altitude, was a brilliant colony of the yellow-flowered *Orchis pallens* (Fig.10, p.35).

The refuge does not come into sight until it is quite close but the final stretch seems steeper than ever. From a wimp's point of view, with all due apologies to Robert Louis Stevenson, to arrive is a better thing than to travel hopefully. This is certainly true when the rewards are so worthwhile; liquid refreshments, an opportunity to rest the legs whilst checking all those doubtful identifications in Arne Strid's authoritative book on the flowers of this region, 'Wild Flowers of Mount Olympus' (published by the Goulandris Natural History Museum) which is held at the refuge and available to interested parties. In this first week in June there was actually very little in flower above this altitude, except for *Gentiana verna*. This is the turning point for the early season walkers.

From the refuge to the peaks is the third and final stage but this is for the fitter, stronger and mentally tough. Although it is not too difficult to go a little higher, the peaks are both difficult and dangerous. It has been the intention to make light of the walk as far as the refuge but a word of caution is appropriate; high mountains, and this is no exception, are prone to rapid changes of weather and particularly to thunderstorms in the afternoon. Never go without taking sensible precautions which include suitable waterproof clothing and carrying drinking water, especially from Prionia to the refuge, for the effect of the Mediterranean sun and altitude can quickly lead to dehydration.



Jankaea heldreichii Lionel Bacon

Iris winogradowii, I. 'Katharine Hodgkin' and *I.* 'Frank Elder'

GLASSFORD SPRUNT

Iris winogradowii (Fig.12, p.36)

Iris winogradowii was first introduced into cultivation in 1927, having been discovered in a limited area of the Caucasus, and is very rare in the wild. It was named for P. F. Winogradow-Nikitin who found it in the wild. It was awarded the Award of Merit in 1935.

Iris winogradowii belongs to the subgenus Hermodactyloides and so is one of the reticulate irises. In nature it grows in alpine meadows, so that it does not like excessive drying out or baking in summer. It does, however, like plenty of moisture in the growing season. It is perfectly hardy and the best stands that I have seen were in the late Harold Esslemont's garden, where he grew it to perfection.

Unlike the commercial form of *Iris danfordiae, Iris winogradowii* maintains its flowering-sized corms while still producing a considerable number of rice-grain cormlets at the base of each flowering-sized corm.

The flower is similar in size and form to that of *Iris histrioides.* In flower it stands about 10cm tall. The flowers are primrose yellow in colour and there is an orange flush on the ridge of the falls. There is also some greenish spotting of the falls. The leaves at flowering time are very short and usually do not extend much above the base of the flower. By the time that the leaf has stopped growing it has probably reached a length of about 40cm or so.

In our area, near Stirling, the flowers usually start appearing in early March, and the flowering season extends over three weeks or so. It is quite remarkable the way that the flowers stand up so well to the awful weather that is customary in their flowering season.

The early flowering season and its attendant foul weather means that there are not many pollinating insects around to do the honours so that the natural seed set is often fairly low. My efforts at hand-pollination are really only marginally better than natural pollination.

If it really is happy in its growing situation then it bulks up remarkably quickly and produces a wonderfully bright area in an otherwise dreary scene.

***Iris* 'Katharine Hodgkin'** (Fig.13, p.37)

Iris 'Katharine Hodgkin' was originally shown in 1969 by E. B. Anderson and was given an Award of Merit on its first showing. At that time it was stated to be a cross between *I. histrioides* and *I. danfordiae*. Two seeds were obtained from a cross and this was the only one which germinated. It first flowered in 1960. The flower is 10cm high, and is like *I. histrioides* in general form. The colour of the flower is difficult to describe. The base colour is white with a bluish cast. Slight variations in colour do occur from flower to flower but overall it is unmistakable. The standards are strongly veined in a bluish colour and the falls have strong dashes of a similar colour. The throat of the flower is bright yellow with an orange ridge.

***Iris* 'Frank Elder'** (Fig.14, p.37)

Iris 'Frank Elder' was first shown by Mr and Mrs Elder of North Berwick in 1978 and won an Award of Merit on its first showing. It was stated to be a hybrid between *Iris histrioides* 'Major' and *Iris winogradowii*. In general appearance it is very similar to *I.* 'Katharine Hodgkin' which makes it very doubtful that the reputed cross which produced *I.* 'Katharine Hodgkin' is true.

On the whole the colours are more muted than those of *I.* 'Katharine Hodgkin'. The base colour, although still pastel in nature, is a stronger tone than that of *I.* 'Katharine Hodgkin'. There is no veining of the standards and the falls, although similar to *I.* 'Katharine Hodgkin', are not so stark in their colouration. As with the other two irises the square section leaves are short at the time of flowering, so that in all three there is an uncluttered view of their flowers.

Cultivation

Writing about the cultivation of any plant is one certain way of putting one's neck on the block, because another grower speaking from experience in his or her area may find that it just will not work. There are so many variables; the climate and indeed the micro-climate, the rainfall, the constitution of the soil. Even in a small country like Scotland there is a considerable difference in climate and rainfall between east and west and between north and south. I can only speak for my own area in Central Scotland.

In the winter the weather is certainly some degrees colder than on the west coast but probably little different from the east coast. In the summer the temperatures are probably within a degree or two between east and west. The rainfall over the year is certainly less than on the west coast

and certainly more than on the east coast.

As with most other bulbous plants these irises, in the garden at least, prefer to be in well-drained soil. Waterlogging inevitably results in rotting. None of them really enjoy being dried off, but do require some easing back of the water supply during the resting season. In theory, at least, this tends to happen during the summer months anyhow, but in some wet seasons the results of excess wet are only too clear. They do require an adequate water supply during the growing season. With us there is not really any danger of a shortage at this time when they are growing outside, but the possibility of shortage must be borne in mind if they are being grown under cover.

A sandy soil with adequate humus content suits our area best of all. In the east more humus and in the west less humus should be an adjustment which will bring about appropriate growing conditions. They are none the worse for being in a reasonably rich soil, as, like most bulbs, they appear to be fairly gross feeders. For preference I supplement their diet with a tomato fertiliser. The higher potash content of the tomato fertiliser produces a more sturdy corm.

My experience is that they do not appear to like growing in pots for any length of time. When I first grew *I. winogradowii*, because it was so expensive, I grew it in pots, and each year instead of bulking up, as I had hoped, the corms became smaller, they stopped flowering and I was in great danger of losing my investment, and no Scot likes to do that. I was advised at that time to plant it out without a pot and it then went on from strength to strength. I have found that the same applies to *I.* 'Katharine Hodgkin' and *I.* 'Frank Elder'.

For plants required for shows I have a system whereby the irises grown in pots one year for showing are planted out until they have recovered, and their place is taken by others which have recovered in the garden.

Propagation

Two routes of propagation are available for *Iris winogradowii*; seeds and cormlets, although the adult corms will often split into two flowering sized corms. *I.* 'Katharine Hodgkin' and *I.* 'Frank Elder', however, being hybrids, are sterile, so that cormlets are the only means of increase.

It has been my policy with *I. winogradowii* to renew my stock on a regular basis by raising new stock each year from seed. This cycle of change is, I think, important in the battle to keep a virus-free stock. It takes about four years to produce flowering sized corms from seed.

Vigorous corms of all three plants under discussion will produce up to twenty cormlets in a growing season. These are grown on in a separate

nursery bed, and will usually reach flowering size in three growing seasons. Most of the losses occur in the first year and those surviving to the second growing season will usually go on to maturity.

I do an annual sort in the nursery beds, separating the flowering-sized corms from the non-flowering-sized corms. Until last year I had often wondered why *I. winogradowii* was so expensive, as it bulks up very quickly once you get it going. Last year disaster struck and my stock was savagely whittled down. I think that it was the combined effects of a very wet summer and the predations of our local slugs.

Pests and Diseases

The same pests and diseases affect all three irises and it is usually quite clear as to what has gone wrong.

Ink Spot

Ink spot is probably the most dreaded affliction of iris corms. This is caused by a fungus infection. It is, undoubtedly, a wise precaution to take steps against this and protect the corms with a systemic fungicide such as Benlate or Supercarb. When I lift iris corms I always take the opportunity to soak them for an hour or two in a solution made up to the manufacturer's specification, and I also used it from time to time during the growing season as a drench. In theory, at any rate, this should protect the corms by direct absorption of the fungicide and perhaps also attack any that is lying in the soil. An important ally is the adequate drainage of the soil.

Aphids

A watchful eye must be kept on the stock for the presence of aphids. Although it is probable that not all aphids are vectors of virus infection, it is never possible to be sure and anyhow, why should they steal the nutriment which is rightfully the plant's?

Early recognition of their presence is important, but how many aphids do you need to have a virus problem? One of the advantages of retirement is that more careful inspection of the plants is possible. Where only odd aphids are found, I pick them off with an old artery forceps. If things get beyond this, and they sometimes do when the warmer weather arrives, I am forced to resort to insecticides.

For those who have a deep-rooted objection to artificial chemical warfare against aphids, there are always the insecticides based on pyrethrum. They still seem to be effective, their main disadvantage being that they are washed off by the first shower of rain. If I can be sure of the weather then this is a safe choice. Unfortunately our weather cannot

always be guaranteed for long enough in advance for this treatment to be completely successful.

I tend, therefore, to go for systemic insecticides, which, provided that it is dry for an hour or two following spraying will be effective and remain so for several weeks after spraying. It is also important to use different insecticides for successive sprayings, making sure that the chemical ingredient of the spray is different and not just the label on the packet or bottle. Super strains of aphids will undoubtedly appear in time if this precaution is not attended to.

Slugs

We live in an area of heavy boulder clay, and there is no doubt that the slug populations are higher in these conditions than in areas of light soil. This is a never ending battle, and often a filigree effect on the petals is obtained through their depredations. In a wet season the problem goes deeper and they will often attack the corms as well. The damage which they cause lets the wet do the rest and rotting off of the corms occurs. Some help is available through making sure that the drainage of the soil is suitable.

I am never happy about leaving slug bait about nor do I think much of the idea of beer traps for them to tumble into. Probably a better idea is to consume the beer oneself and thus refreshed go into battle with the skewer, thumb or heavy foot, whichever is your weapon of choice. Gardening books often mention the efficacy of surrounding the plants with grit. I must say that our local slugs are not in the least deterred by such a strategy, and I feel that armed combat is the only certain approach to this problem.

A Tale of a Trough

HILARY HILL

Once a fortnight I have help in the garden. If that day is impossibly wet, the garage becomes a trough-making factory. This is why by the spring of 1993 twenty-eight troughs decorated the terrace. Although my garden is on the west coast of Scotland, we do sometimes have long dry spells when watering the troughs becomes a time-consuming business.

So, at the end of April 1993 when trough twenty-nine was ready to receive its plants, I decided to incorporate crystals of a water-resisting gel* in the compost. The instructions for use referred only to hanging baskets and containers of unspecified cubic capacity so I guessed the dose and used far too much. Three weeks later the first real downpour came and next day I found that the contents of the trough had risen 10-12cm above the rim, scattering the top dressing of gravel on to the surrounding terrace. Really quite dramatic!

For the next two months I just watched to see what would happen next, watering the other twenty-eight troughs during dry spells but leaving number twenty-nine severely alone. The plants grew rapidly but the bulging compost never subsided. At the end of July, three months after planting, I tackled the trough and removed plants, decorative stones and compost. The plants, *Anchusa caespitosa, Morisia monantha, Helichrysum selago tumidum, Douglasia laevigata ciliolata* and *Erigeron* 'Canary Bird' had made extensive roots, embracing large water-filled globules of the gel – an impressive sight. I replanted the trough, leaving the root balls with their globules of gel intact but setting them in my usual gel-free compost. The plants did not turn a hair, the compost never dried out and trough twenty-nine was the only one I never had to water. I covered it in the winter as I had been warned that the *Anchusa* and *Morisia* did not like winter wet. In April 1994 when the cover was removed the compost was still pleasantly moist.

In July 1993 troughs thirty and thirty-one were ready for planting. This time I was more cautious about the amount of gel to use and added a careful measure of 15ml of gel to 20 litres of compost. Nine months later all seem to be well. If I do not have to water troughs twenty-nine, thirty and thirty-one in 1994 perhaps I have stumbled on a useful technique.

*'Swellgel', obtainable from Glowcroft Ltd, PO Box 137, Gloucester GL4 7YB.

Fig. 8 *Jankaea heldreichii*, Mount Olympus (p23) B. & E. Anderson

Fig. 9 *Aquilegia amaliae*, Mount Olympus (p25) B. & E. Anderson

Fig. 10 *Orchis pallens*, Mount Olympus (p26) B. & E. Anderson

Fig. 11 *Pinguicula hirtiflora*, Mount Olympus (p25) B. & E. Anderson

Fig. 12 *Iris winogradowii* (p28) Glassford Sprunt

Fig. 13 *Iris 'Katharine Hodgkin'* (p29) Fred Hunt

Fig. 14 *Iris 'Frank Elder'* (p29) Glassford Sprunt

Good-bye *Meconopsis*

JAMES COBB

One rarely shoves one's face right into a *Meconopsis* flower – only one has a reputation for scent and no one grows that species. Fortunately one does not have to get too close to see the female sexual apparatus. Basically there is a fat seed pod (ovary) with a narrow stalk sticking out (the style) which carries the stigma. It is this style in *Meconopsis*, combined with the absence of the flat stigmatic disc typical of the true poppies (*Papaver*) that separate these two genera. Now long ago, even before evolution formed from a nebula of ideas in Darwin's head, Viguier noticed this sexual aberration of *Meconopsis* from flat topped pods of ordinary poppies. Being a good taxonomist the guy decided to make things more complicated and invented a new genus – *Meconopsis*. At this time he only knew the European species; *M. cambrica* – the Welsh poppy. So far so good – but lurking in the Himalayas waiting for our intrepid Western scientists were fabled blue poppies – like *M. betonicifolia*. At this point we need to make an aside (no wonder my students say my lectures are disorganised). One of the confounding problems in evolution is the analogy/homology pitfall. Are things the same because they have a common origin – homology; or because they have converged to look alike and do the same thing from quite different origins – analogy? Now deep down inside I'm sure that many who looked at *Meconopsis* in the past instinctively felt, because of the geographical isolation if nothing else, that the stigma structures in *M. cambrica* and *M. betonicifolia* were really analogous and thus they were not really likely to be in the same genus. Goodness knows what a style on a narrow stigma does but it can't be that difficult to evolve it. After all, *M. integrifolia* in some forms is virtually back to the flat *Papaver* structure. There were other American poppies with a similar elongated style but the geographical isolation of these is even more obvious and they have only transiently been in *Meconopsis*. George Taylor in particular in his great monograph left well alone but he undoubtedly had strong doubts. Taxonomists have now a new tool to stir things up – genetic analysis. Basically one can sequence the various molecular and genetic codes plants have. The closer plants are to a common origin the more they have in common in these sequences. Thus one can check out the

relatedness of plants. It should be easy to distinguish homology from analogy. That is just what a German research group is doing and a charming German girl is combining rearing her family with sorting out the Mecs. They don't award PhDs for saying "it's O.K. guys, leave well alone!" My monies are on analogy and then good-bye *Meconopsis. M. cambrica* is valid and therefore a new name for the genus must be found. I have even seen names suggested for it! I might add as another aside I'm convinced modern molecular techniques will not prove as infal lible as their backers advocate so this is not the "final" taxonomic exercise.

To me this opens a can of worms. I am sure when Linnaeus invented the binomial system of genus and species he was trying to put order into chaos by giving each species of organism a definitive name. The trouble is the system is based on relatedness and his idea of order from chaos did not last five minutes. This was because he also invented taxonomists. They have a reputation as being short fused and one of my more delightful memories is of a long drawn out slanging match between a cladist and a reformed cladist (short fused and exceedingly short fused taxonomists respectively) at an American conference which ended in tears. They have rules which allow them to mess about with the names we have to use – indefinitely! Just to be annoying I should like to suggest that on the first of January 1995 all plants should stick with the names they have at that moment for ever. If one wanted to communicate with the taxonomists, who would be free to go on changing things, then one could simply feed the name into a computer network (every good garden centre would have an on-line terminal) and get the latest update from taxonomists. Like this, taxonomists could mess about to their hearts' content and the rest of science plus bewildered gardeners would have their own immutable system. Fat chance I fear – all far too sensible.

This brings me to another point raised a little while ago by Ian Scott (**The Rock Garden** June 1993). Seed collected by expeditions has a collector's number which is very valuable. However, once it has been grown from seed in the garden the number is no longer valid. Where does this leave us? To some extent it may well depend on what we are trying to do. At worst we produce a race of garden hybrids as various species interbreed. Or, one could select for garden-worthy characteristics and produce a consistent strain from the wild species. One could attempt to interbreed as many strains and collections of the same species as possible to maximise the genetic diversity of the species in cultivation as a conservation measure – but then the plans might not be very garden-worthy. What I am not so sure of is why one needs to maintain particular collectors' numbers distinct, unless they have desirable qualities or represent the only genuine non-

hybridised material in cultivation. I have had at least ten different collectors' numbers for *Meconopsis integrifolia* in my garden and some of them are strikingly different, and more importantly behave differently with the same culture (Fig.18, p.54). The same is true of *M. horridula*. In the latter case these are even more distinct (Figs.15 & 16, p.54). The huge dark-capsuled purple-leafed forms that are similar to the old species *M. rudis*, the delicate yellow-anthered form which was *M. racemosa* before Taylor lumped them, to say nothing of the ice blue dwarf gem from high altitudes that I consistently failed with. What do we call these if we are to keep them separate? Gothenburg have gone back to using the old species names as varieties (and I think incorrectly at that from their descriptions). One has to remember however that Taylor lumped for good reasons and that even though extremes look very different there may be intermediates between them all. Nevertheless, like Ian Scott, I object to the idea that my preciously hand-pollinated forms get dumped in with a mass of ordinary material – but then what do I call them ? And – one cannot escape from the gene pool problem – maybe it is better that all the forms do interbreed and maximise the diversity rather than have our rather artificial selection based on some ephemeral aesthetic quality. I don't think one can win, at least not with a generalised seed list.

The answer is almost certainly an extension of what is happening now. Specialised seed exchanges already exist for some groups, for example lilies and even unofficially with *Meconopsis*. In the latter case this has proved invaluable to me since seed of species, or more usually forms, I have lost has been returned to me. There are a number of advantages to this and some disadvantages. The biggest disadvantage is that many plant collections are not owned by those of us who fuss about the right name and grow things purely to give them pleasure, and much that is excellent in the seed exchange comes from such sources and although poor naming can be frustrating it is the origin of many gems. Duplicating seed distribution is also very time consuming once a group has grown to any size. Finally there is the risk that people perceive the main seed exchanges are devalued by having another layer of seemingly elitist exchanges. I do not believe any of these problems are insurmountable. What of the advantages? Correct naming would be a great advantage and wrongly named material could be corrected before it was redistributed. In time this would see large amounts of correctly named seed coming back to the main exchanges and this would then educate non-specialist gardeners as to what the real thing looks like. Specialised exchanges could maintain collectors' specific stocks and obscure forms too numerous to list in the main exchange, as well as send out rare or difficult fresh material. It would also encourage the development of

especially good strains.

This all raises another much more serious problem also aired by Ian Scott and that is hybridisation between species. This is the great flaw in national collections of genera that are largely monocarpic. It is a problem that must be addressed, and sooner rather than later if we are to maintain any pretence that we grow wild-collected material as a conservation exercise. The national collection of *Meconopsis* has for years been with the enthusiastic Mike Hirst at Houghall College in Durham and a second collection may now be building up in a Scottish garden near Moffat. This will not do for the monocarpic species. It really is essential that a scheme is in place where specific gardens only grow a limited number of species and/or other larger gardens maintain large plantings well separated of each species. Almost all the Himalayan *Meconopsis* will hybridise with each other and the progeny are almost invariably sterile. Admittedly crosses between say *M. grandis* and *M. napaulensis* are rare but maybe a set of freak conditions will raise the likelihood. *M. gracilipes*, a most exquisite meconopsis, was almost certainly lost by hybridisation. *M. latifolia* has very nearly followed suit (and still to my mind the most beautiful of the Meconopsis) and I can easily see *M. dhwojii* next. *M. taylori* hybridised out of existence even before it was recognised and *M. regia* has gone too. I think many *M. grandis* become sterile in a generation or two because of crossing with *M. betonicifolia*. The blue *M. wallichii* (which Taylor lumped with *M. napaulensis*) is sterile when crossed with *M. napaulensis*. Were it not that it is very late flowering, usually the first flowers on *M. napaulensis* are well over before *M. wallichii* comes into bloom and the last flowers on *M. wallichii* are really late, we would be in trouble here. Recently there has been a strange plant with brilliant ginger foliage and real punicea-scarlet flowers that is intermediate in form between *M. wallichii* and *M. napaulensis*, in flowering time (and for that matter looks). I don't know yet what happens when these are all cross-pollinated but if the progeny are sterile then we have a more serious problem. In some ways this plant may prove Taylor right; that *M. wallichii* and *M. napaulensis* are two extremes of the same species but if they are sterile when interbred it hardly helps (to say nothing about confusing the taxonomic validity of the species). A specialist seed group, maybe under the umbrella of a national collection, could introduce some discipline into who grows what and initiate some research into what conditions in the garden are necessary to keep both species and desirable strains pure. There have been in the past some quite brilliant strains and the Stainton Sykes and Williams' collections spring to mind but most of these have been well mixed and lost. My guess is that the other genera need

the same protection and the immediately obviousone is *Primula.*

Having got that off my chest, and mentally looked at my watch, we are at the point where my students despair of me. All passion spent, the lad glances at the scribbling in the folder and realises there are at least a dozen things left out he still has to say. So I fear what follow are snippets from the *Meconopsis* file.

I was very proud of my 'Kingsbarns hybrids' and hoped to select a really good blue strain. I now talk of that wonderful blue purple shot silk colour and hint that plain blue is a bit passé. They are nice and dwarf and very polycarpic and grow well anywhere but even unto the sixth generation they are uniformly not blue. However, they have been superseded (stoutly resisting an awful pun) by seed of *M. x sheldonii.* Here again we have a name problem since *M. x sheldonii* is a specific cross and we do not know for sure where the current *M. x sheldonii* seed came from. It turned up here about ten years ago and reputedly came from a nursery somewhere in England. It appears to come uniformly from seed and is almost indistinguishable from *M. x sheldonii* (in fact *M. x sheldonii* is very variable and the original *M. x sheldonii* is nothing like as good as subsequent crosses). It may be that the viable seed was a mutation in the genuine *M. x sheldonii.* Since I have never been able to be sure of the chromosome numbers of either of the parents (*M. grandis* and *M. betonicifolia*) or *M. x sheldonii*, one can only guess here. Alternatively maybe it was a backcross of some sort. My 'Kingsbarns hybrids' came from *M. x sheldonii* and I don't know how this happened either. The *M. x sheldonii* seed is the same size as *M. grandis* (i.e. at least twice the size of *M. betonicifolia*) so beware of small seed if you are looking for it. For years *M. x sheldonii* seed was guaranteed to be *M. betonicifolia* and much still circulates. It is fertile to the fourth generation with me and I am about to do some serious work on it but it is definitely one of the best things to happen in garden meconopsis for a long time. If anyone knows where this seed first came from I should be fascinated to hear.

I recently asked for some seed of a precious species from a friend to whom I had originally given it. He replied he had none but could let me have some from his seed bank. I cannot think why I have been so dumb for so long. I have even grown seed from the Kew seed bank of meconopsis, and Peter Cox rescued me from his seed bank when I had almost lost *M. punicea.* I have now started my own. One either buys some silica gel desiccant or uses the little packets that comes with electrical goods and cameras. This may need reheating to dry it and sometimes it has a water sensitive dye to tell you when it is in need of putting in the

oven. Seed should be dried naturally after harvesting and then placed in a container with the desiccant in the deep freeze or the freezer compartment at the top of a domestic refrigerator. Every so often it will be necessary to renew the seed by regrowing plants (perhaps every three or four years unless one is certain the seed will survive longer). For the species that are back in cultivation, but a little tricky for one reason or another, like *M. delavayi* or *M. punicea*, it is no doubt essential. It should be useful too with really good new strains of monocarpic species so that a few can be grown each year to produce annual flowers in the first few years.

This leads me on to *M. punicea* (Fig.21, p.56). This plant is very easy to grow, fortunately, since it is miffy in producing pollen and in germinating. Many plants simply seem to fail to shed pollen. I do not know if this is a physiological problem due to the way we grow them or is simply a temperature problem. Usually in a planting of a dozen, three or four do produce good pollen but a small planting is a risk. Germination is odd since some years they do fine and others are not so good. Five hundred seeds in 1991 produced three seedlings in 1992 (after a winter stratification) but the same pan produced 50 more a year later in 1993. This last year I have already pricked on a hundred in late March from a sowing last autumn. This is obviously telling me something but I am not yet sure what. I tried hard for years to get *M. quintuplinervia* to germinate with a whole range of hormone and other treatments and met total failure. Then Evelyn Stevens gave me seed of her strain which does germinate but the progeny crossed with my own are again refusing to germinate.

Delayed germination seems to occur with some of the species that Peter Cox brought back from China last year and I have further good germination of pans from last year where seedlings were winkled out and potted on. Just maybe this is characteristic of *Meconopsis* in general but we usually have such good germination the first year that pots are not saved. These species include *M. impedita, M. henricii* and *M. speciosa* and we can also add a Ron McBeath collection of an unnamed species and *M. lancifolia*. It is a great thrill to be able to try these after reading about them for so long and a xenophobic coward like myself can only remain deeply indebted to those who collect them. They are obviously not easy since most of them would have been sent back in large quantities by the likes of Forrest and there is very little evidence that they were ever flowered more than transiently – if at all.

I think because one develops a reputation for doing something that everyone assumes you do it well. I am not very competent at growing

the rare and difficult. I think this is often because of time. Really careful observation of new plants is needed since they are often trying to tell you something but they only whisper for a brief time and if you are not there to listen they are gone. We have *M. delavayi* back again and if I could grow it well I might even change my mind about *M. latifolia* as the 'Top Mec'. However, if it had been up to me we would have already lost it again as I have still not flowered it while others are into the third generation of plants. I killed mine by too much fear. I kept them all potted and I'm particularly bad with plants in pots. My current plants which may flower this year are in custom designed troughs. Whenever I have a spare moment and can subdue my aching joints, I mix another batch of hypertufa. I have made one batch of troughs a foot deep especially for these new species of *Meconopsis*. They can have something really rich in the bottom but a layer of more modest compost for the plants themselves so that they only hit the rich stuff if they reach for it. Using troughs like this has revolutionised my gardening. There is something fascinating about troughs. Plants that I lose both in pots and in the open scree bed thrive in a trough with less attention than they have in the other situations. It is likely to be a complex effect of surface to volume. They can always be covered individually at any time of the year. I suspect that real attention to size of trough is species critical. A whole range of sizes and composts is easily arranged and it is this technique I am using to trial North American species of alpines – my latest 'thing'. Each trough may have just one species and it is fascinating how consistently they live or die. The new mec trough has all the new species still alive but not in the numbers I would like. My main ploy with these was to put the best of all the plants in an indoor bed in my new partially shaded alpine house (if I did not enjoy the camaraderie of showing I would have all my pot alpines planted out in indoor beds – I am very impressed indeed with the St Andrews Botanic Garden alpine house where this has been done on a really large scale). The fatal flaw in this was a cat that came in through the roof lights and substantially "used" the new bed. I still wait to see if any of them survived. The potential is there since a plant of *M. sherriffii* that survived the onslaught looks better than I have ever produced one in spring before. All the new species have grown slowly and the best of them are half the root thickness of an average *M. horridula* of the same age and most smaller. Not having seen them in the field I am not sure whether this slow growth is because I am cultivating them badly and they need quite different treatment from all the other mecs we are used to growing, whether they naturally grow slowly and take a number of years to achieve flowering size or whether they are just naturally small. Time

may tell but the one clue is that I have seen better plants from the same seed growing in others' care; so maybe they do need different conditions. I don't think any of these mecs are likely to be in the *Dionysia* class of difficulty and even *M. bella* yielded to the skill, and above all patience, of Margaret and Henry Taylor. If the carefully nurtured relationship with China is maintained then maybe a modest re-supply will see us through understanding how to grow them to seeding.

It strikes me that it might be worth repeating for new growers a basic system for growing the readily obtainable *Meconopsis* from seed.

Normally dried and cold stored seed should germinate the first spring with no difficulty. By cold stored I mean not by the living-room fire; I keep mine in the larder which was custom built (what for, is an argument between my wife and I!). I sow early February in an open compost. Ideally I make it with about half of a standard commercial soil-less seed compost, then about one-sixth each of a gritty sand, dried and sieved sphagnum and dried sieved leaf-mould. I cannot really believe sterilising is of much value if they are to be left open and cold for a month in a frame or greenhouse since in that time they would be re-infected if pathogens are about. They need keeping just damp and no more. One really bad year I was tempted by unusual amounts of snow (unusual for coastal Fife that is) to pile this on them and it produced a cold soggy compost that rotted most of the seed. What one is looking for is a gentle moisture and cold to break the seed coat so that they will burst into germination when given warmth. One needs to watch seed in this state as some species will germinate in the cold and then need a maintained water supply. At the end of February they are put in a frame with a soil warming cable with a thermostat setting of twenty, and hopefully the odd day's sunshine will fluctuate the temperature which may be better for germination than a steady state. They should germinate within three weeks and then need hardening outside the heat for a week or two and be pricked on as soon as there is a real leaf. They go into a mix with half soil-less compost with slow release fertiliser and one-quarter each of grit and sieved leaf-mould. They need care for a week after pricking on especially if the weather is cold and grey but once they have re-established their roots they quickly grow away. They can be left and planted out directly into a rich deeply dug bed or potted on into an 8cm pot with again a rich gritty open compost preferably with plenty of good flaky leaf-mould. Potting them into a pure peat based soil-less compost is bad news here since in our dry climate the roots will not grow out into the soil once they are planted out from pots. It may work well in other climates but not here. By the end of the summer *M. betonicifolia* should be 20 cm

tall and the winter rosette types at least 15 cm across. Fast and fed is the simple rule and it works well for most species even in a dry climate.

Some thoughts on polycarpic meconopsis come next. This is still a controversial area. Potentially, maybe all the species will throw an occasional perennial plant (though possibly these are hybrids). I know of *M. latifolia* at fifteen years old that flowers every year (though sterile) and the best plant of this I ever saw and the source of all my seed was a plant with this habit. Avril and Leslie Drummond of Forfar have a polycarpic *M. napaulensis* that sets seed and this had been reported before. Some swear that *M. punicea* is polycarpic but of well over one hundred I have flowered, although they all look as though they will be, none so far survived to flower twice. For twenty years I have sought perennial *M. x sarsonsii* (*M. betonicifolia x integrifolia*) and still only know of one at Branklyn and that came from Keillour. I have one perennial *M. x beamishii* (*M. grandis x M. integrifolia*) (Fig.22, p.56) and that is from twenty years' growing seed. There are undoubtedly long-lived *M. sherriffii* but I suspect only a small proportion of the seedlings will flower more than once. *M. quintuplinervia* of gardens is a brilliant perennial but of thirty-odd plants from seed only four or five have flowered more than once and none have the perennial vigour of the parents. The most perennial plant I have ever come across is my unnamed evergreen hybrid between *M. betonicifolia* and *M.* "*regia*-type" – it is simply unkillable. I am sure that really careful selection of species like *M. grandis* and *M. betonicifolia*, where perennial nature is variable, could see really reliable strains developed but there is no point in doing this if the seed is going to be mixed back in with variable stuff. I will admit that cultivation does come into this, and potentially perennial plants can and do flower prematurely and die after the strain of first flowering, but I have been growing them long enough to know what I am doing and believe the variability is often genuine and not just due to cultivation.

Finally, one last hobby horse. I have already taken a gentle swing at taxonomy but let's try to be constructive. By and large the naming of plants in the seed exchanges is rotten. There are all sorts of reasons for this, but the most common will be ignorance. I am as guilty as the rest. I grow a *Colchicum* from seed, it looks good, so it goes back as what I got it as, which is likely to be wrong. Even professionally collected seed is subject to error, especially if collected with only an autumn visit. Now, I own any published monograph on genera which interest me that are available, and as often as not they have a key for identification. But it is a taxonomic key and this simply will not do for the gardener. Even if they

understand the specialised language the gardener will find that they just don't work in the garden. What we need are sets of washable cards we can take out there, which are realistic and have good clear illustrations of exactly what each critical feature is. I tried, when I wrote my book on *Meconopsis*, to produce such a key but I have never heard that anyone has used it and I guess it is still far too awkward. The new garden keys could not be comprehensive. They could be designed to produce identification of species most likely to be confused and species most likely to be encountered. They would be honest and clearly state where identification is not possible based on garden evidence and also where hybridisation is likely to occur. Production of keys to each group would need an expert who is also a gardener, or failing that people with a mix of skills. There are so many groups that need sorting out: *Lilium, Iris, Crocus, Primula, Penstemon* and many more – these are just some that give me headaches. It really would be an immensely valuable job for our specialist societies to start doing this. It would at least reduce the error in seed exchanges and as the practice grows then so would the expertise. A parallel with this is the twitching fraternity who have combined the art of bird watching and the science of ornithology to produce a quite daunting expertise based entirely on an amateur appreciation of the need to solve field identification. A card could guarantee *M. betonicifolia* is always separated from *M. grandis* and the hybrids. At present *M. grandis* is not separable from the new fertile *M. x sheldonii* type plants except by an expert. However, the expert goes on a "feel" for the difference, but a little objective looking would probably find a distinguishing character that would be clearly illustrated once the pressure was on. In the same way, a yellow flowered monocarpic evergreen species might be *M. paniculata, napaulensis, regia, robusta*, or more probably a hybrid and one cannot in the garden guarantee a distinction – so be honest and say so. We could probably eventually take it farther and say that a flower size over x cm would be a *M. napaulensis* or *regia* hybrid (Figs.19 & 20, p.55) and below that *M. paniculata* or *robusta*. However, *M. dhwojii* and *M. gracilipes* in the same category are always distinguishable on easily-illustrated leaf features.

The last thing I want when I am confronting a lily, is a key which starts "germination epigeal or hypogeal". I want something now, or at least to be told that I cannot distinguish *L. regale* (which I suspect) from *L. leucanthum* (which it is meant to be). Some goodwill from the taxonomists, some hard work from the gardening experts and some co-ordinating from the societies could see a really worthwhile project develop, and a much raised level of plant identification. The seed exchanges will not achieve their potential until a more determined effort

is made to solve the identification problem and it would avoid the risk of a two-tier arrangement with specialist lists taking most of the good stuff away.

I shall always keep my garden full of *Meconopsis* because I find them so attractive and they have been good friends. I have however flogged this particular horse enough so even if the genus survives a few more years yet (academic mills grind pretty slowly) – it is goodbye *Meconopsis*.

The "Peat Bed"

IAN AND MARGARET YOUNG

The peat bed has been a feature of gardens for many years now, with excellent examples to be seen at Branklyn in Perth and the Royal Botanic Garden, Edinburgh, to name just two. These peat beds consist of a wall of peat blocks retaining a terrace of a peaty compost; some are a single tier, others are a series of terraces one on top of the other.

To build a peat bed is not at all complicated and can add a great deal of interest to a garden, offering a whole range of plants ideal growing conditions.

Although peat blocks have been used for the retaining walls in the above examples, many people find that in dry gardens they dry out, especially in the summer, and then disintegrate, while in wet gardens people are troubled with mosses running rampant through the blocks and then invading the bed itself. It is much more practical to use your local stone to edge the beds. This offers a permanent retaining wall and there are many plants that enjoy having their roots in the cool moist conditions of the peat bed while liking the extra warmth provided when they drape themselves over the rocks. Stone also allows the beds to be built, as raised beds, to any height. If you decide to use peat blocks they should be cut as large as possible and should not be dried out; "burning peat" blocks are not really suitable. Many people are worried nowadays about the excessive use of peat but the compost for the beds need not be peat, so if you want to be environmentally friendly and not use peat in the garden, then you do not have to deny yourself the pleasure that such a bed can bring. Indeed, a bed made purely of peat would not be a very good idea, being too liable to be over-wet or too dry and with little nutriment therein.

An open compost high in humus that will retain moisture but not become waterlogged, with a pH below 5.5 (ie acid), is what the plants of the peat bed require: so, it could now be called the humus bed.

The humus content of the compost can be provided by well-rotted farmyard manure, garden compost which can include anything that will break down on the compost heap including such material as shredded hedge and tree prunings, leaf mould if available, shredded bark available from garden centres (or cheaper in bulk, direct from your local

sawmills), and there are many other new 'soil improvers' on the market. Spent mushroom compost should not be ruled out as a cheap form of humus, depending on your area, as it is not always alkaline by the time the mushroom farmer has finished with it, we used some and it had a pH of between 6-6.5 when tested. The amount of humus required will depend on the size of your bed and the content of your garden soil, the more clay – the more humus you will have to add.

Our humus bed mix consists of approximately equal parts of garden soil (a sandy loam in our case) and humus which may be any of the types listed above or a mix thereof, depending on availability. We usually add a quantity of 0.5-1 cm grit until the mix looks open and free draining. If you are not sure whether your mix is right you can test by watering it with the hose before planting it up; if the water drains reasonably quickly and evenly, fine, if it puddles and is slow to drain then add more grit or coarse bark to open it up further. It is essential to get this stage right as the plants that you are going to plant in this bed have to have air as well as moisture at the roots.

It is often suggested that you should site such a bed in shade but we have found that in Scotland this is not necessary (all our humus beds have full exposure to the Aberdeen sun); in fact many of the plants will not flower if they do not get the sun to ripen the new growth. If you have a slope in your garden then it is ideal to build the humus bed against the slope as it will then have the advantage of a natural reservoir of moisture. If you are not lucky enough to have a slope then you could build it against a wall, or even make it free standing; then you have the advantage of being able to view it from all round.

To add visual interest and a natural look, consider using old bleached tree stumps laid on the bed before planting, many plants seem to enjoy this association, these can be found on many moors after forest clearing, along river banks and on the sea shore. If you get them on the sea shore allow them to weather for some time for any salt to leach out before placing on the bed. If the bed is too wide for you to reach into all parts without standing on it, then lay a series of stepping stones so that you have access to every part. You should never stand on the bed itself as this will compact the compost and defeat the whole object. When you have planted the bed it is a good idea to mulch it with some garden compost or bark to a depth of at least 5cms (the blackbirds will love this and so will the plants). The mulch helps preserve moisture and it will also help suppress weeds.

Maintenance of the bed is not difficult; an annual feed of an ericaceous fertiliser such as Vitax Q4 (if your natural pH is reasonably

acidic then normal Vitax or Growmore type fertilisers can be used), applied sparingly in spring. A liquid feed (Mir-acid is very good) can be applied as a foliar feed or a drench, after the main flowering, either to the whole bed or to any individual plants that look like they might require a bit more food than the others.

The plants suggested below will survive in most garden conditions; however, with a little extra work to provide the conditions described above they will really thrive.

Now to the exciting bit – the plants – there are too many possibilities to mention in this brief description but it at least gives you a start. Many of the best peat bed plants are evergreen, so by careful selection of the plants and a little thought to where you plant them, you will have a bed that is attractive every day of the year.

To begin with you want some plants to give a bit of height; up to about 60cm for a small to medium sized bed. Rhododendrons are ideal and there are a host of choices to make; if you choose carefully you can have flowering rhododendrons from February through to July with many having a second lesser flowering in August and September. Some of our favourites are *R. campylogynum* (there are many colour forms to choose from, all are good), *R. canadense* (a beautiful deciduous species with good autumn colour), *R. fastigiatum, R. impeditum, R. keiskei, R. keleticum, R. pemakoense* (the flowers come early and are liable to be frosted but it is well worth the risk), *R. primuliflorum, R. pumilum* and *R. radicans* (a prostrate mat).

Leave plenty space around the rhododendrons for some of the smaller heath plants. All the genus *Cassiope* is suitable and desirable; of special appeal are *C. selaginoides* (the form going under the collection number L&S 13284 is the most beautiful), and all forms of *C. lycopodioides*, which make compact mounds that cover themselves with flowers in spring and often produce more in late summer. You should also look out for the *Cassiope* hybrids, especially 'Muirhead' and 'Randle Cook' which are easily propagated from cuttings and very reliable.

Phyllodoce offers a good range of colour from the white of *P. nipponica* through yellow in *P. aleutica* and on to the deep purple *P. caerulea*. *Vaccinium* and *Gaultheria* have some choice species with small flowers but lovely fruits, though some can be a bit invasive so if your bed is small choose carefully. You are safe to start with *G. cuneata* (reliable with white berries) and *G. trichophylla* (tricky, but with beautiful sky-blue fruit). *Vaccinium nummularia* is always attractive, as is *V. vitis-idaea minus*, but make sure it is the free flowering form as most do not produce flowers. There are many more exciting possibilities well worth experimenting with.

Kalmiopsis leachiana and *Leiophyllum buxifolium,* both North American, come in various forms and all are choice subjects. *Polygala chamaebuxus* in its interesting colour forms can be stunning, as can the better forms of *Andromeda polifolia.* Celmisias can bring fabulous foliage effects, some in stunning silver that seem to glow in the winter. Some dwarf conifers are also suitable, we particularly enjoy the pines which can be easily kept compact by candle pruning in the spring.

Autumn gentians are a must and when established will scramble through the shrubs and give a superb show from August till November. The flowers of *Cyclamen hederifolium* blend well with the gentians in August and the foliage lasts through the winter and spring. Other bulbs to use are fritillarias, *F. meleagris* and *F. pyrenaica* in particular; all the erythroniums are lovely, we have had success in regularly flowering *E. americanum* in one of our peat beds (Fig.23, p.57). *Anemone blanda* and *A. nemorosa* in all their forms will scramble well through the dwarf shrubs.

We like to plant so that within a couple of years' growth the plants have all knitted together forming an endless international heath through which the various bulbous species push their flowers. This mat of ground-hugging foliage is the perfect mulch, creating a microclimate that remains moist even in our driest periods.

These beds have given us enormous pleasure and, as we experiment with plants both established in and new to cultivation, will continue to do so.

For further information Alfred Evans' book "The Peat Garden and its Plants" provides extensive information and can be borrowed from the club or many public libraries. It is, sadly, out of print but may be acquired second-hand. There have also been many excellent articles in The Rock Garden over the years and back numbers are available.

Poor Flowering of Early *Narcissus*

HENRY TAYLOR

Why have *Narcissus romieuxii* and *N. cantabricus* flowered poorly this spring? Uncommonly cold weather during last May and June is the probable answer.

Remember that these early *Narcissus* come from northern Africa and southern Spain where it is very warm in early summer. In nature, high temperatures initiate the plant to retreat into a summer-dormant bulb to survive the hot dry Mediterranean summer. Later in the season there is a low temperature requirement before the bulb will grow and flower. But we need not concern ourselves with this low temperature as our Scottish winters are amply cold!

Commercially, *Narcissus* such as *N.* 'Golden Harvest', for early flowering, are lifted from the field in late June or early July and immediately stored at 34°C for five days, then at 17°C for around two weeks until flower initials are completely formed. If a bulb is then cut longitudinally, the floral parts can be seen with a lens to be at the stage known technically as Pc. This is the stage when all floral parts including the corona are first visible. The bulbs are then stored in cool conditions until potted and watered in September. By the way, Pc is an abbreviation for paracorolla!

Obviously most of us cannot give such a carefully controlled temperature regime, and might be rather reluctant to cut our precious bulbs open to check the stage of internal development! But any scheme we can devise to give our bulbs a warm spell during the floral initiation stage when the leaves start to senesce in May or June should result in better flowering in the following spring.

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g. 15 *Meconopsis horridula* (p40) Michael Hirst

Fig. 16 *Meconopsis horridula var rudis*, (p40) Michael Hirst

g. 17 *Meconopsis discigera* (p43) Michael Hirst

Fig. 18 *Meconopsis integrifolia*, a garden form (p40) James Cobb

Fig. 19 *Meconopsis napaulensis*, selected colour form (p47) James Cobb

Fig. 20 *Meconopsis napaulensis*, wild form (p47) Michael Hirst

Fig. 21 *Meconopsis punicea* (p43) James Cobb

Fig. 22 *Meconopsis x beamishii* (p46) Michael Hirst

Fig. 23 *Erythronium americanum*, in the peat bed (p52) I. & M. Young

Fig. 24 *Ranunculus guzmannii*, Ecuador (p69) Marie Brooker

Seed Ecology

ALASTAIR McKELVIE

All gardeners who raise plants from seed want as rapid and vigorous germination as possible. We never regret having too many seedlings as they can be given away to friends or to sales and anyway there always seems to be a high mortality rate in the stages of pricking-out, potting-on and planting-out. We expect high and quick germination but are not really surprised when the reverse is often the case.

For rock gardeners in particular, innumerable hints on germination can be found in the journals of the various societies or in books and these should be consulted to give hints on general methods or recipes for specific genera and species. I hope to show in this article that these can only be hints, because there are so many imponderables to consider when trying to germinate any particular batch of seeds. There is no substitute for trial and error although there are certain general principles which should help.

Much of the advice given in the literature tends to be contradictory and unhelpful, lacking a consistent thread, so that in the end, most of us tend to sow our seeds when we receive them, put them in a cold frame and hope for the best, following methods that have worked in the past or that other gardeners have suggested to us from their experience. In general these methods are fairly successful but in the end many species do not germinate at all, or do so over a period of months or even years. We tend not to enquire about the past history of the seed before sowing, except perhaps to mutter darkly about how seed from a particular collector never seems to be very good or that a certain seed exchange must surely store their seed for months in an over-heated living room, drying out all the time. Optimistically we think we will do better next year without much thought about why we got such poor results.

Ease of germination

For seeds of domesticated plants which have been bred and selected over many years there are usually few problems, since ease of germination is one of the main characteristics selected for, consciously or unconsciously, by breeders. Vegetable seeds have, by law, to satisfy a minimum germination requirement which is always set at a very high

level. Flower seeds do not have this requirement but, in practice, purchased flower seeds usually germinate freely and well. It is interesting that even a few years of domestication of a newly introduced wild species often leads after a few generations to the production of seed with improved germination, although this is by no means a universal rule.

The trouble comes with seed of plants such as alpines which have not been selected and which are still really part of a wild population retaining most of their wild dormancy patterns. In order to achieve good seed germination, for alpine plants which have originated from a wide range of ecological situations, it is helpful to understand a bit more about the environmental requirements of seeds in relation to their morphology, physiology and ecology since all plants in the world have developed a strategy to enable them to survive and compete with other plants.

It is a reasonable hypothesis that the specific germination requirements of a given species have arisen in response to its wild habitat but it is all too easy to miss the obscure features of the environment and give excessive emphasis to the obvious. Equally, it needs to be stressed that the particular germination adaptation of a wild plant may have arisen as a result of a habitat long since changed completely. Thus it is too simplistic just to look at the current wild habitat and suppose that that necessarily gives all the clues to successful germination. But it is true to say that reproductive characters have much greater evolutionary significance than vegetative ones. To achieve success, the physiological and morphological characters of seeds and seedlings need to be closely co-ordinated.

Seed development

Seeds can be classified either as endospermic or non-endospermic. The former have food reserves in a well-developed endosperm and have small, poorly developed embryos. The latter have food reserves in well-developed cotyledons attached to the embryo. Attempts to relate this classification to germination physiology are not successful, but there is a general trend that dormancy in endospermic seeds is often associated with a physiological block in the embryo, while non-endospermic seeds are associated with seed coat constraints. Seeds are generally unable to germinate until they have reached full dry weight, but in many cases seed will germinate when quite immature by growing on culture media. Cereal seeds may take up to eight weeks from flowering to reach full size and normal germinability, but will germinate in culture as early as two weeks after flowering.

Environmental control

Germination requirements may vary between species, within species, between populations of the same species or within the same population from year to year. Much of this variation is not understood clearly but it is an important factor. For example, 1992 in Scotland was in general a poor year for the germination of seed of *Meconopsis* while 1993 gave rapid vigorous germination. We are a long way from understanding the reasons.

Dormancy

All land plants have a dormant phase in their life cycle which, for higher plants, includes the seed phase. Seed is tolerant of difficult climatic conditions such as temperature and water supply. There is a huge and confusing literature about dormancy, particularly the terminology of the various kinds of dormancy. Dormancy can affect seeds, buds and bulbs and there are many mechanisms of dormancy induction, maintenance and release. For example, seeds are said to be dormant when they do not germinate despite being viable and having adequate water and an adequate temperature. This failure may be due to the embryo being immature and needing a period of after-ripening. There may be an impermeable seed coat that stops the embryo receiving water or air. There may be chemicals inhibiting embryo growth until these are destroyed or leached out.

At long last we have reached general agreement about dormancy terminology which has long been an imprecise minefield. Agreement seems to have now been reached defining dormancy as a temporary suspension of visible growth of any plant structure containing a meristem (or growing point).

It will be obvious that there are two main types of dormancy, one regulated by the environment and the other depending on agents or conditions within the plant, or physiological dormancy. Physiological dormancy is sub-divided into two kinds, depending on whether the dormancy is regulated by physiological factors outside the affected structure (paradormancy) or within it (endodormancy).

If seeds fail to germinate they may be dormant but, of course, they may be dead. As a quick test, cut open the seeds. A live but dormant seed will have firm fresh tissue while a dead seed will show infection or degeneration of some kind. A further test will help to distinguish between dormant and non-dormant seed. After forty-eight hours on damp paper towelling, the former will not have altered while the latter will have swollen and obviously taken up water.

The developing seed within the seed capsule normally enters into a dormant phase when it has reached full weight and is beginning to dry off. As a consequence, it is often worthwhile trying to germinate some seeds before they are fully ripe and ready to dehisce, although they will already have reached full dry weight. Examples are the so-called 'green' seeds of petiolarid primulas or the silky achenes of *Pulsatilla* species, where premature seed collection and sowing are often successful, whereas fully ripe seed will have entered into a deep dormancy. While techniques such as this may achieve germination before dormancy has a chance to operate, the use of the wrong techniques may cause seed to enter into an induced secondary dormancy which can be difficult to break.

A number of seeds are not fully mature even when shed and may require a period of after-ripening in dry storage before they are capable of germinating.

Dormancy blocks

Seed dormancy is a means by which seeds avoid germinating when seedlings would be in hot, dry or very cold conditions. Dormancy may be caused in seed of many plants by the presence of hard seed coats, often in desert plants where water imbibition and germination occur at many different times over a long period, which is a response to sporadic and unpredictable rainfall. Where rain is seasonal, mechanisms have evolved where germination occurs at times suitable to seedling growth. Dry storage at high temperature is needed to make the seed coat permeable but unfortunately germination is often inhibited by these high temperatures. These responses, plus embryo dormancy of fresh seeds, delay germination until autumn rains occur. Seeds from dry areas often need soil at or near field capacity in order to germinate, or prolonged rain to remove seed inhibitors. Families with hard seed coats include Leguminosae, Malvaceae, Convolvulaceae and Chenopodiaceae.

Dormancy factors may be physiological, inside the embryo, where incubation of moistened seed at a particular temperature may be required. For example, at low temperatures, after-ripening occurs involving changes which prepare the embryo for germination. This is common in many woody and herbaceous species with rudimentary embryos, such as Ranunculaceae and Papaveraceae. Sometimes, different parts of the embryo have different requirements, where the root or radicle may emerge but the shoot or epicotyl still needs a cold treatment. Examples of this behaviour include *Paeonia, Viburnum* and *Lilium*. In other genera such as *Convallaria, Ilex* and *Trillium* the radicle

and the shoot have different cold requirements so that seeds show a double dormancy and may take two years to germinate.

Germination in many summer annuals is inhibited by high temperature, long days and lack of water while many winter annuals have mechanisms to prevent germination till autumn. After-ripening in dry conditions is necessary for germination. Thus summer germination is prevented by a combination of dormancy enforced by the environment and physiological dormancy.

Ecological adaptation

Differences in germination response of seeds can often be related to the environment in which the plants grow and this can give clues to gardeners. It must be stressed, of course, that gardening is not natural and that plants may adapt quickly once they have been grown for a few years in gardens. In Mediterranean climates with warm dry summers and wet winters, seed is shed in early summer. Many seeds will perhaps not germinate at temperatures greater than 15°C, and there is a high proportion of dormant seeds. This maximum temperature for germination may rise as high as 30°C as after-ripening occurs. These adaptations successfully prevent germination in hot dry weather. In continental climates, seeds have higher minimum and much higher maximum temperatures (as high as 40°C) at which seed will germinate. Many species have some seeds which need storage before they will germinate and some have seeds which will germinate at once, with the seedlings relying on winter hardiness under the snow. In oceanic climates, seeds tend to have high minimum temperatures (10-15°C) and moderate maximum temperatures (35°C). Some seeds germinate at once after being shed in late summer and others in spring after winter chilling. These responses fit them particularly to the climate of the UK, with its inconsistent but seasonal climate.

Environmental factors affecting germination

Water is obviously the biggest single factor affecting germination and is the commonest cause of seed and seedling mortality. I have described above some of the adaptations of plants from dry areas to water supply problems and the need for adequate water to trigger germination. On the other hand, excess water leads to waterlogging so that seed becomes water sensitive and fails to germinate through lack of oxygen; drying out such soil may still leave the seed in a state of secondary dormancy. For example, if barley is harvested at a high moisture content in a wet season it may exhibit water-sensitivity and refuse to germinate in the malting

process until it has been properly after-ripened. It is therefore a mistake to allow seed to become waterlogged; overwintering seed should be kept in a frame to avoid excess water and a free-draining compost used. Adding heaps of snow to pots of seed is usually harmful as it can lead to pots full of freezing water. With small seed there is always a risk of drying out which is fatal and is often the cause of germination failure. Seeds of ericaceous species really need a moist seed bed hence the value of substrates such as sphagnum.

Temperature

There are always minimum and maximum temperatures for germination of particular species, but as we have already seen these can vary with the age and storage conditions of the seed. Many species germinate best with fluctuating temperatures, which is what seed sown by gardeners normally receives, so there is no need for any special procedures. This requirement is particularly prevalent in plants from wet boggy places and is perhaps an adaptation to prevent germination of seed deep in wet soil or water.

In general seeds will germinate within a range from 2°C (albeit slowly) to a maximum of 40°C but a good general average is a day temperature of between 15° and 25°C with night temperatures between 5° and 15°C. It is generally, however, a mistake to germinate seed at high temperatures because seedlings can become forced and succumb to fungal attack. A number of alpine seedlings such as *Meconopsis* die if grown at temperatures greater than 15°C, thus it is best as a general rule to germinate seed and grow alpine seedlings without undue heat. Rhododendrons are an exception to this rule as they seem to like a moist warm environment for quick germination and seedling growth. Just to complicate things, certain plants, the best instance of which is parsley, but includes some candelabra primulas, germinate well if hot water, even up to 100°C, is poured on to the soil surface for the first three days after sowing.

Achieving the correct temperature for germination of non-dormant seed is not really a problem but the proper temperature treatment, if any, to break dormancy is quite a vexed question. There is little doubt of the need for stratification of seed of many trees, shrubs and herbaceous plants with hard seed coats, which are mechanically resistant to germination. Water can enter the seeds but there is no germination until the coat splits and the embryo has undergone cold treatment. The literature contains many references to the correct remedial measures for many species but a general rule of thumb is to subject moistened seed to a temperature of 20-25°C for two weeks (or 15-20°C for 12 weeks) followed by 12-18

weeks at 0-10°C. This is best done outside rather than in a refrigerator.

Many species which do not have hard seed coats still need a period of cold for germination but the general importance of this is a vexed question among alpine gardeners. As already discussed a cold requirement is an adaptation to climatic conditions and, as would be expected, is rarely found in Mediterranean plants but frequently among alpines. Again there are many references to the correct cold treatments for particular species. Opinions among gardeners range from those who automatically give all their seedlings cold, to those who only subject those pots which fail to germinate to a cold treatment. There is probably no substitute for experience in knowing which species benefit from chilling but there are some general rules. Research which I carried out some years ago showed that out of freshly harvested seed of 100 species of ornamental plants, chilling at a temperature of 1.5°C improved the germination of 82% of the species and increased the mean percentage germination from 41% to 60%. A period of four weeks at this cool temperature was sufficient for many species, but a few needed as much as twelve weeks, although a few had reduced germination after eight weeks of cold and went into a secondary dormancy. For the majority of species there was a positive linear response to the length of the cold period. It was interesting that one of the species where freshly harvested seed needed twelve weeks was *Meconopsis cambrica*, a species which in most gardens seeds everywhere and would not be regarded as a difficult species to germinate. But, as with many plants, this cold requirement decreased markedly with dry storage at room temperature.

Light

In general, most genera do not require light to germinate but those that do include *Lactuca* (some cultivars), *Nigella, Rhododendron, Veronica, Epilobium* and *Lythrum*. A very few dislike light which may be an adaptation to delay germination until seed is covered, while others will germinate in light if their initial imbibition of water took place in the dark.

There are three kinds of response to light; insensitive, promoted or inhibited. The response of a particular species, however, often depends on the germination temperature, with some species being light-sensitive at low temperatures but not at high. These behaviour patterns are controlled by a photoreversible pigment, phytochrome, which exists in two forms – Pfr and Pr. If the light reaching light-sensitive seeds contains more red than far-red wavelengths, phytochrome will exist mainly in the Pfr form and germination will be stimulated. If there is more far-red than red radiation the phytochrome will be mainly Pr and germination of such seeds will be blocked.

The ecological significance of these responses is best exemplified by the behaviour of seeds under leaf canopies, where there is normally more far-red than red radiation so that light sensitive seed will not germinate, thus ensuring that seeds do not germinate if buried in the soil. For gardeners these light responses mean that if light is given to germinating seeds it should be a low intensity daylight fluorescent type and not tungsten which has a high proportion of far red light. In practice, seeds of small-seeded alpines should be sown with only a light covering of grit over them, so that light will be able to penetrate to the seeds if necessary.

Seed collection

Seeds can be classified either as small and dry or as large, fleshy and moist. The former can usually be dried and stored, whereas the latter often need to be kept moist and have a short shelf life. Many tree seeds such as *Acer, Quercus* and *Davidia* have large fleshy seeds which can not withstand desiccation. It is also a fairly general phenomenon among species, not necessarily woody, which grow in aquatic or rain-forest environments.

Normal recommendations are to collect seed when capsules are ripe and the seed is dry but as already noted for many species it is always worthwhile collecting apparently unripe seed of species which are difficult to germinate.

When collecting ripe seed it is important to note that not all capsules ripen at the same time so that harvest should be spread out over a period. It should ideally be collected when dry but if it is wet it should be dried gently and never in the hot sun or in an oven. Fleshy fruits should be collected when they begin to change colour. Hand separation of seed can often be tedious; here the judicious use of a food blender on a mixture of fruits and water for a few seconds can produce a slurry where the ripe seeds will sink to the bottom and can be separated.

Seed storage

It is usually a good practice to sow some seed as soon as it is received, but equally some should be stored, since germination is often improved after storage. In the experiments reported above, where freshly harvested seed gave 40% germination, seed of most species which had been stored for six months gave 68% germination. Only 5% of species gave reduced germination after dry storage. Chilling improved germination of stored seed by 18% compared with 46% for fresh seed.

It is crucial, however, that storage is properly carried out. As a means of overcoming dormancy by after-ripening it is often worthwhile keeping

seed at 30-40°C for up to four weeks, but not all seeds will tolerate such conditions. Warm after-ripening is particularly useful for plants from Mediterranean climates; Ranunculaceae is a family which seems to benefit from such treatment.

For long-term storage it is best to store seed at moisture contents (MC) of between 5-8%. Storage at MC around 15-25% can be lethal to seed but it is interesting that above this figure many seeds have an increased life span. This is, of course, evident in the ability of seed to remain viable for years when buried in moist soil.

As a general rule, a reduction of 1%, in the MC of seeds below 10%, doubles the lifespan of the seed. This can easily be achieved by the use of silica gel crystals. Placing packets of seed in a sealed plastic box with a half-inch layer of the crystals in the bottom and storing in a refrigerator will allow seed to be kept for years. If the seeds are stored in a deep freeze the seed will keep more or less indefinitely. It should be remembered that seed removed from a refrigerator or deep freeze may still be dormant and require appropriate treatment. It is interesting that a few cases have been reported of dormancy being broken by placing freshly imbibed seed in a deep freeze for one week, but this does not seem to be a common phenomenon.

Chemical treatments

The literature contains many references to the use of chemicals to break seed dormancy. Examples are urea, ethylene chlorhydrin and potassium nitrate but the best is without a doubt, gibberellic acid, usually in the GA3 form.

GA is a naturally-occurring growth-regulator in plants which is promoted by cold, leading to germination. Thus GA can often substitute for the cold requirements of species. In fact, most species of alpines respond well to soaking in a GA3 solution for 24 hours before sowing. The concentration used is usually around 500mg l^{-1} (500ppm). GA can promote germination in otherwise recalcitrant seed and is always worth considering for rare and difficult species. Its drawbacks are the cost and the difficulty of buying it in sufficiently small quantities.

Mist propagation

Many species benefit from being germinated under mist propagation, particularly small-seeded ericaceous species. The benefits of mist propagation are not sufficient to set up just for seeds but if you already have such a set-up it is useful to give seeds a mist treatment.

Conclusions

After reading all the above, apparently often contradicting, pieces of advice, the reader may be excused for thinking that germination is much too complicated a subject and that the best thing to do is to carry on as before with methods that seem to have worked reasonably well. It is true that one cannot stipulate conditions for successful germination of even one particular species in any one year because of the variable factors of season, seed age, dormancy, disease, storage and temperature. I would suggest, however, that enough general principles have been laid down to assist most gardeners in dealing with seeds reluctant to germinate.

Fairly specific rules have been formulated for the collection and storage of seeds, to which one should adhere. Similarly, temperature regimes with fluctuating diurnal temperatures have been specified which should lead to germination of most non-dormant seeds. The need for adequate but never excess water should also be kept carefully in mind.

The biggest problem will always be to break dormancy, and various treatments have been proposed in this article for doing this, and then promoting germination. Fortunately their effects appear to be largely additive and not interactive. Thus subjecting seeds to warm dry storage, fresh sowing, chilling for increasing periods of time, stratification, mist propagation, gibberellic acid, light and abrasion or chipping will all contribute to the overall germination rate. Rarely does one treatment counter-balance another although it may obviate the need for a particular treatment as when dry warm storage may reduce the amount of cold needed to break dormancy.

What to do then if you receive seed about whose germination requirements you know absolutely nothing? Well, first consult friends or gardening books and journals to see what you can pick up. Then sow some of the seed as soon as you receive it and keep it at a temperature of around 15-25°C day and 10-15°C night. The cooler conditions of a cold frame can also be used but there is no control of temperature and germination will be slower. Also sow some seed and keep it at around 2-5°C for four to eight weeks before setting it out for germination. Store some of the seed dry at room temperature for up to six months then sow, perhaps no longer needing any cold treatment. In all these sowings, only cover the seed lightly so that light can penetrate if necessary. And finally, at all times, keep the pots of seed moist but never sodden.

Almost all seeds should germinate if given some or all of the above treatments but some seed is bound to be slow to germinate so that pots should not be discarded for about three years as there is always the chance of some seeds appearing. The main problem with waiting this

length of time is controlling the growth of moss and liverwort in the pots. If the seed is especially valuable it is worthwhile storing some dry (with silica gel) in a refrigerator or deep freeze to sow the next year if the first sowings prove unsatisfactory. The various treatments can be repeated again plus, in addition, gibberellic acid. This cold storage is also valuable for seeds ripening in late summer where there would be a risk of young seedlings dying in the winter.

This article has tried to summarise the most important points to consider when attempting to germinate seeds. Each batch, however, will have to be considered on its own merits.

Ranunculus asiaticus Edith Clark

A Red Buttercup in Ecuador

MARIE AND IAN BROOKER

The hire car, after a four and a quarter hour journey from Quito, the capital city of Ecuador, finally failed to progress due to a combination of altitude (4600m), low horse-power and the one-in-three gradient of the rough muddy track. We had hoped to reach El Refugio on the Volcan Cayambe on four wheels and at first were dismayed at the prospect of climbing uphill for a further two hours to reach the summit pass at nearly 5790m. However, Volcan Cayambe is a very rewarding area for its high density of alpine plants. With so many new plants in evidence, our slow progress was due to excited discovery, the taking of many photographs, and some seed collecting. After two weeks in Ecuador, the dreaded Soroche (mountain sickness) was not the problem that it had been initially.

Chuquiraga species, various azorellas, *Perezia pungens, Werneria humilis* and *W. nubigena,* castillejas, pedicularis and several species of gentianellas and gentians were growing in abundance. Large clumps of handsome *Ourisia chamaedrifolia* with red fuchsia-type flowers, up to 5cm in length, were prevalent in moist steep ground.

Also on this north-facing gradient we found about ten plants of a *Ranunculus* with large, 4cm diameter flowers. The petals were poppy-red in colour, the flowers had a paeony-like appearance with an orange-yellow interior. The plants were 20-30cm in height. The leaves were thick, fractured easily, were tomentose and part trisected with a crenate edge. The flower stems projected above the leaves and the flowers were held at a 90° angle to the main stem so they either faced downwards or outwards (Fig.24, p.57).

Jim Archibald, who gave very helpful advice to this venture, had suggested that *Ranunclus guzmannii* should be looked for as he thought he had seen it on Volcan Cayambe, but only in bud.

Upward progress was made, and after two hours we reached the pass. At the pass, cushion plants were numerous, with *Azorella corymbosa* and *A. pedunculata* along with clumps of *Draba hookeri* and *Castilleja pumila.* However, there was another cushion plant we had particularly wanted to find, *Nototriche pichinchensis.* Just as we were about to start our descent, as we had been much longer on the mountain than we had

intended, we found it! Clumps up to 2m across, with purple crocus-like flowers, were everywhere. The "Nototriche Club" had two new members!

On arrival home, forty-eight hours later, definite opinions on the identity of our *Ranunculus* were looked for. Alastair McKelvie, who had written a treatise on the genus Ranunculaceae in 1989, had no doubt that this plant was *R. guzmannii*. Ron McBeath at the Royal Botanic Gardens, Edinburgh, found the sample flower to be striking and interesting but did not have herbarium material to compare with it. However, he thought that it was *R. guzmannii* rather than *R. weberbaurii*. Although the flowers fitted the description of *R. weberbaurii*, the plants growing at the Royal Botanic Garden have glabrous leaves. The concensus of opinion is that the red *Ranunculus* found on Volcan Cayambe is *Ranunculus guzmannii*.

Plant Portraits

Cypripedium cordigerum
John Good

Few would disagree that the hardy slipper orchids are among the most beautiful plants that can be grown in our gardens. They have a style and grace which alone would be sufficient to commend them to the alpine gardener, but they are also rare and elusive; an irresistible combination of virtues!

Cypripedium cordigerum D. Don can hold its head high among the most aristocratic of its relatives, although most would agree it must yield in beauty to the queen of lady's slippers, *C. reginae*, and perhaps in impact to our own endangered *C. calceolus* and its North American near relative, *C. pubescens*. This species is coldly rather than prettily beautiful, holding its solitary, perfectly-proportioned ivory white slippers with their yellowish-green backing petals aloft on slender, though surprisingly windproof 30cm stalks (Fig.25, p.74). The flowers beguile night-flying insects with a faint yet pervasive sickly-sweet perfume which drifts some distance on the limpid air of a warm May evening.

The plant is completely deciduous and can easily be damaged in winter if its position is not marked. In early April the below-ground buds on their network of stoutish rhizomes burst into life, producing broad, deeply pleated leaves, each of which clasps its successor and, if a flower is to be produced, the advancing flower stem. Below ground the rhizome and the deeply delving, wiry, mostly unbranched roots push through the humus-rich, spongy soil which this species, like all cypripediums, requires. Given such a soil and the light shade which its wet Himalayan woodland origin indicates as being appropriate, it is likely to be surprisingly easy to please, at least in lime-free areas. I have not heard of good plants being cultivated in limy soil but neither have I been told that it is a strict calcifuge, so experimentation (if you can secure a plant) is worthwhile.

The plant photographed was moved from my previous garden in June 1991 and of necessity spent three months in a pot before being planted out, but it hardly seemed to notice, flowering satisfactorily the following spring. Last autumn (1993) I took courage and divided the clump into three, *in situ*, using a sharp kitchen knife. The original clump and my division are both convalescing fine and as I have not had an SOS

from the recipient of the third piece I assume that has survived too.

It would be irresponsible to do a Plant Portrait of a cypripedium without mentioning conservation. Most of the species are rare in the wild and their horticultural desirability means that they are among the few genera of plants for which many species are actually threatened by collecting. You should therefore go to more than usual trouble when buying a plant to try and ensure that it is not a collected wild specimen. This is, of course, easier said than done, but few nurserymen will lie when asked the question direct. Hopefully as tissue culture techniques become more widely available these irresistible plants will be propagated and produced more freely so that we all may experience the thrill of cultivating them.

Fritillaria tuntasia

Dennis Graham

Fritillaria tuntasia Heldr. ex Halacsy, like many members of the genus, comes from the Mediterranean region, but it is quite distinct from most other species. It is said to be confined to the Greek islands of Kythnos and Seriphos in the Cyclades, growing in rocky places and scrub, flowering in March and April.

The bulbs are rather like small *Fritillaria imperialis* bulbs; those ten years or so old are about 3cm across. Stems from mature bulbs are about 25cm high and carry many grey-green alternate lanceolate leaves, usually twisted longitudinally. The flowers, which appear in mid to late April on pot-grown plants in frames, are conical and blackish-purple in colour, with a greyish bloom, about 2cm long and 1.5cm wide (Fig.26, p.74). *Fritillaria tuntasia* is close to *F. obliqua* Ker-Gawl which comes from the Athens region, and it seems probable that the two species are not clearly distinguished botanically. However, *F. obliqua* has flowers rather larger than *F. tuntasia*, the style is three-lobed as distinct from entire, and it has fewer leaves which are not so twisted.

Fritillaria tuntasia is easy to grow in a rich, gritty compost in the alpine house or bulb frame and needs to be kept moist when in growth. It should be fed at least twice each month with a high potash liquid fertiliser (such as Fison's Tomorite), otherwise it rapidly deteriorates and flowering soon ceases. Re-potting each year is essential. Propagation is best by seed which germinates freely. Bulbs reach flowering size in about five years; they will produce full-sized stems in another three to four years. The plants in the photograph are thirteen years from seed.

Meconopsis superba
Dennis Graham

Meconopsis superba King ex Prain is undoubtedly amongst the finest of the genus but it is not commonly cultivated. It is found in Bhutan and adjacent parts of Tibet in alpine meadows at 3000-4000m, which is above the snow-line.

Meconopsis superba is monocarpic, with large white flowers, and is related to *M. regia*, although it has silvery, as distinct from green leaves which, like *M. regia*, have finely-toothed edges. The rosette, which grows over three or four seasons, can reach up to one metre across, and the silky hairs on the leaves produce a silver sheen. The flower spike develops early in the year and can reach two metres high, but the plants in my garden have only ever grown to one metre or so. The plant in the photograph is four years old and about one metre tall (Fig.28, p.76). The flowers are carried singly in the leaf axils on the stem; usually there are three, four or five, though they tend to come out one after another. About 9cm across, they are of the purest dazzling white, with a deep purple-black stigma – a very beautiful combination.

Plants must be grown in a rich deep gritty loam, with plenty of old, well-rotted farmyard manure added, for they are gross feeders. Anything less gives disappointing results. The rosettes need protection in winter, preferably with cloches, and it is a good idea to allow dried leaves to collect around them to help keep frost out of the crowns.

As *M. superba* is monocarpic, it must be propagated from seed, which usually sets plentifully. It is slow to germinate and seedlings are slow-growing, so that it must be sown no later than the end of February. Plants are not very easy to raise, which probably accounts for its relative rarity.

Iris acutiloba lineolata
John Lee

Of all the truly alpine oncocyclus irises this is the one I would consider best for the alpine house or bulb frame enthusiast, in terms both of beauty and appropriateness. Admittedly, it may not possess the dramatic bi-coloured ensemble of *I. iberica elegantissima* nor the royal, funereal look of *I. paradoxa* but it does have a cool elegance with well-defined lines and a compact form which sits at ease with its alpine character.

As with all the "Oncos" the flower is a work of art in itself. About 5cm in size, the flower has a background colour of pearly grey with an overlay of rich brown veining forming an exquisite pattern throughout (Fig.27, p.75).

Fig. 25 *Cypripedium cordigerum* (p71) John Good

Fig. 26 *Fritillaria tuntasia* (p72) Dennis Graham

Fig. 27 *Iris acutiloba lineolata*, shown by John Lee at Hexham 1992 (p73) Alan Porrett

Fig. 28 *Meconopsis superba* (p73) Dennis Graham

Fig. 29 *Crocus kotschyanus* (p81) David Mowle

Fig. 30 *Crocus banaticus* (p82) David Mowle

Fig. 31 *Crocus longiflorus* (p82) David Mowle

Both standards and falls have a pointed (acute!), slightly tapered appearance which adds yet more grace to the plant. Incidentally, it's on the fall that the brown signal patch of *I. a. lineolata* can be seen; *I. acutiloba*, which exhibits two such spots, is a more difficult plant to keep healthy and not nearly so floriferous. *I. a. lineolata* has narrow (5mm), long, sickle-shaped leaves: a perfect foil to the short stems (10-20cm) and flowers which arise from them.

I. acutiloba lineolata is found in the Transcaucasus in north-western Iran south of the River Kura (*I. acutiloba* is found to the north of the same river). According to Brian Mathew, its habitat is typically stony steppe country and rocky mountain-sides at heights of 1500-3000 metres. Apart from the genuine alpine credentials, one other obvious implication of these facts is that the plants like plenty of sunshine in a well-ventilated, airy space with excellent drainage.

Conveniently, this leads me into the vexed area of how to grow this and other "Onco" species. Fortunately, like so many of the trickier alpines, its cultivation, although difficult, can become a manageable routine which, with a little bit of luck and time, will occasionally result in pans of breathtaking beauty.

Our story starts in early October when the rhizome is beginning to waken up after its harsh, three-months long, bone dry summer dormancy. Any repotting or removal of dead roots is best done at this time. The compost used must be free draining: a 50/50 mix of John Innes No.3 and sharp grit is quite satisfactory though something similar would equally suffice. Unusually, perhaps, I find large (20cm) plastic pots preferable to their clay counterparts though I have grown them in the latter with little appreciable difference. The lower two-thirds of the pot is filled with the compost, trickling it around the roots as you do so; the rhizome sits just proud of the compost on a thin layer of sharp sand. Once the rhizome is positioned correctly the remaining third of the pot is filled with grit, the larger and coarser the better. This procedure ensures immaculate drainage, in particular around the rhizome.

The pot is now given a thorough watering from below. Remember, that in a large plastic pot this initial watering is sufficient for the plant to "tick over" until about mid to late February (keep your eye on the plant not the calendar). A clay pot in a plunge might need additional light watering especially if a lot of top growth is made before the onset of the harshest winter weather. About mid-February more regular watering can be given; and bear in mind that these plants, in common with most bulbous subjects, like to be fed often and little with a fertiliser that's high in phosphate and potash (Growmore, Phostrogen and Tomorite are ideal).

Around the beginning of June the leaves will start to yellow and watering should cease at the end of June for the next three months until the cycle repeats itself in early October. A summer baking is, I think, essential to produce good flowering for the following season. It goes without saying that the basic technique can be adapted and modified for use in a bulb frame or covered raised bed. The open garden? You're probably wasting your time, energy and money unless your annual rainfall is under 20 inches with guaranteed summer drought!

At all times the plants should receive all available light and air. The chief pest is the aphid (raising the spectre of virus) which is best prevented by including a systemic insecticide in the February watering. The main problem, rhizome rot, can be avoided to some degree by dusting with fungicide powder. Should the rot occur anyway (foliage yellows prematurely), remove the top grit and cut away the offending rot, seal it with methylated spirits and Benlate, allow it to dry and replace the grit.

Get it all right and you will be rewarded in mid-April with a show of flowers which will inspire awe in you and, if you are show inclined, the judges too. Mention of showing highlights the biggest drawback of all the Oncos: the brevity of their floral display, though it is one glorious week of visual satiation. A final word: If *I. sari* in all its sensual, frilly exuberance is the Marilyn Monroe of Oncos then *I. acutiloba lineolata* is most definitely the Greta Garbo: an aloof, refined, pristine beauty, almost other-worldly!

Plants are occasionally offered by dwarf bulb specialists who advertise in **The Rock Garden**. Propagation is none too easy either; seed, if obtained, germinates very erratically or not at all; rhizome offcuts, if they survive their first winter, usually go on to produce healthy plants but the operation is fraught with danger for the mother plant. No wonder the scarcity of it! But then Greta Garbo was always singularly possessed.

Some Autumn-flowering Garden Crocus

DAVID MOWLE

Amid all the lively talk at our club gatherings one aspect of gardening is rarely mentioned, yet we must all enjoy watching, almost as impartial observers, the slow evolution of our own garden. Unless we are continuously unlucky, the increasing maturity brings increasing pleasure and we can begin to dot the i's and cross the t's of our efforts. Long after the framework of scree and woodland bed has become established we can start to search for special plants to increase our pleasure at particular times of the year. This article introduces a group of dwarf plants offering small patches of bright colour during September, October and November; the autumn crocuses. Some grow best in humus-rich beds of woodland soil while others prefer the heavier fertile soil of the herbaceous border. Yet others need a well-drained scree. Being similar in form and scale they can provide a unifying thread running through the garden at this somewhat dismal time of year.

I must start with *Crosus nudiflorus*, reliable in producing its elegant purple, wineglass-shaped flowers towards the end of every September and happy to spread slowly by underground stolons in any reasonably drained sunny situation. If left undisturbed, it will form patches of colour without ever becoming a nuisance.

A patch of *C. nudiflorus* will produce its flowers over a period of three to four weeks, with each individual flower only lasting a few days. I am only going to recommend those species which are reliable in the face of the rough weather they can expect to meet in the autumn. A sudden storm will seriously damage the open flowers of nearly all the autumn-flowering crocuses but the continual opening of further blooms will quickly repair such damage. *C. vallicola*, which produces its white flowers with long pointed tips at the same time as *C. nudiflorus*, does not have this ability to recover from damage and so is a plant only for the adventurous. If you do wish to try it, plant it in a well drained humus-rich soil in the shelter, but not the shade, of a small shrub – a small rhododendron for instance.

Many species flower in October. The most vigorous with me is

C. speciosus which is a good border plant. It has large, weatherproof purple-blue flowers with very obvious darker striping inside the cup. The white form is equally vigorous, a clean white and unstriped. Different in character but also reliable are *CC. media* and *pulchellus*. These have smaller flowers, around 5-7cm high. *C. medius* is a rich purple with the flower full of red stamens, a combination which makes it immediately recognisable. *C. pulchellus* is much paler, usually a clear blue tinged with lilac. It demands that you crouch down to check its white anthers emerging from a yellow throat. These two need only a good garden soil in the sun to be happy.

There are two October-flowering species which, with me, need the excellent drainage provided by a raised bed or scree happy among the high alpine plants. *C. kotschyanus* has a short, stocky appearance, opening its pale lilac flowers at the slightest hint of warmth to reveal five deeper lines on each petal inside the cup (Fig.29, p.76). Down in the throat each petal is decorated with a heart-shaped yellow patch which is quite characteristic. The subspecies *C. k. kotschyanus* and *cappadocicus* are both vigorous and good garden plants able to resist inclement weather, but subspecies *C. k. hakkariensis* and *suworowianus* seem only to succeed in the bulb frame or pots, beautiful though they are. *C. k. kotschyanus* var. *leucopharynx* is a mystery variety not recorded in the wild. I have tried several times to grow it but have always finished up with the wrong plant. Perhaps I am not intended to grow it! The other species needing excellent drainage is *C. hadriaticus* with big white flowers and either a white or a yellow throat according to subspecies. I grow this in a sunny spot sheltered from the wind. Here it avoids the damaging squalls of autumn and so I cannot comment on its toughness. A good clone of *C. hadriaticus* is being offered by nurserymen as *C. cartwrightianus* 'Albus' which does not seem to require such perfect drainage – in this case a 'wrong' name does help the gardener!

CC. hadriaticus, cartwrightianus and *sativus* are closely related, being linked by the very obvious three-branched red styles. *C. cartwrightianus* really needs the dry summer rest of a frame or alpine house. I have followed Brian Mathew's advice with *C. sativus* and planted it 20cm down in a rich, well drained sunny bed. After two years sulking it now flowers every year.

There are two good October species for the sunny peat bed, or its modern equivalent, the leafmould and chippings bed. *CC. banaticus* and *serotinus* ssp. *salzmannii* seem to prefer either the slightly acidic conditions or the more continuous moisture available. The long-tubed deep lilac-blue flowers of *C. banaticus* have a characteristic shape by

reason of the large outer three petals surrounding the short tube formed by the three small inner petals. Out of this tube extends a fuzz of divided style branches (Fig.30, p.77). There is also an equally vigorous and lovely white form. The other crocus for the moister conditions is *C. serotinus* ssp. *salzmannii*, with violet flowers of varying intensity, and with the colour varying even on one petal. The overall effect may suggest that some of the colour has run in the rain but it is still a charming flower to have in the garden. The other subspecies of *C. serotinus* lack vigour out of doors.

November is the last month for which crocuses can be recommended as the weather in December is too fierce. *C. longiflorus* has a flower of deep lilac enlivened by strong striping, yellow anthers and a red style (Fig.31, p.77). It is happy in any good soil but a place should be found away from the full force of any gales. *C. goulimyi* has its own way of giving a good performance in inclement November weather. Once established in a well-drained soil, each corm produces four or five flowers at intervals of several days. It is quite usual for the first patch of flowers to be destroyed by the weather but three days later it can be flowering unconcernedly in the rare weak sunshine of the time. The cup of petals is not large but is held at the top of a floral tube some 15cm high. The three inner petals are of a lighter lilac-blue than the outer petals giving a most distinctive appearance. There is also an equally satisfactory white form in cultivation.

All the species mentioned can be bought from the specialist nurserymen, exchanged at the Small Bulb Group evening in September, or grown from seed-exchange seed. Sow immediately in a 10cm plastic pot in 50/50 John Innes compost and grit. Leave them uncovered in a cool place outside for two years then turn out the whole potful into the chosen site.

Crocuses are attractive from September to April but they are of most value in the garden during the autumn months. Of course, if you have an alpine house you can enjoy them through the drear days of December and January, too – but growing them in pots is another story!

The Unexpected Primula

IAN D. SCOTT

It's too easy to fall into the trap. You get some seeds with a name on the packet, so you automatically link the name with what comes up. So I was properly set up when John casually enquired if I could name a plant that he was growing in his plastic tunnel. "*Primula macrophylla moorcroftiana*", was my confident reply. Confident because I had similar plants back home. "Then why is it covered with farina?" he asked. Good point.

A couple of weeks later I had a small pot of the same plant (C&McK 734) in flower. Everyone agreed that it was a nice plant with a delightful perfume, probably *Primula macrophylla moorcroftiana* except for three small details: it was too small; it was farinosed and the flower had a white eye! Then I had a stroke of luck at the Perth Show. One of the paintings on display showed something which was very similar to our mystery plant. The flowers had a white eye and the petals were notched. On the other hand the leaves in the painting were slightly larger and were not covered with so much farina. Another stroke of luck, I had taken a photograph of the plant, in the autumn, before it had died back. Lo and behold the leaves were much longer and showed hardly a trace of farina. Well it doesn't look exactly like the drawing of *Primula megalocarpa* in Halda's book, but it is identical to the coloured picture of the species in John Richards' book. So I now await seeing the size of the seed capsule. Comments from other growers are welcomed.

Unexpected primula number two was raised from CLD 351 seed. Out of curiosity I bought a couple of primulas from the Cortusoides section which were advertised as "could be interesting". One was certainly that! The leaves plainly showed that the plants were from the Cortusoides section, only the flowers on the first plant to bloom were bright pink with a dark red eye! There was nothing in the books to help me here. When, in the following year, the other plant flowered with a yellow eye, it was obvious that they were both *Primula polyneura*. This species is known to be quite variable and I would not be at all surprised if the purple petal colour of the clone sold at Inshriach masks the colour of the red eye. "Red-eye" has now produced viable seed. Will it breed true, or show even more variation?

Unexpected primula number three arose from the EMAK seed.

Primula pinnatifida is a delightful muscarioid. In the first year my plants were virtually wiped out by a combination of slugs (they can't resist it), and a failure to grow it in a wet enough situation. I now work on the assumption that if the ground won't let moss grow, then its too dry for *Primula pinnatifida*. Despite this we managed to get one plant to produce enough seed to raise about four dozen seedlings by the following year. By sowing the seed in February, there were flower buds starting to appear in September. You can imagine our amazement when one of these was white! In all other aspects the plant was identical to its pale purple flowered brethren except that the crown was a yellowish-green instead of being stained with a distinct red tinge. Flowering so late in the season, no viable seed was set and the plant appeared to die during the winter. Come spring, however, a small side shoot has appeared. Will this also be *Primula pinnatifida alba*? We await developments with fingers crossed.

Primula macrophylla moorcroftiana (see p.18) Joel Smith

The Frost-Free Greenhouse

GLASSFORD SPRUNT

My objective in establishing a frost-free greenhouse was to produce an environment that would allow me to grow, successfully, plants which, for various reasons, would not survive our winters, with their wet and cold, sometimes alternating with false springs. I also wanted to be able to grow some plants which were quite clearly frost-tender.

Revamping my facilities

The greenhouse is situated in the back garden between two levels. The path to the east side of the greenhouse is on a slope of 1 in 3. The old greenhouse, which was some twenty-four years old by this time and showing its age, was a Cedarworth greenhouse 5×2.5m based on the Dutch light size of pane of glass, and was set into a recess between these two levels of the garden with a raised bed behind it. This bed was a constant problem as the space between the base of the greenhouse and the base of the raised bed was only sufficient to accommodate my feet in the Charlie Chaplin position, or as shown in Egyptian frescos. This space regularly and easily filled with wind-blown leaves and empty pots, so that progress was always made to the accompaniment of the crunching of breaking pots. This bed was not easily accessible and so was neglected and the plants did not do well.

The new greenhouse

Although I had talked about building a new greenhouse for some considerable time, I suspect that some of my friends did not believe that it would ever progress beyond this stage. In 1989 I removed the raised bed and laid concrete over the site of the old bed at the height of the floor of the proposed new house and floated the surface of this floor. The wall at the back of this area had a shelf running along its whole length at a height suitable for the base of a plunge bed for the new house. Four piers were built towards the front of this area and were spanned by reinforced concrete lintels. The base of this bed comprised 90×60cm concrete paving slabs and these were laid over these supports. The front of the bed was built up with a single course of bricks to the height required. The bed was tanked and pipework was let into the base of the bed as part of

the watering system. Before the new greenhouse structure was put in place this bed was filled with concreting sand tipped from the barrow from the path above.

The brickwork was continued, after demolition of the old brickwork, to the size of the proposed new house which was to be 6.5×4m. The old greenhouse was in the meantime still carrying out its function of plant protection. Western red cedar "off the saw" planks 15×5cm were obtained from the wood merchant and were taken home and processed through the planer and various other machines to produce the sections required.

Some preliminary drawings were made, in my inept way, and calculations made to be sure that the space between the glazing bars would correspond with the standard width of the available horticultural glass. All the various sections were cut to length and all the appropriate mortise and tenon joints cut. All the joints were glued with waterproof glue and cross-nailed. The greatest problem was getting the assembled sections to the site for erection, for although they were not heavy they were very unwieldy. The sections went together on the new brickwork without any great problem and once the roof sections had been put in place the whole structure was screwed down to the brick foundation. The ventilators and other woodwork were then completed and glazing started. The old greenhouse was gradually robbed of its glass and this was cleaned and cut to appropriate size for the new house. A relatively small amount of new glass was thus required. The dismantling of the old greenhouse proved a little more of a problem as I could not remove all of the roof glass because of the new house obstructing their withdrawal. Fortunately my son appeared, quite fortuitously, and with his help we were able to dismantle the roof without mishap. The rest of the dismantling was then easy.

Re-tanking of the rainwater tanks of the old alpine house was carried out and the overflow connected to the drainage system and the gutters were connected to the inlet of the tank. The water supply from the mains was re-routed as were the electrical connections from the mains supply. Piers were built over the water tank to take the middle plunge bed, the piers being connected as before by reinforced concrete lintels. The bed was constructed by recycling one of the plunge beds from the old house but at the same time adding some extra depth to it.

The front bed was built somewhat differently as I wanted to utilise the space underneath it as a further growing area. The support for the front bed was constructed from square section steel tubing, and the bed itself was made from the materials used in the other bed from the old house.

The beds are all different depths, the front being 30cm, the middle 25cm and the back one 35cm. The front two beds were tanked and had watering piping connected underneath as in the other one, but in addition they both had under soil heating with thermostats connected.

After this work was completed the floor was raised to the correct height by filling up with the bricks saved from the old plunge bed from behind the house and topping it up with the subsoil from this bed. The floor level was made up to its final level with a 5cm concrete screed, floated to obtain a slope to the drains and to achieve an acceptable finish. The last two beds were then filled with sand and the long process of re-potting and re-plunging commenced.

Benefits

The various benefits that have resulted from the new set-up are many. The order in which they are presented to you is not an indication of their order of importance, but rather an indication of the order in which they came to mind.

(1) Gardener comfort

For a start I no longer crack my skull on the lintel of the door. The lintel in the old house was too low for me and if I had my mind on other things then I inevitably failed to duck sufficiently to avoid a nasty contact. The high roof height gives an airy feel, which was certainly not true of the old house where the roof ridge bar was only a few inches above my head and tended to give a feeling of claustrophobia.

The temperature, even in the depths of winter is always a few degrees higher than the ambient temperature out in the garden, and can be adequately controlled so that it does not run away. The wind chill factor can also be dealt with satisfactorily.

I have found that the installation of a bar stool has been a most useful addition – sadly its accompaniments are not included. A blockboard sheet across the passage between the beds serves as a useful temporary potting bench.

(2) Protection of tender or doubtfully hardy plants

Many of the plants which I grow do not have a great deal written about them and so it is often not easy to find out just how hardy they are. I think, therefore, that it is important to be able to provide a frost-free environment until such time as I have been able to bulk them up sufficiently to be able to try them outside.

Some of the items that I have been buying in recent times are both scarce and expensive and there is a good chance that if I lose them then the chance to grow them will not come again too soon, so it is wise not

to risk them until there is sufficient back-up. Such writings as are available about some of these plants is very often in the scientific journals, written by botanists or taxonomists many of whom know little about the gardening problems of the plants about which they write.

(3) Flower protection

Many of the bulbous plants which I grow are in flower when our winter weather is at its foulest and flowers appearing in the garden are often battered by the winter storms. They can be brought in under cover and enjoyed in the relative comfort of the frost-free house.

(4) Extension of the flowering season

Another great advantage of the frost-free house is that pots can be brought in from the cold when they are on the point of flowering, they can be enjoyed in flower and returned to their spot outside and a successor brought in. Thus you can enjoy your favourite plants for longer.

(5) Pollination

In the winter months pollination of winter-flowering plants can be a dodgy business. There is a scarcity of pollinating insects on the wing, and you can be sure that the weather will do its worst when you are wanting to carry this out. There is no doubt that even artificial pollination is more succesful under cover than it is when carried out in the open, besides you do not have the problem of grovelling in the mud. It seems to me to be quite possible that the few extra degrees of warmth may also be a factor in the success of pollination. It is likely that the stigma is more receptive and that the pollen tube grows more actively after implantation. Apart from anything else, under cover there is no rain to wash it off again.

I have only been moderately successful when using a paintbrush for pollination and where the anthers are free standing in a flower then my usual option is to take them off with a forceps and transfer the pollen to another flower directly from the anther. This usually results in the stigma being well loaded with pollen and successful seed setting.

Crocuses and other flowers which close up under adverse conditions can usually be persuaded to open up by the use of an electric light close by when pollination can then be satisfactorily carried out.

(6) Lengthening the bulb seedling growing season

Some bulb seedlings do appear to make more rapid progress after germination if they are grown on in the protected environment of the frost-free house. *Crocus cvijicii* normally does not flower with me until its fourth growing season, whereas in the protected house usually a whole year can be taken off this.

I have not as yet studied the seed to flowering times of any other species, but in growth there seems to be little doubt that many of the

fritillarias remain in leaf for longer and so in theory, at any rate, should come to maturity more quickly. If an easy way of bringing some of the rarer species to maturity more quickly could be found then this would prove to be of considerable benefit. There certainly seems to be some material here for research.

(7) Plunging pots

Over my years of gardening I have come full cycle as far as pots are concerned. Most of my serious growing, in pots at any rate, is done in clay pots although I like to use meshpots for growing on immature bulbs. With the deep plunge beds which I use it is possible to plunge almost all the sizes of pot which I use right up to the neck. There are many advantages to plunging pots especially if clay pots are used: it evens out the rise and falls in compost temperature and this reduces the stresses on the plants; it maintains a steadier level of moisture in clay and meshpots. I find that I have greater difficulty in being certain of the levels of moisture in the compost in plastic pots than in plunged clay pots and it is easier to end up with drought in a plastic pot because the contact between plunge and compost is not quite so easily established. For plants which are not yet mature enough to be taken to shows my preference is to grow them on in plunged meshpots which allow a free root run. There is no doubt in my mind that these developing plants make much better progress when their roots are allowed to range freely.

Plant management

It goes without saying that the most important factor in plant management is to have good plant material to manage. The best way is to choose plants in growth. This considerably increases the chance of choosing healthy material, a sickly looking seedling is unlikely to develop into a Forrest Medal winner. When I am buying new plants I prefer to get them from a reliable source and I usually grow them on in a group until I am satisfied that all is well. Anything that turns out to be a bit iffy should be isolated from the rest until it has improved or been consigned to the compost heap.

(1) Potting

My non-bulbous plants usually have the top compost renewed regularly and those requiring larger pots have this done after the flowering season is over and before too much new soft growth appears. The pots of seedling bulbs are usually left alone for two growing seasons, this is just because of the practicality of dealing with the tiny bulbs and distinguishing them from the grit in the compost. Most of the pots of bulbs are re-potted every year. This has many advantages, the most interesting

aspect being that the grower is able to check up once a year how well his plants are doing. It also allows the grower to separate the mature from the immature plants. In the pots scheduled for presenting at some future show it is always worth leaving a few bulbils in the pot just to show the judges how well your plants are doing and that they are multiplying up.

Most of the pots in the frost-free house are bulbous, and many have died down by the end of May or the beginning of June. I try to get on with this monumental task as soon as a pot is clear of its top growth, because in addition there are all the pots in various plunge beds in the garden, and plants and bulbs to be potted up for sale or exchange. June and July are, therefore, usually months of frenetic activity.

The pots likely to be used at shows are prepared along with back-up pots. The surplus of flowering-size plants is potted individually for later sale, and the immature bulbs are potted up in meshpots to allow them to develop further. Most of my pots for show plants are of clay. Some of the reticulate irises do not appear to be too happy in clay pots so that I tend to rotate them, in clay pots one year and in meshpots the next followed by clay pots after that. This way I am able to get them to the shows and at the same time maintain the corms at flowering size.

(2) Potting compost

All my potting compost apart from that used for my pleiones is based on John Innes No.3, whether for seed sowing or potting up mature plants. I have written about compost in a previous article but recapitulate. My average potting compost is: 2pts John Innes No.3, 2pts fine grit, 2pts coarse grit, and 1pt leafmould or sieved peat. This in effect reduces the strength of the fertiliser in the compost to about the equivalent of J.I. No.1 I even grow ericaceous plants in this compost, which is modified by the replacement of the 1pt of leafmould by 2pts of peat. This seems to lock up the calcium in the compost and so far chlorosis does not seem to be a problem. No doubt, some day I shall find a plant that will prove me to be wrong.

As a fertiliser, I use a high potash fertiliser of the tomato growers' type most of the time. This grows the bulbs hard and keeps them in flowering condition. I think that a lot of gardeners are rather mean with fertilisers for bulbs. Many of them are gross feeders and to do well they need to be treated well. In the growing season I feed them weekly – weakly. The fertiliser solution using a liquid concentrate is at the rate of 1 tablespoonful to a gallon of water.

Sunday is fertiliser day, and I have chosen one specific day of the week for this activity and in this way I am certain that all the pots have been attended to. Sometimes at the height of summer it is necessary to

supplement the watering due to the rapid removal of water from the compost. The intermediate waterings are carried out using water on its own.

Problems

No system of growing plants can be free of problems. There is no special significance to the order in which they are laid out below.

(1) Condensation

Condensation can be one of the major problems of the frost-free greenhouse in the winter months, particularly if the weather is too cold to allow sufficient ventilation. The area of the plunge beds and compost surfaces in the pots is quite considerable and it is only to be expected that a considerable amount of water vapour will be given off from this surface. Every possible opportunity is taken to ventilate the house so that at least, when the house is shut down on a cold night, the inside of the glass has had a chance to dry off. Normally even on cold days the door and ventilators are not closed until the temperature has dropped to about 3-4°C.

(2) Associated fungal attack

With raised humidity comes the problem of increased liability to fungal attack, the commonest being botrytis. Dead plant material, in conditions of high humidity, very quickly becomes infected with botrytis. The plants, pot surfaces and plunge bed surfaces must be kept clear of any material which could become a focus for fungal attack.

In addition to this, keeping the air on the move with a fan is a considerable help in keeping the spores on the move. The use of systemic fungicides can be of help, but once the fungus has got a hold then the plant is often doomed. Excision of the damaged tissue followed by cauterisation of the cut surface with methylated spirits followed by green sulphur is an old-fashioned treatment but it can still often be effective.

(3) Moss, liverwort and algae

In my previous greenhouse, moss, liverwort and algae occurred in large sheets smothering everything in its path. In spite of peeling it off regularly it was almost a losing battle. It occurred to me that if I could find a way of reducing the moistness of the top surfaces of both pots and plunges then it should be possible to, at least, enter into successful competition with these pests. I made sieves through which I sieved dried concreting sand. The coarsest grade I used for topping off the pots and the finest, which was silt-like, I kept aside for making mortar when I was doing bricklaying. The middle grades were used for topping off the plunge bed between the pots to a depth of about 0.75 inches. This

resulted in an almost dry surface and certainly one which the moss, liverwort and algae have found almost impossible to colonise. The problem has thus virtually disappeared and I have not had to resort to moss killers or algicides. Paying attention to the humidity of the house as indicated above is also very important in winning this battle.

(4) Pests and their activities

There is really no closed season for pests in the frost-free greenhouse. Although they are much less active in the winter than they are in the high days of summer, they can still make their presence felt.

(a) Slugs: One of the problems of having the greenhouse built on a slope is that the back plunge bed is on the same level as the ground behind and slugs find easy access to the house through the open ventilators. Slugs are only occasionally a problem in the other two plunge beds and when it occurs I suspect that they are introduced as eggs or very small slugs on pots brought in from the garden. In the summer months slug hunting with a torch is carried out regularly and when found they are summarily dealt with. I am not particularly keen on slug bait as this introduces an agency which I am not able to control accurately. Slug baits also tend to go mouldy in time and this is something that I do not want to introduce into the house.

(b) Aphids: Constant vigilance is required here. Even in the depths of winter occasional aphids are found in the house and often at widely separated parts of the house. When they are only single or in twos or threes then they are despatched individually. If they appear in epidemic proportions then I have to resort to systemic insecticides and when these are used then I never use the same one twice running. With the cyclamen it is just quite impossible to go over the numbers which I grow looking for individual aphids and with them I have to resort to watering with systemic insecticides.

(c) Vine weevils: Some years ago I suffered an epidemic infestation of vine weevil and a high percentage of my cyclamen were left without roots. Fortunately most of them recovered although they were set back by this attack. I have been fortunate since that time and have had no further trouble. My compost for the cyclamen is all treated with insecticide powder which smells unpleasant and once the pot has been top dressed with coarse grit then I sprinkle the top of the pot with Chlorophos, which is one of the agents used by the vegetable gardener against carrot fly and suchlike. I doubt very much whether this combination has any lethal effect on the vine weevil grubs although it may have some effect on the adults. It is quite likely that the smell of these agents masks the smell of the cyclamen and so discourages egg laying. It could also be that the

appalling smell deters the female from laying and she goes elsewhere. The fact of the matter remains that I have been trouble-free in the greenhouse since that time.

(5) Etiolation: Etiolation was a problem in my previous house. Although minor drawing up of some of the plants does occur it has not been the problem that I had anticipated, and it has been less in subsequent years than it was the first year when I maintained temperatures at a higher level than I do now. We have very many dull days in the depths of winter and I feel that it is important to keep the temperature in the house low in keeping with the low light intensity.

The future

There is little doubt that progress in the future is going to depend on more accurate record keeping. It is so easy to have an impression of what is going on which is totally erroneous, because the human mind is happy to remember only that which suits its preconceived notion of what is going on. Record keeping is a chore and often it is difficult to draw the information in the records together in an informative way. Although I have not been very keen on the concept of computerising information, I can see the possibilities of using the computer to make the links which may show the way forward.

Lewisia tweedyi Edith Clark

Obituary

JACK CROSLAND

Jack Crosland died on 16 February 1994. He is survived by Peggy, his loving wife for many years, to whom we send sincere condolences.

Listening to Jack it would be difficult to place by his accent where he was born. He was actually a Yorkshire man but moved to Scotland as a boy. His career as representative in the north of Scotland for Paton and Baldwin, the wool manufacturers, involved much travelling on quiet roads and often his mind must have dwelt on the little plants that had their homes in the Grampians and Cairngorms through and round which he frequently had to motor. In earlier days a quiet road took him past Inshriach Alpine Plant Nursery, well publicised as Jack Drake's, and there he would contemplate the new introductions of Ludlow and Sherriff and others, and on leaving, purchase some of their floral treasures. He no doubt thought that if these plants could survive at Aviemore they would have a chance of being relatively permanent in his cold garden at Torphins. In many instances his assessments were accurate, for his garden and alpine house at Treetops were home to many superbly grown plants. The many visitors who were welcomed to his garden will substantiate that. His garden was full of species and varieties of all manner of attractive plants and his frames were invariably full of seedlings and cuttings into which he would delve deeply to present a particular plant to an interested visitor. He was extremely generous. Jack's tastes were catholic and taller shrubs, herbaceous, as well as rock garden plants and bulbs could be discussed knowledgeably.

He was a superb cultivator and from his garden a whole string of prize-winning plants found their way to various shows. The accolade at any SRGC show is to win the supreme award, the Forrest Medal, and Jack won that prize no less than thirty times. His great friend and companion on many a plant searching journey, Harold Esslemont, was the only one to surpass that figure. His first was won at Perth in 1961 with *Rhododendron hanceanum* and the last at Edinburgh in 1985 with the L & S form of *Cassiope selaginoides*. It is interesting to note that in the centenary year of Forrest's birth, 1973, when the medals were cast in silver, Jack won two. They were fitting awards, for the plants were *Pleione forrestii* and *Primula forrestii*. It is on record that he was first in class, in Section

One, 121 times, thereby achieving 2 Gold Merit Medals. His success in the cultivation of species and cultivars of pleiones is well known.

Jack Crosland was a stalwart of the Scottish Rock Garden Club. He served it long and faithfully for many years, holding various posts, to all of which he applied himself with enthusiasm. Over the years he served a number of terms as a member of Council. For a time he was Secretary of the Aberdeen Show, for many years he was Scottish Secretary on the RHS Joint Rock Garden Plant Committee, recording and describing the recommended awards. He also served as a voting member on that same committee. He submitted many plants to it, receiving Cultural Commendations for some, and various plants being awarded an AM or FCC because of his skill as a cultivator.

Jack gave generously of his time as a lecturer, giving talks on his favourite subjects to members of clubs all over Britain. He was much more than just a lecturer, though, for he was a teacher as well, and would go to some length to make sure his point was understood.

He travelled widely in Europe looking at plants in the wild. From the islands of Rhodes and Crete and Mount Parnassus in mainland Greece to the Dolomites, the Swiss Alps and to Spain, and thanks to his prowess as a photographer he brought back lasting illustrations of the plants he saw to use in his lectures.

Jack Crosland only had friends.

Alfred Evans

The Seed Exchange

JEAN WYLLIE

A big thank you to all the donors who sent us seed last year. I know it was not a good year for harvesting in the UK but the new donors from overseas more than made up for a small drop in home donations. Please keep up the good work, we cannot distribute what we do not get!

A big thanks also to Henrik Zetterlund and Goteborg Botanic Garden for their very generous donation of seed from their trip to Kunming.

The many hours of work done by the Fife, Edinburgh and Stirling Groups must not be forgotten – Thanks to Morris's Seedlings, Edinburgh's Packers and Stirling's Slaves!

Donors who sent two self-addressed labels with their seeds also win a special thanks. (Overseas members need only send one. See Year Book, page 7). Home non-donors must send me a SAE before the end of December to get a list.

Seed arriving early is stored in a refrigerator, we now have a Seed Exchange one – now I do not have any worries that my husband gets *Lewisia* with his lettuce or *Myosotis* with his milk. The early arrival of all seed makes it easier to send the list out quickly and begin the distribution. As far as possible all donor requests are sent out before non-donors, so get your orders in quickly.

We are compiling a set of slides to put together a talk on SRGC Seed Exchange past and present and would be glad of any little stories for or against us to add a bit of spice (e.g. long awaited seedlings turning out not to be what was expected?).

The Easy Ten for beginners has been very successful over the past three years, we hope the members who participated over the first two years have moved on to the real thing by now. There is not an endless list for the Easy Ten so we will be starting again this year. If you want to participate please send £1.00 with your name and address to Mr Morris Wilson (address on page 7 in the Yearbook) by 14 February 1995.

Happy gardening, seed collecting and remember post early for the Seed Exchange.

Book Reviews

Poppies. The Poppy Family in the Wild and in Cultivation
by Christopher Grey-Wilson
Published by B. T. Batsford
208 pages, 114 colour plates, 38 line drawings
Price £25.00

There can be few more evocative, popular and colourful families of plants in our gardens than the poppies. It is therefore surprising that this is the first book devoted to the great variety of garden-worthy plants to be found in the *Papaveraceae*. Christopher Grey-Wilson has provided us with an extremely well-researched volume, which will more than fill the obvious gap on our bookshelves and remain a standard work for many years to come.

All members of the poppy family likely to be encountered in cultivation are covered in the book and many more little known species, which the author feels will be or should be brought into cultivation. As the book's subtitle suggests, a wealth of information is provided on their distribution and habitats in the wild and on their requirements and suggested methods of achieving success in cultivation.

Following general headings on the poppy family, cultivation, classification and a key to genera, the rest of the book is devoted to a thorough and systematic treatment of the individual genera, grouped into their respective subfamilies. Each genus is introduced with a description of its main botanical features, geographical distribution and general cultivation requirements, with, where appropriate, detailed information on the history of our knowledge of the genus and its classification. Descriptions of the species follow, in alphabetical order, for the convenience of the reader. Here is to be found a great deal of specific information on morphology, distribution and habitat in the wild, affinities with other species, and copious useful suggestions on their individual cultivation and propagation.

The reader is provided with lists and descriptions of named cultivars in groups such as the Icelandic, Californian and 'oriental' poppies, and keys to the major genera are easy to follow, in conjunction with a comprehensive glossary. The use of botanical authorities for all published names and the inclusion of synonyms and epithets is a valuable feature of the book, essential for our understanding and interpretation of the frequently confused nomenclature. The author's separation of *Meconopsis*

wallichii, as a distinct species, and the resurrection of the genus *Cathcartia,* for the plant we grow as *Meconopsis villosa,* should be welcomed.

The book is superbly illustrated with colour photographs, many by the author, and his detailed and accurate line drawings punctuate the text. For many the book will provide a whole new meaning to the word poppy, provoking a rush for seed lists, as we search for new treasures to add colour to our gardens and challenge our skills. Overall it is a well-written, informative and very readable work, which will prove an essential reference for the discerning gardener and botanist alike.

DMT

Fleurs de Vanoise
Edited by Michel Delmas
Published by Edisud, Aix-en-Provence
Hardback, 318 pages, 500 colour photos
Price FF120.00

This extensive flora to the Parc National de la Vanoise describes, and illustrates by excellent colour photograph reproductions, over 500 of the most common and most characteristic plants of that very interesting region of the Graian Alps. The classification is by environment ("milieu"); 12 in all ranging with increasing altitude from dry forest to crags. This helpfully colour-coded classification groups plants in the order: trees, plants with conspicuous flowers and grasses ("herbes") and describes each under the following heads: names, including common synonyms, in French and Latin, family, height, average flowering season, local name if any, description, including distinguishing characteristics, habitat, distribution, uses, etymology, protection status, and finally, related species. There are also a useful introduction to the geology and vegetation of the Massif de la Vanoise, helpful descriptions of the environments, an illustrated botanical glossary and indexes in French and Latin. Even for those who cannot read French, this flora would provide, on the basis of its specialisation, excellent photo-illustrations and price, a most useful adjunct, for identification, to a more general and/or less well illustrated alpine flora in English.

DD

Letter to the Editors

Dear Editors,

In the June 1993 issue of **The Rock Garden** there was an interesting note from Richard Hancock discussing development of gentian seed, drawn from his observations in the wild.

Early in December 1982 Heather Salzen collected seed of *Gentiana depressa* from dry south-facing slopes in the Thami Valley, Solukumbu, Nepal. The seed was viable and from spring 1983 members of the Aberdeen group have grown this collection and its progeny.

Viable seed has been produced and supplied to the seed exchange on at least two occasions. Seed production under Banchory conditions is not straightforward as the corolla and calyx cups collect water, and except in very dry autumns the seed capsules rot. To obtain seed I cover the plant with a pane of glass in August or September. As the seed capsule begins to fatten I have at times torn away the corolla and part of the calyx, but in dry weather I do not think this is helpful. Eventually, in late September, the stalk at the base of the ovary lengthens and then the apex of the partially-exposed seed capsule splits. From then onwards the seeds are slowly released over a number of weeks by progressive splitting. You must choose your time, balancing maximum seed ripeness against minimum seed loss, but if mature, and kept warm and dry, this seed will ripen and maintain its viability.

Under our conditions, seed pods take four to six weeks to ripen, not four to seven days as recorded in the wild. This discrepancy may arise because the corolla remains blue for weeks after first opening.

Yours faithfully,

Wilfred Holmes
The Elms
Ramsay Road
Banchory
Kincardineshire
AB3 3TT

Discussion Weekend

ST ANDREWS, 23rd – 25th SEPTEMBER 1994

The comments of many members who attended the Diamond Jubilee Weekend suggest it to have been a success. Because of this, it has been decided to use the same accommodation and lecture facilities this year.

The programme has now been finalised, and we are sure that it will be as interesting and varied as last year.

Friday	8.00 pm	Peter Lewis – Campanulas
	9.30 pm	Dwarf Bulb Group Margaret & Henry Taylor – Bulbs of Andalucia
Saturday	10.00 am	Botanic Garden Visit
	2.30 pm	Duncan Lowe – Scree & Crevice Plants
	4.15 pm	Brian Halliwell – Plants & Gardens of Japan
	7.30 pm	Conference Dinner: *Speaker*, Jim McColl
Sunday	9.45 am	Sidney Clark – Wild Orchids of Scotland
	11.30 am	Bob Mitchell – Trilliaceae
	2.30 pm	Michael Almond – Between Black Sea & Caspian

Prices: **Residents**

Friday dinner – Sunday afternoon tea	£112
Saturday lunch – Sunday afternoon tea	£82
Sunday dinner – Monday breakfast	£28

Non-Residents

Saturday or Sunday: morning coffee, lunch, afternoon tea and all lectures	£20
Saturday evening conference dinner	£23

Bookings should be made on the form which can be found with the January issue of **The Rock Garden**.

The booking, together with the appropriate remittance, payable to the Scottish Rock Garden Club, should be sent to:

Mrs Elizabeth Field, 2 Maynard Road, St Andrews, Fife KY16 8RX.

Anyone requiring further information about the weekend should contact Elizabeth at the above address, enclosing a stamped addressed envelope.

1995 SRGC Weekend Tour to Gardens of Northern Ireland

Following the success of the Oban weekend in our Diamond Jubilee year the club is organising a similar weekend based in Ballymena in Northern Ireland. We have organised a guided tour of gardens in the province. Many of these have been seen on television and their owners are members who are regular attenders at our Discussion Weekends. These gardens are among the best in the country. They have been chosen for us by Harold McBride who has written and lectured on rock gardening in Ireland. Ericaceous and New Zealand plants thrive especially well there. Here is your chance to see for yourself the wealth of plant treasures normally hidden from us by distance. Visits to the famous gardens of Mount Stewart and Rowallane will be possible. There will be an admission charge for these gardens. In the evenings, local plants-people will tell us more about rock gardening in Northern Ireland.

We will be staying in the Country House Hotel, described as one of Northern Ireland's best kept secrets with an atmosphere of calm and effortless style. The hotel's award-winning restaurant offers some of the finest cuisine in County Antrim. The hotel has its own leisure club with swimming pool, steam room, sauna, jacuzzi and beauty salon. There are eight golf courses nearby. The hotel is within easy reach of The Giant's Causeway, the scenic Glens of Antrim, Carrickfergus Castle and Old Bushmills Distillery, the oldest in Ireland. We have negotiated special competitive rates with the hotel based on dinner, bed and breakfast. Packed lunches may be bought from the hotel.

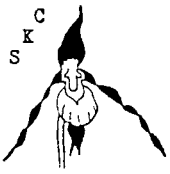
Travelling by luxury coach we will leave Dunblane and pick up passengers in Glasgow, Ayr and Stranraer. We will cross with the coach from Cairnryan to Larne and use the same coach to tour the gardens. Crossing on Friday morning and returning on Monday afternoon gives us three nights in Northern Ireland. There should be time for one garden visit on Friday, the others being spread over Saturday and Sunday. The dates for the trip are likely to be 2nd-5th June 1995.

Numbers on the trip are limited to 50 so if you want to come to visit Northern Ireland's best gardens write soon and reserve a place.

The cost will be between £155 - £175 per person.

This includes return coach transport, ferry crossings and dinner, bed and breakfast in the Country House Hotel. Firm booking and deposit etc will be required in January 1995. We will keep a waiting list in case some members who reserve places are unable to go. The trip is only for members of the Scottish Rock Garden Club.

To reserve your place or to find out more please send a SAE to:
Mrs Bette Ivey, Whinstones, Kirkmichael, Blairgowrie, Perthshire, PH10 7NX who will send you more details, a booking form and details of any deposit required.



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