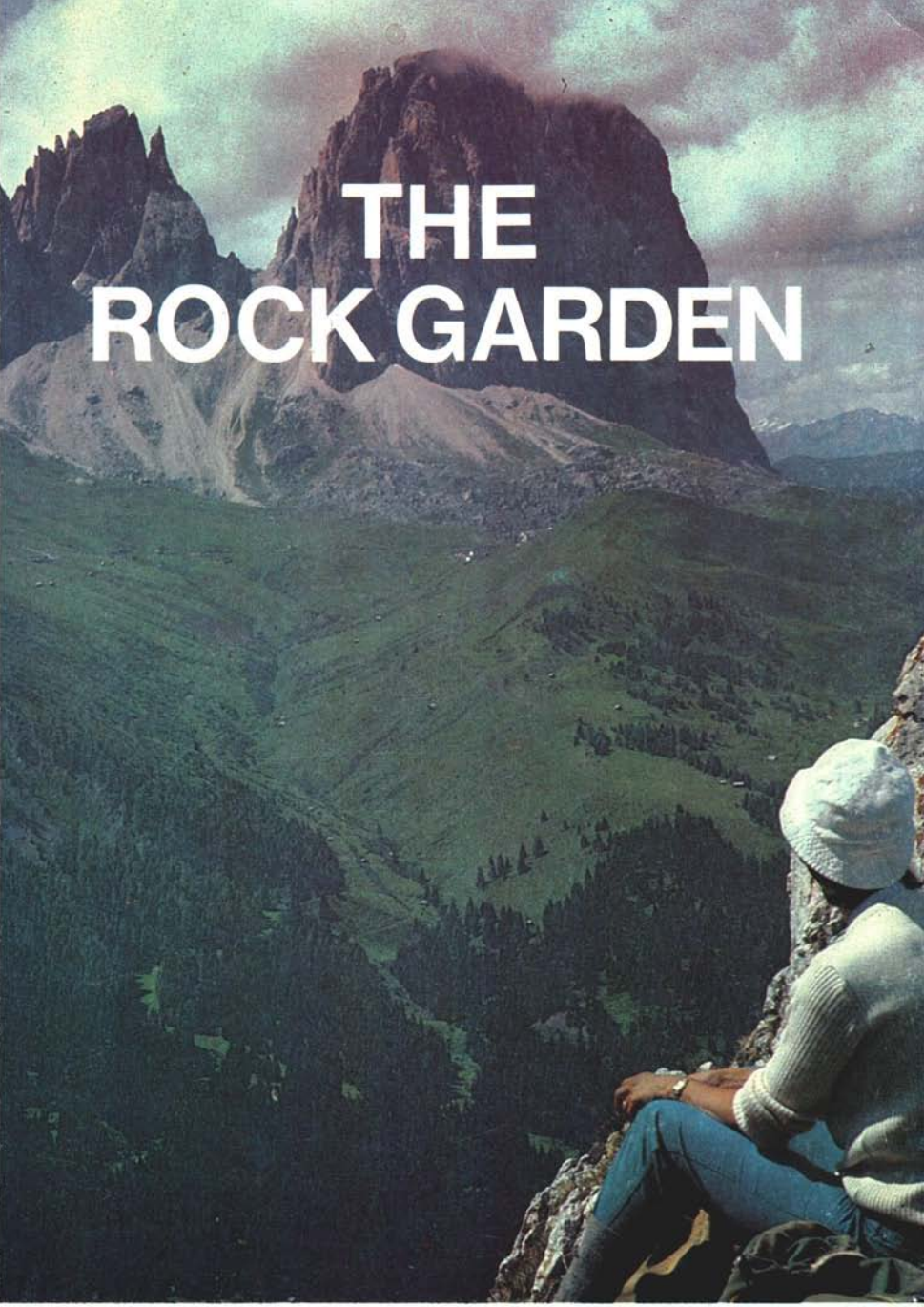

THE ROCK GARDEN

THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

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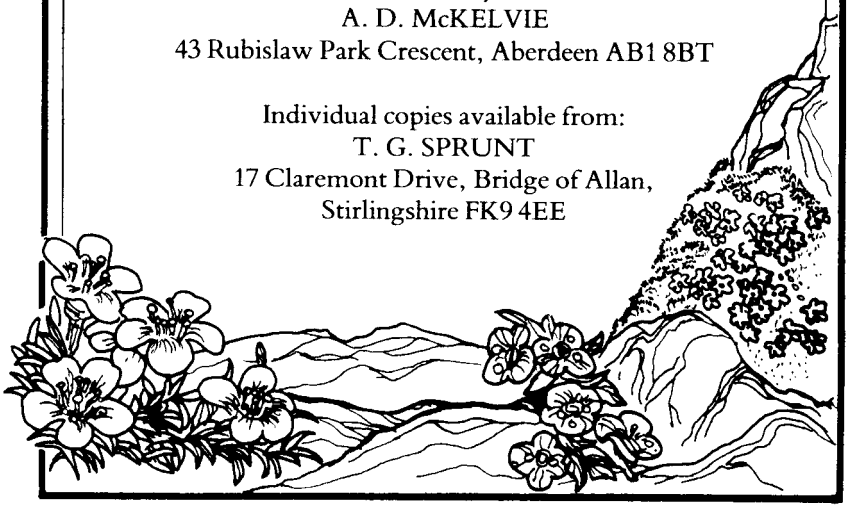

Front cover:
In the high Dolomites
(Photograph by D. Lowe)

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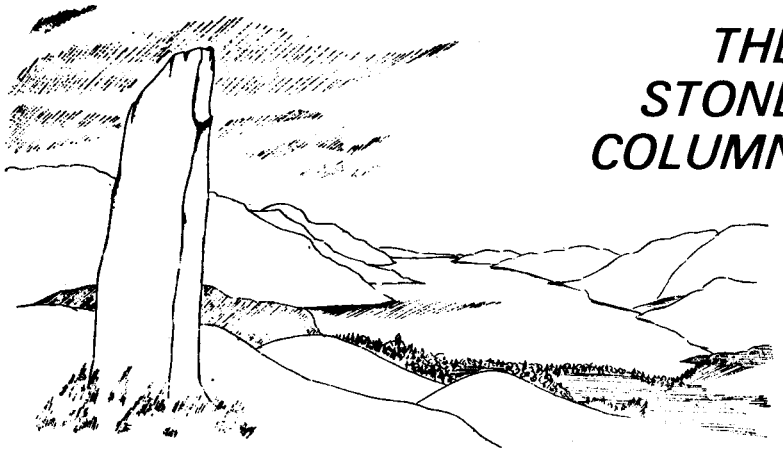
Editorial

AN EDITOR'S job would be much easier if some of the obfuscation surrounding the naming of plants could be removed or at least lessened. An awful lot of time is taken up checking Latin names particularly down at the sub-species or variety level. I have made a determined effort recently to clarify in my own mind the differences between a sub-species, variety, clone, forma, strain and cultivar. You may say that cultivar is simple: it is a cultivated variety. The term was proposed in order to distinguish between a man-made variety and a naturally occurring one. It is absolutely clear with roses, for example, that 'Peace' is a cultivar and not a naturally occurring variety of some wild species. It is, however, much less clear when one is discussing 'varieties' of *Primula aureata* or of *Ranunculus parnassifolius*.

Of more importance than these variations below the species level is the constant changing of plant names particularly of genera. One can accept, albeit reluctantly, changes in specific names because of historical precedence. One is less willing to accept the somewhat arbitrary allocation of well-documented and well-known plants into new genera. Gardeners tend to think that botanists know best so that proposed changes are simply accepted, whereas the truth is that the botanists do not agree among themselves.

My old Professor in Edinburgh, Sir William Wright Smith, used to say that it did not matter by what Latin name you called a plant as long as you gave the 'authority' after the name. This is probably a counsel of perfection for gardeners but it contains a lot of sense. Take, for example, *Vitaliana primuliflora* Bertol which has many synonyms including *Androsace vitaliana* (L.) Lapeyr, *Gregoria vitaliana* (L.) Duby, *Douglasia vitaliana* Benth. et Hook. and *Primula vitaliana* L. In addition, Flora Europaea gives five sub-species which gardeners tend not to recognise. What is the humble rock-gardener to do when the botanists are so divided?

In the midst of all this confusion please have pity on us when we use some out-of-date name not duly authorised in Flora Europaea. I intend to put my money into a complete set of The European Garden Flora (the first Volume of a set of six has now been published) and use this as my guide. Not all growers will agree but at least I will have a source of reference to most of the plants we grow. ALASTAIR McKELVIE



THE STONE COLUMN

The ARGS Golden Jubilee, Asheville, North Carolina

The American Rock Garden Society is one year younger than the SRGC; its inaugural meeting was held in New York City in March 1934. Just as we in Scotland extended our 1983 Discussion Weekend to celebrate our Golden Jubilee, so the ARGS expanded their 50th AGM to a six-day Conference held in Asheville, North Carolina. However, it was a rather different gathering Frank Cabot and his team had in mind for June 1984. Although there were lectures, a fairly celebratory dinner, and a much less formal "pig-pickin' barbecue" in the evenings, the emphasis was firmly on daytime field trips to explore the local flora. With breakfast commencing at 6.30am and the second lecture lasting until about 11pm, it's probably a good thing that most rock gardeners are fairly fit. We needed to be, to withstand the pace of such an intensive programme of what the retiring President Bob Means described as "Scholarship, plantsmanship and fellowship".

Apart from the flora, two things impressed us most. Firstly the careful attention to detail, from the piper outside the dormitory block at 7am (to make sure we were all awake?) to the beautiful floral decorations and delightful menu cards at the dinner. Secondly the smooth interlocking of the complex travel arrangements; but then the Americans have always been good at logistics. These complexities resulted from our division into six groups for day trips to differing locations. Each group was again sub-divided into parties under the leadership of an expert local botanist. These guides, most of whom were PhDs at least, really knew, and cared about, the ecology of their area. Our routes had been very carefully chosen, to see a comprehensive range of the flora. One place we visited epitomises their attitude to conservation – Bluff Mountain Nature Preserve. Run by the North Carolina Nature Conservancy, access is strictly controlled. The

number in a guided party, the number of parties per day, and even the total number of visitors per year are all limited. A man living at the foot of the mountain is employed as caretaker to watch the trail. He's the one with the gun. All this may seem like an infringement of liberty, but if it protects a valuable plant community we are in favour. Contrast the trampling on Ben Lawers, the grazing in Craigellachie Wood, Aviemore, or the minimal protection given to many of our SSSIs.

We must admit that we are not great fans of some travelogues; the "up the mountain" articles which are just lists of plants. How does one avoid this pitfall? We'll just try to put some of the plants we saw into a garden context. Western North Carolina is roughly on the same latitude as Crete, while the mountains are slightly lower (Mt Ida, 2,456m, Mt Mitchell, 2057m). So far south, the summers are naturally hotter than Scotland but, well away from influence of the sea the winters are also rather colder. Any herbaceous plants should be winter hardy for us. With woody plants, lack of summer ripening could be a problem over here. It was noticeable that our eastern American Ericaceae did very well in 1984. Rainfall is considerable all the year round, reaching over 150cm in most of the mountains. Thus, apart from a few grassy "balds", the hills are wooded right to their summits, and there are no true alpines. The balds on some of the ridges could well be artificial, having been created by the first settlers for their grazing animals. Nearly all our native Caledonian forest was cleared for the same reason. Let's not be narrow-minded, what alpine gardener is there who doesn't grow woodlanders? And what magnificent woods they are. Most of the gardeners we saw contained only native plants, hundreds of attractive garden-worthy species. We must look to their history and geography to see why the southern Appalachian woods are the richest temperate ones outside Asia. During the Ice Age they were not glaciated; we saw no natural lochs. The mountains run north-south with many valleys, so as the climate grew colder plants could migrate southwards and downwards, returning with the warmer interglacial. How different in Scotland; our pre-glacial flora was scraped off and dumped down south together with most of our soil.

For lack of space, we shall have to skate over some of the multitude of herbaceous plants quite rapidly. Trillium has an extensive literature, and we only saw a few late flowers on *T. vaseyi*. Much splitting has been going on in the *T. erectum* group, and some of the segregates are more attractive than *T. erectum* itself. Aroids are fashionable at the moment, especially the Asian species of Arisaema. We thought our own seedlings (from Seed Exchange), pretty ordinary, but saw much better ones in the wild. Clonal selection for dwarf plants with richly marked spathes

could pay dividends. Likewise with the American wild gingers, Asarum species, which are fashionable over there. This time the selection is for leaf-markings. The evergreen species from the Carolinas, sometimes known as Hexastylis have more attractive leaves, and much larger flowers than their cousin, *A. europaeum*. We particularly liked the sombre but subtly-marked flowers of *A. shuttleworthii*, well worth a place as a woodland ground-cover.

We have sometimes referred to plants as MRWs (Mediterranean roadside weeds); a dramatic ARW is the aptly-named 'Fire Pink', *Silene virginica*. We also saw its intense red flowers in a south of England garden on our return. Although a native of xeric woodland, over here it probably should have a poor scree in full-sun to keep it compact.

Unfortunately we didn't see the classic Carolina woodlander *Shortia galacifolia* in the wild. We did see the next best thing; the huge mats in Charlie Moore's vast wild garden, in a reproduction of the natural habitat. They were growing on the sloping banks of a stream, under *Rhododendrum maximum*, with a top-cover of *Tsuga canadensis*. The leaves really were as large as those of Galax. The latter, *G. aphylla*, was quite common and we soon were a little blasé about it. Back in Scotland we give it sun to colour the evergreen leaves for the winter. Over there it flowered in the deepest shade. Incidentally there is now a segregate of *Shortia galacifolia*, namely var *brevistyla*. Seed given to us by Charlie has germinated well. Unlike the Japanese shortias, it needs to be sown fresh.

Equally impressive was the Sarracenia bog in the Shinn Garden. We have one pitcher plant in Fort Augustus: *S. purpurea* raised from seed collected in Nova Scotia. This is fully hardy here; in fact its collector told us that there was ice in the pitchers when she found it. *S. rubra* var *jonesii* has brighter red flowers and the additional advantage of a sweet scent. It is a mountain plant and should be tried by anyone with a suitable bog.

So rich is the herbaceous species that it's quite impossible to mention them all. Two of Poll's favourites were *Medeola virginica*, a trillium relative with tiny but elegant flowers, and the beautifully-marked leaves of an evergreen orchid, Goodyera. Sadly neither have accepted cultivation at Askival. In the case of the Medeola, we have no idea why; it's supposed to be easy. With Goodyera it could be lack of mycorrhizal association. In our last 'column' we described the western Beargrass, *Xerophyllum tenax*. On one dry wooded ridge we saw a very similar eastern species, *X. asphodelioides*. How the two differ botanically we don't know. Two somewhat smaller members of Liliaceae, also with raçemes of white flowers are *Chamaelirium luteum* (the flowers turn yellowish on drying, closet botanists again; live *Phyllodoce caerulea* is not blue either) and *Amianthium muscaetoxicum*. We grow the former in a

rich peaty soil; it's dioecious and the male with its long rats tail of staminate flowers is to be preferred.

We have never seen the 'Fly-poison' in cultivation in Scotland; please write to us if you grow it.

We have saved the largest group of plants we would like to consider until last. Most of the Ericaceous shrubs of the Carolinas are hardly rock garden plants, but they have that certain style which makes the family acceptable in alpine gardens. Also, although most are understory shrubs in the wild, transferred to our cooler climate they grow beautifully in full-sun in well-drained positions. Thus they associate well with the rock garden.

The Rhododendrons of eastern USA are rather overshadowed by the multitude from the Sino-Himalaya. They do have points in their favour however. We saw *R. catawbiense* in full-flower on Roan Mountain a couple of days after a sharp frost had scorched the young growth of many deciduous trees. It's much nicer than *R. ponticum*. There are two Azaleas which can hold their own with the best from Asia. The 'Pinkshell Azalea' *R. vaseyi*, was unfortunately over. Now we shall have to wait for our seedlings from the ARGS Exchange to flower. Meanwhile, we enjoy the superb autumn colour of their unusual willow-like leaves. On the other hand, we saw many colour forms of the 'Flame Azalea', *R. calendulaceum*, ranging from clear yellow to rich orange-red. Eclipsed in gardens by the hybrids derived in part from it, we feel this species has more grace and style than most of the Ghents and Mollis'.

The large Kalmia, *K. latifolia* was also ubiquitous; we saw it in flower everywhere. There was surprisingly little variation; we understand most of the 'red' and 'banded' forms were found further north in its range. These named clones are becoming cheaper and more readily available thanks to micropropagation. Unlike most Rhododendrons they should do better away from the west coast. Another Carolina Kalmia, *K. cuneata* is far less common; we didn't see it wild as it only grows in a small area nearer the coast. However, it flowered in our garden for the first time this year and is so unusual we must include it. One to test your visitors, it doesn't look at all like a Kalmia with wiry branches and thin deciduous leaves. The typical Kalmia flowers are very pale-cream with magenta markings within. It grows naturally in wet places, and definitely did not like a dryish position here this summer.

The Vacciniums were many and very confusing, especially the complex around *V. corymbosum*. We can dodge this latter issue by saying that the commercial clones of the fruit garden are as ornamental as any. We saw three other species which deserve a place in any garden

of Ericaceae. The prettiest in flower by far was *V. stamineum*. When we first saw it, we thought it could be Zenobia, about one metre high with glaucous foliage and rows of hanging white bells. We were not looking carefully enough; the flowers are more open, and the yellow stamens project like a beak. Hence the name. We should have known better, Zenobia has a coastal distribution. *Vaccinium erythrocarpum* also has hanging flowers with exerted stamens, but that is where the similarity ends. The four deep-pink corolla lobes are reflexed like those of *V. oxycoccus*. Unlike the true cranberries, *V. erythrocarpum* is bushy and rather large, up to one metre. A more typical Vaccinium in flower was *V. vacillans* with good pinkish bells nearly one centimetre long. Our plants at home have coloured beautiful red every autumn since we planted them, while remaining less than 0.5m high.

Close to Vaccinium is the neglected genus Gaylussacia, the 'Huckleberries'. Only one species is sometimes found in Scottish gardens, the little evergreen *G. brachycera*. It deserves to be more widely grown; the pale-pink bells over 0.5cm long are well displayed and the pinkish young growth is frost-resistant. Two clones are necessary in order to get the glaucous fruit. Vegetative propagation is easy, however, as the plant suckers. Some patches in the wild are said to be extremely ancient, amongst the oldest living plants. The other species are deciduous and can be distinguished from Vaccinium by the presence of golden resinous glands under the leaves. We saw the small dark-red flowers of *G. baccata* first on Bluff Mountain, then again a few weeks later at home, which gave us quite a thrill. Being much further north, spring is later in Scotland. It's finest feature is the rich dark-crimson of the autumn colour. Our plants, seedlings from the 1978 ARGS Exchange, are about 30cm high and are just starting to sucker gently. Also a small spreading shrub is *G. dumosa*; we saw its larger (1cm) waxy white bells only in the Shinn Garden. In our experience Gaylussacia seed does not germinate very freely; a lot of seed from Connecticut only produced four plants of *G. dumosa* in 1982. On the first of our two days out in the woods with Fred and Roberta Case, we crossed into South Carolina, and found the taller *G. ursina* growing in deepest shade. Unfortunately it was just past flowering. Apart from being the Trillium experts the Cases' wide knowledge and enthusiasm made those two days marvellous ones to treasure.

During the second day out, this time along the Blue Ridge Parkway, we found a dark-flowered form of *Menziesia pilosa*. We grow both this and the western equivalent *M. ferruginea*, which are very similar. Neither is really an essential garden plant; the Japanese species are much superior in flower. With us *M. ciliicalyx* has to

produce at least two sets of leaves per year, being cut back by frost, and flowering is spasmodic.

Pieris floribunda is another American species theoretically inferior to the Asian member of its genus. This theory does not apply in our cold frosty garden. *Pieris formosa*, *P. japonica* and their hybrids may have red young growth, but it's cut every year and consequently they do not set flowers. *Pieris floribunda* does so each autumn, holding the short erect racemes of buds prominently displayed all winter, opening without fail each spring. They are completely impervious to icy winds at all stages.

We turn finally to the three 'L's: Leiophyllum, Leucothoe and Lyonia. The finest mountain, per se, we visited was the narrow ridge of Chimney Rocks. Here where the broken outcrops along the crest form a superb natural, oriental style, rock garden, *Leiophyllum buxifolium* was flowering in full sun. The soil was sandy and the drainage acute. It rather destroys one's illusions about the needs of Ericaceae. That being said, we find it stays compact in a well-drained peaty soil at Askival. The flower structure is in many ways that of the Diapensaceae. If we can keep and flower our plants of *Diplarche multiflora* from Nepal, it will be interesting to compare them. Also on Chimney Rocks, but growing in more shade, was the deciduous *Leucothoe recurva*, not in flower. We planted-out three seedlings of this in 1983. One died the next winter, one is 'miffy' and the third growing well. This variation is a good argument for raising seedlings. The long one-sided racemes of white flowers have yet to appear, but the autumn colour is again excellent.

There is some confusion over the naming of the evergreen Leuchothoe which we saw more often, and which is also much more common in gardens. The "Flora of the Carolinas", lists it as *L. axillaris* var *editorum*, but the names *L. catesbaei* and *L. fontanesiana* are also used elsewhere. With us it hides its flowers under the branches; for the small garden grow *L. keiskei* from Japan instead. There is, however, a variegated clone of the American species for those who like such things.

Only one of the three Lyonias we came across is native to western North Carolina. The other two we saw only in gardens, as they are found further east in the more coastal areas. One of the latter two, *L. mariana* is by far the finest species for the garden. Unless one is a collector the other two *L. ligustrina* and *L. lucida* can be ignored. *L. mariana* in full-flower is very pretty, the short dense racemes being well out on the ends of the branches. The tubular corollas are white, or very pale-blush, and about 12.5mm long. It almost goes without saying that the autumn colour is excellent; even our young seedlings turned a good red in their pots.

We have done no more than scratch the surface of the immensely-rich flora of the Southern Appalachians. Many writers have drawn parallels between the flora of Japan and that of eastern USA. From the garden point of view, sometimes the Japanese species is to be preferred, sometimes the American. Take Trillium as an example of the latter case. Often the American plant has hardiness in its favour.

Some of the plants we already knew from our own garden; others we should hope to add to it sometime. That they are accessible to us all is thanks to the dedication of American rock gardeners who collect seed and send it to the various exchanges. The continent has much more to offer us than its Eastern woodlanders. From the "Jewels of the Plains", running up to the alpines of the Rockies, from the bulbs of California to the Arctic plants of Alaska, the range is vast. These are other stories, and one lifetime is not long enough to write them all.

Editor's postscript

Re-printed from the 50th Anniversary Issue of the American Rock Garden Society . . .

"Michael Stone, who with his wife Polly has established a consummate alpine garden in Fort Augustus in the Scottish mountains, had the difficult task of following Frank's tour de force, but he did so nobly. His slides were exquisite and the plants he showed, many seldom grown or even seen by American rock gardeners, were stunning. This along with the excellent and detailed advice about how they are grown in a one and a half-acre garden made for a memorable lecture and was a fitting climax to the evening."

Kingdon-Ward's flowering plants

ROBERT MITCHELL

"IN FARTHEST BURMA", "The Mystery Rivers of Tibet", "Plant Hunting on the Edge of the World", "The Riddle of the Tsangpo Gorges" and "Plant Hunter in Manipur" are just five of the twenty-five books sought after and avidly read by plantsmen and explorers alike, seeking to know more about the fascinating areas in which Frank Kingdon-Ward travelled from 1909 till his death in 1958. But perhaps it was his first book, "The Land of the Blue Poppy" (1913) which really set the scene for him and fired the enthusiasm of his public for more adventure and more information of areas virtually unknown to British readers at that time. The book tells of the area in which he found the Blue Poppy (*Meconopsis betonicifolia*) and successfully introduced it to British gardens. This plant, perhaps above all others, is his best known introduction. However, to orchid growers, it could be Calanthe, Cypripedium, Orchis or Paphiopedilum, all of which commemorate the man. Among the Rhododendron enthusiasts, is there a better yellow than in *Rhododendron wardii*? To the lily grower, *Lilium mackliniae* from Manipur is special, for it is the botanical link between Lilium and Nomocharis and a lovely plant as well. No fewer than forty-two species have been named in his honour as well as the genera Kingdon-Wardia (an annual member of the Gentianaceae) and Wardaster (*Compositae*).

Kingdon-Ward was very much a loner, preferring to live off the land and to travel light. He preferred to collect his specimens and seeds himself. He could select the best forms while in flower and return to his marked plants for the seed harvest. In this way, he was able to introduce many fine plants.

This year marks the 100th anniversary of the birth of Francis (Frank) Kingdon-Ward. He was born in Manchester, where his father was a Lecturer in Botany (later he became Professor of Botany at Cambridge University). Following a tripos in the natural sciences at Cambridge, Kingdon-Ward took up an appointment as a teacher in Shanghai in 1907 and in 1909 he undertook a journey to Sechuan (Tatsienlu) and Kansu, during which he made a small botanical collection. His enthusiasm for exploration and collecting was fired on this trip and in 1911 he was employed by A. K. Bulley to collect in western China. And so, Bulley,

who had financed George Forrest in 1904, now had a second collector in this plant hunter's paradise. From then on, he devoted his life to exploring unknown areas, mapping and recording and collecting plants.

Kingdon-Ward was a prolific writer and accounts of his travels and the geology and botany of the areas he visited are to be found in a great variety of journals. Over 700 have been listed by Schweinforth (1975), and his 25 books relate to his travels in Burma, Yunnan, south-east Tibet, Manipur, Assam, and Ceylon and give detailed accounts and formulate his ideas on the geological structure of the areas he visited.

While his main enthusiasm was geographical and he had definite ideas about the topographical affinities of the Sino-Himalayan ranges, to gardeners his plant collections produced many fine plants from the 22,000 or so numbers he amassed over the years.

His two favourite introductions were *Chionocharis* (*Myosotis*) *hookeri* which he found first in 1921 in Yunnan and again, frequently, in Tibet. It could be called the Sino-Himalayan equivalent of *Eritrichium nanum*. Of it he writes, "The foliage is certainly charming; tiny imbricated leaves bearded with long silken hairs, and the hassock shape not unbecoming to the barren scene". Of its flower colour he states – "*Eritichium nanum* is, I think, almost as rich a blue". "I have seen many plants upwards of a quarter of a century old". "(It) is one of the most lovely plants".

Hooker describes it as "like a small tufted alpine Cerastium, but with light blue flowers". He found it in Sikkim growing between 15-17,000 feet.

I do not believe it to be in cultivation but, with the interest in the high Himalayan plants of many of our members and of the recent plant collecting expeditions to this area, it may well be germinating in some secretive corner of the enthusiast's frame. Certainly, it would be worthwhile reintroducing this favourite of Kingdon-Ward.

Campanula calcicola from the dry, limestone cliffs of Tibet and Yunnan, is "unhesitatingly – the best rock plant I ever found. It was a pigmy Campanula with all the charm of the most refined of its genus from the Maritime Alps and the most beautiful leaves of any rock plant I have ever seen – miniature kidney or spoon-shaped to rounded leaves, with light jade-green veins inlaid on a dark serpentine green base. The half-nodding, fairy bell flowers, glossy violet and smooth as the inside of a deep sea-shell, rise but an inch above the leaves". It is not surprising it received an Award of Merit in 1925, four years after its introduction. Since then, it has proved fickle and again may be lost to cultivation.

But there are others which have survived and bedeck our gardens with their beauty. He was particularly fond of his *Meconopsis betonicifolia* for its marvellous colour, its perennial habit and its ability to set copious seed, but he had a soft spot for *Meconopsis violacea* too, with its "large flowers of a sumptuous violet, having the soft, watery sheen of Japanese silk". "They are rather stiffly borne in a tall tapering spire, shooting up from the glistening, golden-haired cut leaves". He considered this one of his best introductions, but, because of its monocarpic nature, thought it "not everyone's plant". I doubt if this plant is now in cultivation. However, *Primula florindae* certainly is and, from the garden point of view, "took the top honours". He describes the quickening of his heart-beat when seeing this plant en masse for the first time, with their "tall wand-like stems breaking into fountains of flowers". *Primula alpicola*, too, he also enjoyed finding and seeing them growing in a variety of colours – violet, ruby-cheeked and white together with the yellow form – when with "the wind whipping over the pass, ruffled them, and the bells swayed to and fro".

He particularly loved his Carmine Cherry *Prunus cerasoides*, which he describes as "the most splendid tree I ever saw in the wild". He hoped it would take its place in the gardens and landscape of Britain and vie with the horse chestnut. Alas "the undescribable blaze of its lip red flowers" has not come to pass in Britain for it is not as free flowering as in its native haunts, and paler forms were raised from its seed. However, the form *P. cerasoides rubea* in cultivation has rose pink flowers and may come closer to the colour of this favourite tree. Of the tree-like rhododendrons, he particularly mentions *R. macabeanum* and the rose-flowered form of *R. fictolacteum* as being particular favourites. Among the dwarfs, he directs considerable praise to *Rhododendron leucaspis* with its white "little foam bubbles of flowers swaying over the leaves (which) are every whit as beautiful"; *Rhododendron cephalanthum* var *crebreflorum* – "charming, fairy-like, with dainty shell-pink flowers"; *Rhododendron pemakoense* "blooms lavishly, its purplish-pink flowers, although not striking in colour, are easy on the eye. The rock garden would be the poorer without it"; or of *Rhododendron beanianum* on which he writes – "I am not sure I would not say that *R. beanianum* is the finest Rhododendron, or at least alpine Rhododendron". Its charm influenced others for a plant grown from Kingdon-Ward's seed (No 6805) received an Award of Merit in 1953.

Cotoneaster conspicuus and *Cotoneaster wardii* are two fine plants which are a joy in the garden; and among the barberries he eulogises *Berberis calliantha* with statements like "something more than 'just another barberry'" or "this plant – for all-the-year round display – will hold its

own with any barberry ever introduced". He describes it well and succinctly as "a large bush, its canary-yellow flowers contrasting pleasantly with the small prickly, sea-green leaves, white as foam beneath".

I am sure each one of us has our own Kingdon-Ward favourites and there are certainly plenty of plants to choose from. Could it be *Cassiope wardii* or the host of Rhododendrons which he introduced? Many are recognised as the best garden plants of the species. Perhaps it is the very desirable *Lilium mackliniae*, named in honour of his wife.

Kingdon-Ward's name will forever be linked with plant collecting in the Sino-Himalayan regions, his books will be read and re-read and our thoughts and aspirations will go to the remote areas of that marvellous part of the world which is only now opening up again to foreign travellers. Perhaps we will in time be able to reintroduce many plants first found by Kingdon-Ward, but the mystery and adventure of his travels will forever delight the reader.

Fig 119 *Fritillaria bithynica* (see page 244) Photo: Lynn A. Almond

Fig 120 *Crocus biflorus* (see page 247) Photo: Michael J. B. Almond

Fig 121 *Sternbergia candida* (see page 252) Photo: Michael J. B. Almond

Fig 122 South-west from above Balbura (see page 247) Photo: Michael J. B. Almond

Fig 123 *Physoplexis (Phyteuma) comosum* (see page 273)

Fig 124 *Milligania densiflora* (see page 232) Photo: D. Wilkie

New pastures Down Under

BRENDA and JOHN ANDERSON

AUSTRALIA is a very long haul from Scotland, even with fast modern transport. However, last January our perpetually winter-itchy feet led us off to Victoria, in the bottom south-east corner of Australia, and over to Tasmania. We chose these areas mainly because they are in the temperate zone and both contained a number of SRGC and AGS members, but also because maps showed roads going up into the mountains – a most important factor as one grows older! Joyce Halley of the Seed Exchange wrote to some of her "seedy" contacts, and we asked the AGS for the names of their local Secretaries. Everyone responded and we are extremely grateful for the help and friendliness shown to us throughout our visit.

Bill and Grace Maxwell took us under their wing for the Melbourne part of our stay and not only organised excellent motel accommodation for us, but came all the way out to the airport to meet us, convoy us through Melbourne and out the other side to the Dandenongs where they live and have created a truly lovely garden. This is an area of rolling, wooded hills and valleys to the east of Melbourne city, with scattered little communities with evocative names like Lilydale, Fern-tree Gully, Sassafras and Emerald. Out here, it is always degrees cooler than down in Melbourne, and, to our surprise, we found ourselves driving along cool, green gullies, with the sunlight just glinting through, to light up frothy bushes of the lovely white *Prostanthera lasianthos*, and the massive heads of Tree Ferns. Tucked away in these gullies were houses with beautiful gardens, many with a stream running through, or near them.

We had been warned that, while January would be a good month for wild flowers in the mountains, we would be too late to see much in the way of flower in gardens. Spring comes early here, and January is midsummer. The Maxwells had arranged for a couple of expert garden guides (Philip Gordon and his sister Barbara) to take us around some private gardens and show us the wide range of plants that can be grown. There is an average of 125cm of rain here and, though there are quite severe frosts and sometimes snow, the frost never gets a chance to go deep into the ground, as it does here. Owing to the relatively humid atmosphere created by streams and forest, rhododendrons in great

variety grow excellently, as do azaleas, camellias and magnolias, in fact most of the plants that we associate with the milder parts of Britain. They can even grow meconopses and primulas, though in a very hot spell these do suffer. In their rock gardens, you will find many of the European, Japanese, and north American alpines that you would expect to find in a well furnished rock garden here, plus some of their own natives. The National Rhododendron and Rock Garden in The Dandenongs must be a sight well worth seeing in the spring. Good gardeners and naturalists make a wombat gate (similar to our Forestry Commission badger gates) in their boundary fence. The wombat, who is about the size and shape of a snub-nosed badger, and a confirmed vegetarian, will dig his way in anyway, if you are on one of his nocturnal paths!

The Maxwells had also organised a couple of evening meetings of club members at the National Rhododendron Garden Lecture Hall, where we were able to get to know people and we showed some of our slides. They had also arranged for us to spend a couple of days in a cabin in the mountains with a friend – David Glenn – who has a plant nursery and an intimate knowledge of the alpine plants of the area. He gave us our first introduction to the native plants of the mountains, and showed us where to look, and what to look for – a very time saving exercise in any new terrain!

The mountains to the north and east of Melbourne are the southern end of the Great Dividing Range, which runs right up the eastern side of Australia. At this southern extremity, one drives through mile upon mile of eucalypt forest. The lower slopes and valleys have been cleared and are rich farm land, but there must be many hundreds of square miles of eucalypt forest, the species varying with altitude and soil. Eventually the forest thins and the top 300m or so of mountain breaks through, not in dramatic, jagged peaks, but as great rounded domes of huge rounded rocks, interspersed with grass, heathland and sphagnum bogs. One side may, however, come to an abrupt halt, with a drop of several hundred feet into the forest below! In this area, Mts Baw Baw, Buller and Buffalo, which we visited, are all around the 1,500m bracket, within easy reach of Melbourne, and popular ski areas in the winter, but blissfully underpopulated in the summer!

David Glenn took us, by forestry tracks which no ordinary car would have negotiated, to an area near Mt Buller known as The Bluffs. As the forest began to thin out, so glades of flowers would suddenly appear. Large clumps of 60cm high *Veronica derwentiana* (white and pale mauve), white olearias and sheets of bright pink *Stylidium graminifolium*, which somewhat resembles a foot-high orchis, but with a

distinctive, prominent style. Hiding under bushes were colonies of the Common Bird Orchid, *Chiloglottis gunnii*, which has quite large, almost stemless, flowers of a curious reddish-brown, with a yellow splodge to represent the young bird's beak. Along path edges, there were lots and lots of *Viola hederacea*, which we met in similar conditions on most mountains. A little shrublet that appealed to us particularly was *Tetratheca ciliata* – a delicate looking little thing, only about 22cm high, with sprays of bright pink, starry flowers. On the open tops, the mountain mint bush, *Prostanthera cuneata*, was just beginning to show its lilac flowers. It grows in a member's garden in Invergowrie, so why shouldn't some of the other mountain Australians? The alpine form of *Baeckia ramosissima* hugged the contours of rocks – pink in the bud, with white, prunus-like flowers. There were quite large clumps of bright golden Helipterum with narrow, silvery leaves – *H. albicans* ssp *albicans* (Fig 132). Equally silver were the leaves of the white *H. albicans alpinum*, and a charming natural cross between the two, which was lemon yellow. There was also a much smaller white variety, *H. anthemoides*. All these are perennial and well worth trying if you get the chance of some seed. *H. albicans* ssp *albicans* germinated for us very quickly, from seed sent in March, flowered in August, and has made substantial clumps. Time alone will show whether it will stand our very variable winter temperatures.

A lovely orchis, which David found for us, was not yet out, but we found it in quantity later on, on Mt Baw Baw, growing in bog conditions. This was *Thelymitra venosa* – about 25cm high, with spikes of several upward-facing, large blue flowers with dark veining. They are most attractive, but live up to their common name of Sun Orchid, since they only open in warm, sunny weather. As it was cloudy and cool for most of our time in the mountains, we had great difficulty in getting a photograph and had to resort to picking a head and bringing it into the warmth of the car.

The Maxwells were going on a seed collecting trip to Mt Kosciusko and a rendezvous had been arranged, so that we could make the long, cross-country journey in convoy. It was quite different, open country, with a scattering of large acacias and gum trees, left as shade for animals. We were intrigued to see warning picture signs, not of cattle or deer crossing, as in this country, but kangaroos and wombats. We saw neither, but an idiotic emu decided to cross the road, changed its mind, got tangled up in its own legs, rolled down an embankment, and ran off in a flurry of offence and feathers!

Mt Kosciusko, just over the border in New South Wales, is Australia's highest mountain at 2,200m, and I am afraid we found it

most unimpressive! It doesn't rear up at you, it just ambles on! January is the height of the holiday season, but this was the only place in all our travels where we encountered swarms of people – and flies! We had spent the night at Charlottes Pass, just before the road ends, and you get out and walk. From early morning, the crowds started to arrive, and by 10 o'clock the road was lined on both sides, for at least a mile back, with cars, mini buses and buses, out of which poured marsupial mums with babies in hanging front pouches, dads with young perched on their shoulders and already fed-up teenagers trailing on behind, and earnest types with rucksacks, maps and sticks, all with their own halo of flies, and all apparently determined to climb the highest mountain! Paths are clearly defined, and, for obvious ecological reasons, one is not supposed to leave the track. At that time of year, it appeared to be the mecca of bush-walkers, not botanists. We decided that it was definitely not our kind of mountain, and even the discovery of a lovely plant of the dwarf *Pimelea alpina*, which looks superficially like *Daphne cneorum* and smells just as sweet, and a sheet of the creamy-yellow, starry, scented flowers of *Stackhousia pulvinaris*, did not deter us from beating a hurried retreat.

We had learnt from the Maxwells that the two famous Kosciusko endemics – *Ranunculus anemoneus* and *R. muelleri* var *brevicaulis* – flower early, with the melting of the snow, so there was nothing to hold us, and we retraced our steps into Victoria, to an area known as the Bogong High Plains, where we had been told we would find much the same flora as on Kosciusko. This was much more our kind of country! Tracks wound right up onto a moorland plateau at around 1,500m, rising to 1,800m. Twisted old Snow Gums (*Eucalyptus niphophylla*) clung on to sheltered slopes, beneath which might be little lochans (or tarns as they are called), and in boggy areas were great, hard cushions of *Abrotonella nivigena* (the Australian equivalent of the New Zealand raoulia), sheets of the stemless, starry, white flowers of *Neopaxia australasica* (formerly *Montia*), sometimes interspersed with a scattering of the little pinky *Viola betonicifolia*. We were too early for the main flush of celmisias and craspedias, but found one little stream festooned with the silver leaves and large white daisies of *Celmisia sericophylla*. And, what's more, we had the whole place entirely to ourselves – not even any flies! On slightly lower slopes, there were scatterings of that little blue daisy, *Brachycome rigidula* and the white *B. nivalis*, both of which seem very happy in Scottish gardens, and a slightly larger one which was probably *B. tenuiscapa*. Lower still, in open woodland glades, were large stands of the now familiar *Stylidium graminifolium*, and also smallish bushes of the very woolly-leafed *Olearia frostii*, with pale blue flowers. A three-year

seedling of this flowered magnificently in our garden this summer – and then promptly died! Having now seen it growing in the wild, I am sure we had put it in too dry a situation, and that it died of drought – almost unthinkable for an Australian in Scotland!

We were surprised to see the wet growing conditions of most of these Australian alpines, even in mid-summer. Certainly if you get the chance to try *Ranunculus anemoneus* or *R. muelleri* var *brevicaulis* from seed, we would suggest that you make sure to keep them really moist. Seedlings of the latter (unfortunately *R. anemoneus* failed to germinate), planted in our bog, are twice the size of those planted in the peaty, damper end of the rock garden. Of course, whether they will stand being wet all winter remains to be seen – in nature they would be under a nice, dry snow blanket.

Our last mountain, on the way back to Melbourne, and then Tasmania, was Mt Buffalo, which was engulfed in cold, damp, swirling cloud, but finding the beautiful Fringe Lily (*Thysanotus tuberosus*) quite dispelled our gloom. It is about 30cm high, with wiry branched stems, and large pinky-purple flowers, having three broad, flat, fringed petals, with a dark stripe, and three narrow, unfringed segments. Each flower only lasts a day, but there are many on each stalk. Having said "keep 'em wet", this one grows on the dry edges of woodland. For days we had been trying to get a photograph of the flocks of red Rosella parrots; here, they came down the moment one entered the car parking area, to ask for food, and even insisted upon investigating my hair! We also got quite a good view of a lyre-bird scuttling down a path.

We flew to Hobart, the capital of Tasmania, which has a beautiful situation on the shores of the long Derwent estuary, and is backed by 1,050m Mt Wellington, and its smaller neighbour, Mt Nelson. The slopes of both these mountains are graced by houses with stupendous views, many with beautiful gardens. We had written to the AGS Secretary, Mrs Wilcox, and to Ken and Lesley Gillanders, who have a plant nursery some miles out of Hobart, along the Huon valley, and both were very helpful in telling us where to go, and what to look for when we got there. Mrs Wilcox held a most enjoyable evening party for us to meet people, and show slides. We gained many useful tips, and people were so kind in lending us maps and books.

Cool, changeable weather was still with us! A trip up Mt Wellington started off in thick mist, but, suddenly, half way up we were in sunshine. We saw our first wild Banksia (*B. marginata*) in bud, with thick, orange "candles" and last year's seed heads very much in evidence. A little farther on *Telopea truncata* was in flower. This was

particularly interesting to us, because we have grown and flowered this shrub, or small tree, for a number of years. It is a member of the Proteaceae, and the Australian relation of the Chilean Embothrium. Both species were badly hit by the dreadful winter of 1981; two out of four embothriums were killed, and the Telopea badly damaged, but it has come away and looks as if it will flower in 1985. Our's has larger flower heads and larger, slightly different shaped leaves to those we saw in the wild, but possibly this is due to richer growing conditions or it might be a hybrid with *T. speciosa* from New South Wales. One of the large epacris family – *Cyathodes juniperina* – was making a fine show, simply laden with large, bright pink berries, and nearby another epacris – *Leucopogon montana* – had both white flowers and red berries.

Right up on the summit, there is quite a large area of bog, liberally dotted with the iron hard, emerald green cushions of *Donatia novae-zelandiae* decorated with clusters of snowy white, stemless flowers, and the equally hard, and almost identical, hummocks of *Abrotonella fosterioides*, which has insignificant yellowish flowers. These hummocks are a feature of high, wet moorland throughout Tasmania.

On the only brilliantly fine day of our visit, Mrs Wilcox and some friends took us out to the Hartz Mts in the southern part of the Island. The Hartz rise to a bit over 1,200m, and, unlike the mountains of Victoria where the forest is all eucalyptus, in Tasmania there are four species of indigenous pine, and at least two species of Nothofagus – the southern hemisphere beech. This makes for a much more open forest. The mountains are much sharper, and craggy, like our Scottish mountains.

Approaching the Hartz from the fruit growing area of the Huon valley, one rises through mixed forest, until the track becomes too rough to continue. Along the road there were lots of bushes of *Bauera rubioides*, with attractive, nodding pink or white flowers, but it appears to be a bit straggly for cultivation. There were also bushes of *Pimelea nivea* and *P. ligustrina*, both with sweet-scented, round heads of white flowers, reminiscent of *Daphne blagayana*. We had a picnic beside a large and beautiful clump of *Milligania densiflora* (Fig 124), a member of the Liliaceae and a Tasmanian endemic. It has iris-like leaves, and densely packed branched spikes of small, creamy-white flowers, up to 90cm high.

A short walk through fairly open forest, in which the dwarf *Eucryphia milliganii* was pointed out, and we were on open bog and heathland. "Heathland" in Australia is usually composed of various members of the epacris family, which almost (but never quite) replaces Ericaceae. It was so boggy that in places paths had been laid, consisting of the trunks of tree ferns! The two main plants in flower were both

shrubs of 45 to 60cm high, *Richea scoparia* and *Bellendena montana*, the latter being related to Telopea, of which we had seen bushes in the forest, on our way up. Both like wet situations, and both should be hardy here; *Richea scoparia* grows at Glendoick and in the Edinburgh Botanic Garden. The Richea has spike-tipped, triangular, leathery leaves all the way up the stem, ending in a 7-15cm spike of white, sometimes pink, flowers like inflated grains of rice! The Bellendena has smallish, notched leaves, and many 4cm heads of tiny, tight-packed, cream flowers, with very prominent red anthers, giving an overall effect of pink. For ground cover, there were mats of tiny silver leaves of *Ewartia catipes*, and a scattering of *Gentianella diemensis* just opening their white buds. The young growth on dwarf eucalyptus gave bright red patches, and, standing out on a hillside above a lovely, blue "tarn" was what appeared to be an incongruous group of small palm trees! Bare 3m trunks sprouted giant "pineapple leaf" tops – this was another Tasmanian endemic, *Richea pandanifolia*.

From Hobart, we moved on towards the Central Plateau, up the Derwent River valley. It is a really beautiful drive, full of interest. Open forest glades were frothing with the white of *Leptospermum scoparium* and *L. lanigerum*, and different species of shrubby Helichrysum and Olearia. An interesting shrub was *Lomatia polymorpha* – a member of the Proteaceae – which has quite large, Grevillea-like, white flowers, marked with light green, and a very prominent style, which is folded over the outside of unopened buds. There were large colonies of the white, iris-like *Diplarrhena latifolia*, and golden patches of creeping *Goodenia hederacea* and *Hibbertia procumbens*. We were fortunate enough to find a ditch full of enchanting little "Fairies Aprons" – *Utricularia dichotoma*. Bright lilac-purple "aprons" with a tiny white bib dance on wiry, threadlike stems about 15 or 18cm high, over a fine web of roots with tiny little bladders, which ingest minute insect life from the mud; in other words, this will always remain a truly wild plant.

The Central Plateau is bordered on one side by the Great Lake, on the other by 1,500m Cradle Mountain and the Lake St Clair National Park, rising at the farther end to a range of craggy peaks at around the 1,200m mark, which form The Great Western Tiers, which drop down to the valleys and fertile plains below in a series of dramatic cliffs. It is a wild and beautiful area of moor, lakes and bogs, teaming in wildlife and full of botanical interest. Unfortunately, the whole time we were there the weather was cold, wet and blustery. Nevertheless, we were able to find, and photograph, several interesting flowers. A whole hillside was pink with the starry flowers of an enchanting little shrub with very aromatic leaves – *Boronia citriodora*. A very wet area filled with the

inch-wide, upfacing trumpets of the Sky Lily, *Herpolirion novae-zelandiae*; quite a lot of *Gentianella diemensis*; *Drosera arcturi*, which has quite substantial white flowers, and upstanding, lanceolate, sticky, red-haired leaves. Little *Pentachondra pumila* grew at the base of some rocks, with both bright red berries and white flowers, some flowers still perched on the top of fully formed and coloured fruits. Also present were *Scavolea hookeri*, a ground-hugger with small, fan-shaped, half-flowers, and various euphrasias, all much larger than our natives.

We made two sorties to the "wet west", which really is wet – over 5m of rain in places. On both occasions, it poured from the moment we started to descend towards the coast. This was a pity, since the road swoops down, in a series of loops and bends, through mixed, almost subtropical looking forest in which one saw towering white columns of *Eucryphia lucida*, stretching up towards the light. We had seen its south American counterpart, *E. cordifolia*, in the rain forests of Chile, but there it was not so cramped, and made a spreading tree. Hanging over roadside embankments were many large bushes of one of the very few Australian members of the Ericaceae, *Gaultheria hispida*, just dripping with large, white berries.

We made these sorties to the west mainly for the purpose of finding one of the showiest of Tasmanian plants, *Blandfordia punicea*, the exact situation of which had been meticulously described to us by Ken Gillanders. On our second trip, the rain let off long enough to do a bit of exploration and, sure enough, there it was, just waiting to be photographed! A member of the lily family, Blanfordia carries large heads of dangling 30cm long, tubular flowers of a bright orange/red tipped with yellow, on stout 45cm stems. It should grow in the West of Scotland, and possibly against a sheltered wall in the east.

Our last port of call was back on the mainland, for a few days with Dr Heather Dick in Ballarat. This is an old gold mining town, some 100 miles to the west of Melbourne, and with a much hotter, drier climate. The gardens were interesting, in that they went in for far more native plants, shrubs and trees, but unfortunately most of these would not survive our wet, cold winters. Heather had organised a gorgeous day trip for us, out to the Grampian Mts, under the expert guidance of Geoff and Jean Arnott. As they told us, spring comes very early out there, but their intimate knowledge of the mountains enabled them to show us a few flowers. One was the Australian fuschia – *Correa reflexa* – which has tubular red flowers with reflexed, green tips. Another was a handsome orchis with a 22-30cm stem, carrying a head of large pink flowers – *Dipodium punctatum* – and *Dichopogon strictus*, a member of the lily family, with tallish, branched stems carrying many small, scented,

mauve flowers. They found just one little bit of the rare, brilliant blue *Lobelia gibbosa*, and a spray of the most common heath, *Epacris impressa*; this one was pink, and we had found a spray of the same heath in Tasmania, but it was red. At the right time of year, their moors are ablaze with this epacris.

The view from one of the fire prevention look-outs was stupendous, taking in most of the mountain range, and also many miles of the plain stretching away towards Melbourne. This is largely sheep country, very dry in midsummer, and much more akin to our pre-set mental picture of what Australia would look like! To us, the highlight of this trip was not only hearing koalas calling in the forest, and catching glimpses of them high up in the trees, but having one found for us, taking his afternoon siesta quite low down, in the comfortable crotch of a gum tree. A smart tap on the trunk, and he roused himself to give us a disdainful look, and a beautiful photograph!

We had a wonderful and, botanically, most profitable holiday thanks to the help and encouragement of all our new-found Australian friends. From the comparatively small area we visited, we felt we had seen a lot of new plants, some of which should be amenable to cultivation in our Scottish gardens. However, if you want to be dazzled by sheer brilliance of colour, visit the Nullabor Plains area of Western Australia about September, October, November. The Maxwells go over there plant hunting, and showed us slides of a quite breathtaking selection of the smaller plants of that region. In spite of the fact that they come from a very dry, hot area, Bill Maxwell has managed to establish some in The Dandenongs, and he is convinced that we should be able to grow these as alpine-house plants. Here's hoping we may one day see some of these beauties on the Show Bench!

On 21 April 1985, Lt. Col. John D. C. ANDERSON, aged 80, died after a short illness. Twenty-two years ago John and his wife Brenda moved to a wooded valley at Wester Balruddery, near Dundee, where they created a much admired garden and became one of the bulwarks of the SRGC. John had recently returned from another successful plant hunting and photographing expedition to Chile. He was a gardener who recognised hardy plants worthy of introduction and as a keen propagator also recognised good viable seed. He brought into cultivation many plants from remote parts of the world, but his main enthusiasm was for the legendary species from the Andes.

He is very sadly missed by us all. H.T.

Robert Fortune 1813–1880

A. C. SMALL

A NOTABLE EARLY SCOTTISH PLANT COLLECTOR in the Far East was Robert Fortune who was born at Kelloe in the parish of Edrom in Berwickshire on 10 April 1813 and was educated at the local parish school.

His first employment was as an apprentice gardener at a local garden. Later he worked for more than two years between 1840 and 1842 at the Edinburgh Botanic Garden. This was followed by a post as Superintendent of Indoor Plants at the Horticultural Society of London's garden at Chiswick although he remained there for only a few months.

In 1840 Britain started hostilities against China following her refusal to redress injuries suffered by a British citizen in China. In 1842 a treaty was concluded granting access to five large ports, Canton (Quangzhoo), Amoy (Quemoy), Foo-Chow-Foo (Fuzhoo), Ming Po (Mingbo) and Shanghae (Shanghai), modern spelling in brackets, while Hong Kong was leased to Britain. The time was now opportune for collectors to visit China to search for plants.

So in 1842 Fortune was sent by his employers to collect hardy plants suitable for growing in gardens in the UK. In this he was surprisingly successful considering the difference in latitude between Hong Kong (24°N), Shanghai (31°N) and London (57°N) though, in fact, he did not confine himself to hardy plants as the list of his introductions shows.

His salary was £100 per annum plus £500 for expenses, but all records and specimens were to be the property of the Society. He disregarded advice not to take firearms and took fowling pieces and a pistol, besides a Chinese vocabulary and some Wardian cases. Since the area of his searches was to be confined to Hong Kong and the immediate precincts of the five ports he was greatly restricted with the result that he had to be content largely with what plants he could obtain from gardens and nurseries. Even then he found the owners to be very reluctant to sell to this foreigner. His nature, though, was such that he made various excursions beyond the official limits, even, on two occasions, having his head shaved, an agonising experience, growing a moustache and a pigtail and dressing as a Chinaman. Regarding his accent he explained that he came from a remote part of the country. Thus arrayed he paid a visit to Foo-Chow which was barred to

foreigners and succeeded in carrying off this risky adventure in the belief that there were many good nurseries there, but in this he was disappointed. He did, however, acquire a Gardenia and a new double yellow climbing rose.

My dictionary defines "intrepid" as "not to be frightened, brave, dauntless, fearless"; this would seem to fit the character of Robert Fortune. He had a number of exciting experiences, the best known being when he was the only European aboard a Chinese junk that was attacked by pirates. Several vessels approached for the attack and Fortune had to threaten the two steersmen to maintain their place at the helm while the rest of the terror-stricken crew took cover below. He waited until the first pirate came within range and had turned broadside for the attack then fired to such effect that the pirates turned away. A second pirate then approached but after receiving a similar salvo retreated followed by all the others. On another occasion he entered a cemetery to examine, more closely, some flowers he had noticed. Some robbers followed him and closed the gate behind them before making their attack which resulted in the loss of most of his belongings including his outer clothing. Luckily he was not carrying much money or his watch at the time.

Regarding the flora, he wrote that at Hong Kong all the most ornamental plants are found in the mountains between 1,000 and 2,000 feet above sea level, eg *Enkianthus reticulata*, adding that the mountains were covered with the bamboo *Arundinaria sinensis* and the orchid *Spathoglottis fortunei*.

It was the winter of 1843 when he visited the island of Chusan, still under British control, where he recorded *Glycine sinensis*, a climbing legume and several azaleas but no heathers, while at Amoy he noted *Campanula grandiflora* and *Abelia rupestris*. At Ming Po he described the gardens of mandarins he visited containing dwarf trees (bonzai) Junipers and artificial rock work on which he commented that it was a perfect resemblance to nature. Here he obtained many cuttings. The native flora of the mainland he found to be similar to that of the island but more extensive.

His next stop was at Shanghae, his most northerly station, which he describes as sited on a very fertile plain, well cultivated with the consequence that wild plants were few, but these included *Cryptomeria japonica* and he managed to buy the tree peony, *Paeonia moutan*.

In the spring of 1844 he returned to Chusan where he collected *Anemone japonica (A. hupehensis)* which was frequently grown in cemeteries.

Next, back at Hong Kong, he busied himself preparing and packing plants in the Wardian case for despatch to London. He prudently

divided the plants into three or four separate loads to be sent on different ships to ensure, as far as possible, that some should arrive safely. The Wardian cases were protected by iron bars and were to be placed on the poop of each ship. Arrangements were made for the cases to be opened periodically for inspection and plants given attention. Of 350 plants despatched only 35 were lost.

1845 saw him at Ning Po where he bought Paeonia, Azalea, Viburnum, Daphne and Rosa species.

About this time he visited also the Tartar city of Chapoo and also Foo-Chow where he acquired *Cunninghamia lanceolata, Pinus sinensis,* Hydrangea species and a number of greenhouse plants before returning home via Manila.

The following year he was appointed Curator of Chelsea Botanic Garden and made several contributions to the RHS Journal. In 1847 he published "Three Years Wandering in the Northern Provinces of China", but did not stay long at Chelsea, resigning to take up an invitation from the East India Co to collect the tea plant in China with a view to establishing plantations in India. First he went to Hong Kong where he purchased *Pinus sinensis* and some more greenhouse subjects. Near Amoy he visited the islands of Koo-Lung-Soo and Poo-To-San; at the latter he acquired *Camellia japonica.*

He described the manuring of the fields by the use of mud from canals, ponds and ditches, night-soil and urine diluted with water. Interestingly it is now suggested that silt dredged from the Clyde be spread over the site of the 1988 Garden Festival at Glasgow. According to a retired Church of Scotland missionary in China about 50 years ago, it was customary for a pail to be placed at the end of each row of crops for the collection of urine for this purpose.

Back again at Chusan he acquired *Daphne fortunei* and *Diervilla (Weigela) rosea* besides *Azalea (Rhododendron) ovata* and *Buddleia lindleyana* for the greenhouse.

Still in 1848 he was back at Shanghai where he again adopted Chinese dress and succeeded in obtaining the palm Chamaerops and *Dryandra cordata.* At Wae-Ping he obtained from a mandarin's garden the sacred bamboo *Nandina domestica,* a new evergreen Ilex and a fine evergreen Berberis, perhaps *B. fortunei.* Of mandarins' gardens he commented that they were small but all the plants were choice. From Sung-Lo on Kim-Lung island he brought away *Magnolia purpurea, Prunus sinensis alba* and *Paeonia moutan,* all of which flowered in mid-January, also *Citrus japonica* in fruit, growing in a pot. Many varieties of Chrysanthemums particularly well grown were sent from here. At this time he complained that moschatas (mosquitoes) were very troublesome but his

servant procured what he called moschata tobacco and when it was burned it dispelled the pests. As a result of his efforts 2,000 plants and 1,700 sprouting seeds of tea were successfully introduced to India. The seeds were sown before the start of the voyage and sprouted in the Wardian cases in transit.

In 1853 back home he published "Two Visits to the Tea Mountains of China" in two volumes, the mountains being the Boheas 6,000–8,000 feet high. One wonders how in view of previous restrictions on travel he was enabled to get access to this area. Perhaps the powerful East India Co was able to use its influence with Chinese officials. He described in some detail the preparation of the leaf and also the manufacture of rice paper.

The tea plants packed in damp moss covered with oiled paper were sent for safety to Mr Beale's garden at Shanghae. There they were transferred to the Wardian cases for despatch to Calcutta where, after a month at sea, all arrived safely.

That same year he made another journey to China for the East India Co for more tea plants calling first at Formosa (Taiwan). Besides the tea plants he noted the varnish tree (a species of Rhus), the wax insect, the Fraxinus and Caesalpinia whose pods are used as soap. He also mentions collecting seeds of *Thea viridis, Abies kaempferi, Cephalotaxus fortunei* and *Rhododendron championae*. From a visit to the Valley of Nine Stones he noted a golden pine and *Farfugium grande (Senecio kaempferi)*.

At Ming Po he recorded *Forsythia viridissima, Spiraea reevesiana* and *Amelanchier racemosa*.

In 1857 he published "A Residence Amongst The Chinese" and the same year he was sent by the Government of the USA to collect tea plants in Japan and China, first spending a week at Nagasaki then several weeks between Yedo (Tokyo) and Yokohama before returning to China.

A year later in 1858 at the request of the US Patent Office he made his last sponsored expedition. In Japan he was able to travel up to 28-30 miles from his base but, just as in China, nurserymen were reluctant to show their gardens and sell plants to him. He travelled on horseback and was accompanied at all times by yakoneens (guards). All purchases were recorded by officials and delivered and paid for the following morning.

Plants included Daphne, Skimmia, *Taxus cuspidata, Retinospora obtusa (Chamaecyparis obtusa)* and *R. pisifera (C. pisifera)*. Between 1860 and 1861 he made two more trips, independently, calling at Yedo where for the first and only time he had trouble with the Chief of the British

Legation who took offence because Fortune had not obtained his permission to land there. Since this official was absent at the time of Fortune's arrival the latter had obtained consent from the US authorities but that was not good enough and he was promptly ordered away. An apology and an appeal were rejected so he took himself off to Kanazawa on the west coast.

Plants not previously noted include *Cydonia (Chaenomeles) japonica, Primula cortusoides, Paulownia imperialis, P. japonica, Deutzia scabra, Styrax japonica, Caprifolium japonicum, Spiraea callosa, Lychnis senna, Lonicera aurea reticulata* and *L. japonica chinensis.*

When his Wardian cases were ready for sea the British Consul arranged for customs to allow plants to go free of duty. On 29 July 1861 they left for Shanghae to be cared for at Mr Webb's garden until the time for shipping viz 11 August via Chapoo.

On 17 September he proceeded to Peking where he was allowed to visit some mountains, his bedding loaded on to a cart while he preferred to walk. Plants seen included *Pinus bungeana* with white bark, the maiden hair tree *Salisburia adiantifolia, Quercus sinensis* whose acorns were used to make a dye and *Vitex agnus-castus.* Then on 28 September he left Tien-Tsin and arrived at Shanghae on 20 October to find all his plants in Mr Webb's garden in excellent condition. The next fortnight was occupied in preparing the plants for their 16,000 mile journey to Southampton via the Cape of Good Hope. Some special favourites he took with him in two Wardian cases on a partly overland route, one a Saxifraga with variegated foliage. These were taken ashore at Hong Kong for some fresh air. The route now was via Ceylon and Suez, thence through Egypt, the canal not being opened until 1879, arriving at Southampton on 2 January 1862. Thus ended his journeying in Cathay (China) and Zipangu (Japan).

In 1863 he published "Yedo and Peking" on the title page of which he is described as Honorary Member of the Horticultural and Agricultural Society of India. He now settled down to farming with his son-in-law in Berwickshire and died on 18 April 1880.

To sum up he introduced large numbers of live plants to enrich our gardens. He was a good plantsman and an assiduous collector who took great pains to ensure that his plants were delivered in good condition. It is only fitting that many plants bear the specific name "fortunei". His interest was not confined to plants but included shells and insects, one, at least, of the latter bearing his name *Damaster fortunei.*

Besides 19 plants carrying his name he is credited with introducing at least 26 which are to be found in our British gardens.

Discussion Weekend – September 1985

St Salvator's Hall, University of St Andrews
Friday 27 to Sunday 29 September 1985

Programme

Friday 27	
5.00pm-6.30pm –	Registration
7.00pm –	Dinner
8.30pm –	*Scottish Alpine Plants* – James R. Aitken
Saturday 28	
8.00am –	Breakfast
9.00am-10.00am –	Show Entries
10.00am –	Garden Visits
10.00am-12.30pm –	Registration
12.00 noon –	Joint Rock Garden Plant Committee
1.00 pm –	Lunch
2.15pm –	Welcome by the President
2.30pm –	W. C. Buchanan Lecture: *Finding A Place For It* – David Mowle
3.45pm –	Tea in Lower College Hall
4.15pm –	*The Genus Iris* – Brian Mathew
7.00pm –	Dinner
9.00pm –	Optional Programme: Informal Discussions/Short Film
Sunday 29	
8.30am –	Breakfast
9.45am –	*The Evolution of a Garden* – Henry and Margaret Taylor
11.00am –	Coffee in Lower College Hall
11.30am –	Esslemont Lecture: *Plant Hunting in the Andes* – Brenda Anderson
1.00pm –	Lunch

2.30pm –	*Californian Bulbous Plants* – Wayne Roderick
3.45pm –	Close of Proceedings
4.00pm –	Tea in Lower College Hall and disperse

St Salvator's Hall is situated between The Scores and North Street, in the older part of the town. St Andrews is one of the most historic and interesting towns in Scotland. It is easily reached by road. Please note that trains only stop at Leuchars, some four miles distant, and bus connections are sometimes difficult; none on Sundays. Anyone in difficulty please contact the *Registration Secretary*.

Free car parking is available in North Street, and The Scores. Both areas are adjacent to the Halls of Residence.

Accommodation can be booked for the duration of the Conference or for the whole weekend. Members may wish to come for the day only, in which case appropriate charges will be made.

Charges (including VAT and Conference Fee)
Full board from Friday dinner till Monday breakfast – £60.00
Full board from Friday dinner till Sunday tea – £46.00
Full board from Saturday lunch till Sunday tea – £36.00
Full board from Saturday lunch till Monday breakfast – £46.00

Day Charges (including Conference Fee)
Friday: Dinner – £5.50
Saturday: Lunch, Tea, Dinner – £13.00
Sunday: Coffee, Lunch, Tea – £9.00

Applications should be sent to the Registration Secretary, Mrs Mollie Pirie, The Drum, Blebo Craigs, By Cupar, Fife KY15 5UG, enclosing the appropriate remittance, before *Saturday, 17 August 1985*. Documentation will be issued at the Conference.

Donations of plants will be welcome for the 'Bring and Buy' stall.

The Autumn Show will be held in conjunction with the Discussion Weekend Meeting of the Joint Rock Garden Plant Committee which will be held at 12 noon on the Saturday of the Show (see Show Schedule).

Fig 125 *Iris Winogradowii* (see page 275) Photo: H. Esslemont

Fig 126 *Primula 'Gloria Johnstone'* (see page 281) Photo: R. S. Johnstone

Sites and flowers of south-west Turkey

MICHAEL J. B. and LYNN A. ALMOND

SINCE OUR FIRST VISIT to south-west Turkey in 1978 (see SRGC Journal, Vol 36 (1979), Nos 3 and 4, pp 202-207 and 244-247) we have returned to the same area twice, in 1981 and 1983. In both years we were there in the first two weeks of April and were able to explore in far more detail the mountains between İzmir and Antalya, where there are innumerable fascinating ancient ruins and lots of places of interest to the amateur botanist. Our increasing familiarity with the country and its people has enabled us to reach further into the little-visited Lycian mountains (the western extremity of the Taurus range) and to gain a greater appreciation of their natural and man-made wonders (see map on page 256).

The Lycian mountains are bounded to the north by the Büyük Menderes (Maeander) valley; the river flows down westwards from the Anatolian plateau to the sea, meandering true to its name over the lower reaches of the valley and piling up its silt ever farther out to sea. Farther north the valley is paralleled by those of the Küçük Menderes and the Gediz, flowing to the Aegean Sea south and north of İzmir respectively. In the valley of the Gediz is the ancient site of Sardis, capital of the fabulously rich Croesus, King of Lydia. When we were there the ground round the temple of Artemis, over whose finely sculpted columns rises the weird outline of the acropolis hill, was ablaze with *Anemone coronaria*. The Anemones were mainly bright red, but there were also occasional white and purple specimens – and also some *Gynandriris sisyrinchium*. By the main road, next to the reconstructed façade of the Roman gymnasium, a horse-drawn plough was threading its way between the vines that produce the raisins and sultanas for which the İzmir area is so famous, and the owner's brightly painted cart stood at the edge of the field among the roadside flowers.

The most notable feature of the Büyük Menderes valley is undoubtedly the fantastic petrified cascades of Pamukkale, caused by the deposit of limestone from the hot springs that well to the surface there, and the classical remains built on top of them. Where else can you step straight out of your hotel room on a crisp April morning into a swimming pool whose water is the temperature of a nice warm bath and swim among the remains of fallen Roman masonry? The flora of

Pamukkale itself, however, is limited by the thin soil and by overgrazing. In April at least, much more interesting flowers can be found in the mountains to the south, on the other side of the valley. Up one of the southern tributary valleys of the Menderes, for example, is the ancient site of Aphrodisias. As well as boasting one of the biggest and best preserved Roman circuses in the world and a wealth of other fascinating remains which are gradually being disinterred by a team of archaeologists sponsored by the National Geographic Society, the extensive site of Aphrodisias also provides an interesting range of plant life, including *Hypecoum imberbe, Leontice leontopetalum, Anchusa azurea, Ornithogalum nutans, Asphodelus microcarpus* and a small yellow Ranunculus. Much of the site is still quite overgrown and some of it is virtually waterlogged in winter and spring; we saw terrapins basking on the steps of the ancient council chamber – they dived into the flooded centre at our approach.

Further west another southern tributary of the Menderes, the Çine Çay, rushes down through impressive gorges topped with massive boulders of the local acidic, micaceous rock. It flows under the picturesque old bridge at İncekemer, near which *Fritillaria bithynica* (Fig 119) grows among masses of pale lilac *Anemone coronaria*. Under a boulder near the bridge we found *Arisarum vulgare* in flower and beside the path and the road we also found bright red *Anemone coronaria* (including a double form), *Legousia speculum-veneris* (with unusually big flowers), *Ornithogalum nutans, Lathyrus articulatus, Dracunculus vulgaris, Lavandula stoechas, Muscari comosum* and a pretty blue borage. Lower down the valley the river calms down and flows sedately past the old mosque of Ahmet Gazi at Eski Çine, awash in a sea of *Asphodeline lutea*. It then waters an extensive plain, on the western rim of which lies the village of Karpuzlu (the "water melon place"), set beside rich farmland dominated by the citadel of the ancient city of Alinda – with its excellently preserved walls, fine theatre and unique Hellenistic market hall. Among the olive trees on the slopes and top of the citadel are masses of small, rich purple *Romulea linaresii*; but there was little else of interest in the way of flowers on 27 March 1983. To anyone with any interest in the past, however, Alinda is a wonderful place to visit – extensive remains of an ancient city, completely untended and an integral part of the landscape: in this, though, it is by no means unique in south-west Turkey.

The road south from Denizli (the nearest large town to Pamukkale) through the Lycian mountains, via Gölhisar, to the port of Fethiye on the Mediterranean coast, is full of interest from every point of view. Although full of interest both botanically and archaeologically, the breathtaking scenery would be reward enough for the drive, in spite of

the fact that the condition of the road often leaves much to be desired. Immediately south of Denizli the road winds up to the Kazıkbeli pass (1,250m) below the south-western flanks of Honz Dağ (2,571m). On the ridge above the road, among the juniper scrub and the rocky outcrops, are to be found a multitude of crocuses – *C. danfordiae, biflorus,* variants of *biflorus* (including ssp *crewei*), *baytopiorum* and *fleischeri* – and also *Scilla bifolia, Gagea* (*fistulosa* or *arvensis*?), *Euphorbia rigida* and a pretty purple Corydalis. In early spring the high slopes are still largely covered with snow and the views are extensive through the clear mountain air – if you look carefully in the right direction you can see the wedding-cake cliffs of Pamukkale glittering in the sun through the haze of the valley below, almost twenty miles away on the other side of the Menderes valley.

South of the Kazıkbeli pass is the mountain plain of Acıpayam, lying at a height of about 1,000m. The western Taurus, being limestone in the main, is dotted with such plains composed of the rich *terra rosa* washed down from the bare limestone slopes surrounding them. The Turkish term for this feature is *Ova* (the same as the *Polja* of the Balkans) and as often as not there is no visible outlet for the water that collects in them; in winter it often forms a lake covering part of the valley floor, which in spring and summer gradually dries up by evaporation and seepage. Acıpayam Ovası is dotted with almond trees, just coming into blossom at the beginning of April – and the storks, the traditional harbingers of spring, have just returned and are renovating their nests. If you stop and look carefully you can see other wild-life; if you are lucky, as we were, you may even see a marbled polecat (*Vormela peregusna*) about his business among the almond trees.

There is a direct road marked on the maps from Acıpayam south through Çameli and Üzümlü to the sea at Fethiye. It is a good dirt road as far as Çameli and for a little way beyond. Further than this, at least when we tried it in 1981, the road exists in theory only. The detour is of interest, however, for the splendid scenery, for opportunity of seeing the local inhabitants tilling their fields (high on the hillsides where the snow has not yet melted properly) with ox and with ass – and, of course, for the flowers: fine specimens of *Colchicum triphyllum*, bright yellow *Crocus danfordiae* and *Ornithogalum lanceolatum* (these last two growing, unfortunately, in mud of the most execrable stickiness). A more orthodox and surer route south is by way of Gölhisar, a pleasant little town standing in its *Ova* at about 1,000m, which possesses all the requisites, including restaurant and hotel (basic but clean), for a staging post or a base for a few days exploring. It can be reached directly through Acıpayam or by the longer, and more picturesque, route by

way of Salda Gölü and through Yeşilova, Tefenni and Çavdır. Directly above Gölhisar to the west are the extensive remains of the ancient city of Cibyra, an important town in the first century BC when Cicero held assize there.

To the south of Gölhisar the road winds up to a pass of about 1,800m as it passes between peaks rising to over 2,200m and enters the upper valley of the Kocaçay (or Xanthus). At the top of the pass (which the maps do not name, but which lies between the villages of Drimil (or Altınyayla) and Karaçulha) the terrain consists of bare, crumbling serpentine, with some rocky outcrops but mainly with the consistency of a spoil-tip. There are pine and juniper dotting the slopes on the north and south sides, many of the former infested with mistletoe. The ground is generally bare of herbage and the scattered flowers are quite difficult to see. If you look carefully, however, you can find the ice-blue *Crocus baytopiorum, Colchicum triphyllum, Colchicum bertii* and *Scilla bifolia*. A little way south of the col, the roadside juniper scrub conceals a multitude of *Cyclamen trochopteranthum*, its bright pink flowers just coming out at the beginning of April and not yet followed by the leaves. The road comes down into the valley and across the main stream by means of a deep ford. If you leave the road just before the ford and strike back right in a westerly direction you will find yourself walking across the valley floor towards a steep hillside covered in pine trees. As you get nearer to the base of this hillside you will see numbers of massive stone sarcophagi littered around the fields; on the last piece of level ground before the bottom of the hill you will find the remains of the market place of the ancient city of Balbura. Under the thorn bushes and between the blocks of stone around the edge of the market place you can see small patches of bright pink. The *Cyclamen trochopteranthum*, slightly more advanced than at the roadside above, was a mass of pink flowers at the beginning of April, accompanied by small, dark-green leaves with finely etched patterns. Further west, on the other side of the ravine, are the remains of a theatre stage facing a natural bowl in the hillside; to the side of the stage, on the cliffs and on the ancient sarcophagi, grow more Cyclamen and also *Crocus danfordiae, Colchicum triphyllum* and *Scilla bifolia*. Far above you, among the trees on the east side of the ravine, you will be able to make out the massive retaining walls of a later theatre, possibly of Roman date. Here we found fine specimens of *Anemone blanda*, their dark purple set off beautifully against the light grey limestone rocks. We were also lucky to find, on the hillsides above Balbura, some scattered specimens of the little yellow fritillary, *Fritillaria bithynica* ssp *serpenticola*. The city of Balbura sits almost 1,700m above sea level and in early April the snow is just

clearing the site (Fig 122); it really is remarkable to think that people lived here all the year round and carried on an outdoor, Greek style of life in the market place and theatre.

The fields and rough pastureland on either side of the road as you drive on further south are covered with sparse juniper scrub and, increasingly as the road drops to a lower altitude, evergreen oak scrub interspersed with groups of pine trees. The open ground is in places covered with *Crocus biflorus* (Fig 120) in various shades of mauve and *Colchicum triphyllum* and *Scilla bifolia* are also dotted around; the scrub hides more *Cyclamen trochopteranthum*. If you are lucky you may find, as we did, a *C. trochopteranthum* with petals pure white except for the usual dark carmine nose on each petal.

Before continuing south-west towards Fethiye, an interesting diversion can be made to Söğüt and Kozagaçı. You pass through a series of wide, flat, upland valleys interspersed with narrow, gorge-like connecting passages, past picturesque villages with poplars and pollarded willows, and you can observe the villagers sitting on the verandahs of their wooden houses gossiping, drawing water from the village well and ploughing with their oxen in the fields. You will pass the ruins of an ancient Greek watch-tower looming above the road and (near the village of Küçüklü) some memorial sculptures, including one showing two horsemen facing each other with a standing figure between them, are carved into a rocky bluff above the road; and below them a large circular tomb lid with a man on a prancing horse carved in its centre lies partly buried at the roadside. Among the usual roadside flora we also found a pretty dark-blue borage nestling at the foot of the dry stone walls.

Söğüt lies in an extensive upland plain at about 1,400m. Part of the plain is occupied, as so often is the case, by a shallow lake which expands and contracts with the seasons. The south-eastern end of the plain gradually rises away from the lake floor to form a wide valley with rocky cliffs on its western side. About four miles along a side track, nestling under these cliffs, is the village of Kozagaçı. The bluffs below the cliffs are scattered with crocus – *biflorus, danfordiae* and a small white crocus of the same size and shape as the bright yellow *danfordiae* – *Ornithogalum lanceolatum* and *Colchicum triphyllum*; and the woods beside the village watermill contain *Viola odorata*.

If you battle up through the snow towards the cliffs to the left of the waterfall which cascades down above the village, however, you will be rewarded with a remarkable, if not unique, sight. In spite of the lack of any ancient remains on the site, the cliffs are dotted with superbly preserved memorial carvings, a dozen or more portrait groups of the

local inhabitants of the area some two thousand years ago (the lack of any inscriptions makes dating them difficult). As you climb the rough path up the cliffs you are faced with a new group of ancient Lycians watching your movements at almost every corner. Right at the top is another carving of a man on a prancing horse – in fact three separate carvings of men on prancing horses – probably depicting the local god Kakasbos. The view from the top of the cliff is very fine but in early April the season is not yet far enough advanced for the flora to have emerged from the snow.

After retracing your steps to the Gölhisar-Fethiye road and continuing south-west again you pass more remains – tombs, memorials and ruined mausolea – dotted along the side of the road and, of course, more cyclamen hiding under the thorn bushes, together with the odd gagea. You will pass through the scanty remains of the city of Termessus Minor probably without even noticing the few scattered column drums littered round the patch of level ground which once was the market place. You then cross the Kocaçay – now quite a sizable river – by a new concrete bridge a hundred yards or so downstream from the old hump-backed stone bridge which crosses the river at the lower end of one of those short rocky gorges down which the river passes between two expanses of relatively level valley. Immediately in front of you is a steep, rocky, tree-covered slope and to the left a side road branches off alongside the river. The road leads in about five miles to the village of Seki; but if you turn off it to the right within about half-a-mile or so you will come to the little village of İncealılar. From here a path leads up on to the top of the rocky bluff that lies above the bridge over the Kocaçay. As you wind up the steep slope between the thickets of Quercus scrub, the stone sarcophagi announce the approach of another ancient city. On top of the ridge, at about 1,600m and overgrown with pine trees, are the extensive remains of the city of Oenoanda. The paving of the market place is very well preserved and between the flag-stones grows *Cyclamen trochopteranthum*, the bright pink flowers poking up just above the level of the pavement but the small leaves staying down in the cracks, safe from the goats which browse unhindered among the fallen splendour. The well-preserved theatre is decorated with the vivid yellow of *Gagea arvensis*.

Below Oenoanda the road drops steeply down through the pine woods that clothe the valley sides south of the great Kocaçay gorge, where the river drops down from the broad upland valley around Seki to the lowland valley it flows through for the last forty miles or so of its course to the sea. In the woods can be found more *Cyclamen trochopteranthum, Anemone blanda* and, here and there, a stealthily marching

tortoise – by far the most commonly seen wild animal in these parts. As the road reaches the bottom of the valley the pine woods thin out and the ground between the trees is covered in scrub; the snow-capped mountains can be seen flanking the valley west and east, and closing round the valley head in the north. On the valley floor there are cultivated fields, olive groves and stands of both deciduous and coniferous woodland. Orchids are dotted around like jewels encrusting the ground – *Ophrys ferrum-equinum, O. fuciflora, O. fusca, O. lutea,* and *O. scolopax, Orchis anatolica, O. italica* and *O. papilonacea*, and *Serapias parviflora*. The red *Anemone coronaria* carpets the ground under the olive trees and *Iris unguicularis* grows in clumps at the roadside. The valley is a treasure house of archaeological sites – Tlos, Pinara, Sidyma, Xanthus, Patara and the Sanctuary of Leto. At Tlos *Euphorbia rigida* carpets the steep slopes below the Lycian rock tombs with their stone "beams" and wonderful carvings of the dear departed. In the damper ground by the old market place you can find *Aristolochia pallida* and, if you are lucky, you may even catch a glimpse of the porcupine, the entrance to whose burrow, surrounded by discarded quills, is at the base of the cliff under the tombs. The rocky acropolis is crowned by the often rebuilt castle and the sheer cliff below is embellished by the colonnaded Tomb of Bellerophon, with its carving of the great hero (again in the guise of the horseman god).

On the western slopes of the valley the tombs of Pinara gaze out past the Euphorbia across the overgrown theatre and across the valley to Tlos and to the snow-capped heights of Ak Dağ beyond. And so often the goats here keep the Quercus scrub well cropped and make it so dense as to be impenetrable.

Farther south, on the west side of the valley but higher up the slopes of Elmacik Dağ, lies the site of Sidyma which once boasted a magnificent Sebasteion dedicated to the Emperor Claudius and still has a fine collection of tombs and other assorted monuments. Here *Laurus nobilis* was in flower, climbing up the side of a half-ruined mausoleum with a fine corbelled roof, and in the fields majestic spikes of *Fritillaria acmopetala* stood up above the growing corn. On the field edges patches of *Bellevalia trifoliata* and *Ornithogalum umbellatum* grew here and there.

The city of Xanthus, on its rocky eminence next to the river, commands the lower valley of the Kocaçay and the ancient (and modern) river crossing. Examples of the ancient fauna, such as lions attacking cattle and wild boar being hunted by men on horseback, can be seen carved on some of the tombs littering the site among the olive trees. Five miles or so farther south was the port for the area, Patara. As you sit on the seats of the ancient theatre, which is half-filled with sand,

you look out across the harbour, now a lagoon cut off from the sea by a massive sand bar, to the great granary built by Hadrian; beside you, between the stones of the theatre, grow *Lloydia graeca, Salvia triloba* and *Euphorbia spinosa*. Behind you, on the bluff, are the remains of the ancient lighthouse and away to the right, across the fields that now occupy the site of the city, is a fine triple triumphal arch, erected in about AD 100. In the fields themselves and on the hillside beyond the arch, among the tombs, one can find *Malva sylvestris, Papaver rhoeas, Echium lycopsis, Ornithogalum nutans, O. lanceolatum* and pale lilac and white *Anemone coronaria*.

As the road from Fethiye to Kaş rises to leave the Kocaçay valley, south-east of Xanthus, the rough scrubland is a treasure house of *Ophrys – ferrum-equinum, fusca* in various shapes and sizes, *lutea* and apparent crosses between the last two – hiding shyly beneath the *Cistus parviflorus* scrub, together with *Papaver rhoeas* and pretty lilac *Anemone coronaria*. In the pine woods higher up we found Cyclamen leaves and numerous spikes of *Limodorum abortivum* not yet in flower. As you descend the other side of the hill, towards the village of Kalkan, there is *Arum dioscorides* at the side of the road and the fields of fodder vetch are infested with Orobanche.

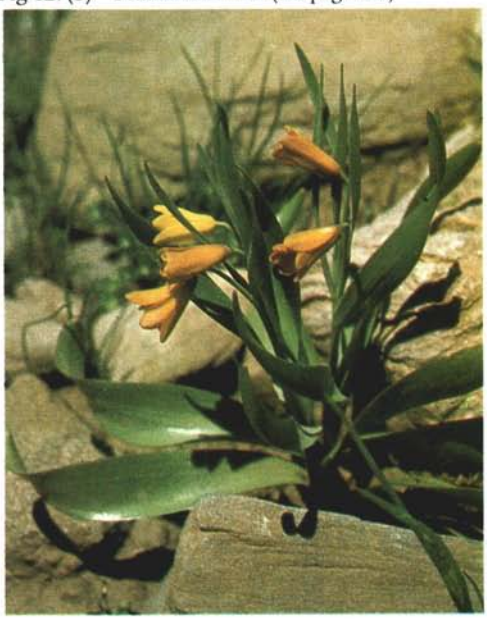
After Kalkan the mountains crowd right down to the sea and there are two alternative routes to Kaş. The main road presses on along by the sea, blasted out of the cliff face; an alternative and longer route takes you over the top of the cliffs, with fine views out over the sea to the small Greek island of Castellorizo and past sleepy villages and the remains of ancient settlements unnoticed by any guide book. Kaş itself is a picturesque little port, with ancient remains including a well-preserved little theatre and a very impressive sarcophagus standing at the top of the main street, below the old timber-framed Turkish houses. In the rocks next to the theatre we saw *Cyclamen hederifolium* leaves with very marked patterns and on the eastern outskirts of the town, down near the sea, some impressive domes of *Euphorbia dendroides*.

To the east of Kaş the Lycian Taurus pushes out its fingers to the farthest south into the Mediterranean. The rocky coast between Kaş and Demre is limestone, covered in evergreen oak and Arbutus scrub, interspersed with small plains of alluvial *terra rossa* at heights varying from sea level to about 500m. Without a path the terrain is difficult in the extreme to negotiate; without reliable maps (or, indeed, any large-scale maps) it becomes doubly difficult to find your way about.

Hidden among the rocks and undergrowth, however, if you look hard enough, are an amazingly large number of ancient remains – mainly of small cities and villages which history has passed by but

Fig 127(a) *Fritillaria carduchorum* (see page 280) Photo: Ole Sonderhousen

Fig 127(b) *Fritillaria minima* (see page 280) Photo: Ole Sonderhousen



whose ruins are remarkably well preserved considering the 1,500 years or so of neglect they have suffered. The undergrowth also conceals a considerable variety of plant life: fields of *Ornithogalum nutans* backed by purple flag iris beside the road above Kaş and *Orchis anatolica, O. simia* and beautifully marked *Cyclamen hederifolium* leaves in the *Quercus* and *Arbutus* scrub at Yavu, beneath the ancient citadel of Cyaneae. And on that citadel itself, among the hundreds of scattered sarcophagi, are a pretty blue *Erodium gruinum* and a striking carmine Silene, in addition to the *Ceterach officinarum* on the steps of the theatre. At Üçağız, under the carob trees you can see a small-flowered form of the red *Ranunculus asiaticus, Allium subhirsutum*, another larger, pink Allium, another Silene, *Salvia triloba, Cistus albidus* and *Dracunculus vulgaris* – including a specimen with white spadix (instead of the usual dark purple, matching the spathe). Dracunculus are also at Kale (ancient Simena), as well as *Bellevallia dubia* and *Urtica pilulifera* (the Roman nettle) by the quaint little rock-cut theatre in the Turkish fort. At Sura, meadows are bright yellow with Crepis and dotted with *Anemone coronaria* of a delicate lilac hue. In the shadow of the granary of Hadrian at the ancient port of Andriace grow *Aristolochia pallida* and a gigantic Dracunculus easily five feet high with, by the roadside at the nearby Roman mausoleum at Karabuçak, spikes of *Gladiolus atroviolaceus*. In addition, the fauna is also interesting – albeit not natural – camels grazing dressed and undressed, camels in train with their loads on the narrow paths between the villages, kids perched high on evergreen oak scrub keeping it well pruned and compact, their elders scouring the market place at Cyaneae for suitable fodder, and fat-tailed sheep blocking the road to Üçağiz in quiet rumination.

If you now retrace your steps to Fethiye you will find a pleasant port with quite serviceable hotels and restaurants, and making an excellent base for exploring the area. The buildings of the town are generally of little interest as the place was razed to the ground by an earthquake in 1956, but there are many fine sarcophagi lying around the town and some very impressive tombs carved into the cliffs above it. A pleasant excursion can be made by way of a side road south of Fethiye to Ölü Deniz. The beach there is very fine (and virtually deserted in April) and by the side of the road from Fethiye you can find *Orchis anatolica, Ophrys ferrum-equinum, Ophrys lutea*, dark lilac *Anemone coronaria* and a pretty little light blue borage. Other interesting plants can be found by leaving the road and heading up towards the hills to the east. In the evergreen oak scrub you can find *Iris unguicularis cretensis*, rich purple *Romulea linaresii* and the yellow *Fritillaria forbesii*. In the pine woods beyond are *Cyclamen trochopteranthum* (growing on large, moss-covered rocks), large, sky-blue *Chionodoxa siehei* and a pale Corydalis.

Whether the struggle up to the ruins of Cadyanda, above the village of Üzümlü (north of Fethiye), is worth while depends on how enthusiastic you are about seeing the remains – an interesting theatre and hill-top stadium with sundry other buildings and some tombs of an unusual design; the flora in the dense pine woods is interesting in places but by no means exceptional. We saw *Muscarimia moschatum, Fritillaria acmopetala, Orchis anatolica, Thymelaea tartonraira,* a Daphne and a Doronicum. We were also lucky enough in the mountains near Fethiye on another day to find, among pine trees at the edge of a clearing and growing with beautifully marked *Crocus biflorus*, the rare *Sternbergia candida* (Fig 121) – a flower the general size of a daffodil (about a foot high and easily four inches from petal tip to petal tip) with ice-white petals and a delicious scent.

North-west of Fethiye the road skirts the Gulf of Fethiye through pine woods, giving tantalising glimpses through the trees of an idyllic seascape dotted with small islands. Under the trees are patches of Cistus and under them the parasitic *Cytinus hypocistus*. Also within easy reach of the road you can find *Orchis italica, Ophrys fusca, Ophrys lutea, Polygala nicaeensis,* Gladiolus and a pretty little purple and white Viola. After branching off the main road from Fethiye to Muğla, the Marmaris road negotiates a range of pine-covered hills (in which you can find *Ophrys scolopax* and *O. fuciflora*) before coming down to the seaside resort and port of Marmaris, which is well-supplied with hotels and restaurants, and even has a few souvenir shops.

South and west of Marmaris two long promontories stretch out towards Rhodes and Kos. The southern one (the Daraçya or Bozburun peninsula) is scenically more interesting but the road is rougher. You can find *Campanula rupestris* on the cliffs above the village of Turgut and, a little farther on beside an unusual ancient tomb with a corbelled stone roof almost hidden among the pine trees above the road, the last of the *Barlia robertiana* was just going over on the 2 April 1983. Further along the road towards Bozburun, an exploration of the woods at the side of the road can reveal massive *Cyclamen hederifolium* leaves, fully 12cm across and in great profusion in the pine litter, growing with beautiful cerise-coloured *Anemone pavonina*. Among the rocks on the steeper slopes, with *Anemone blanda, A. pavonina, Iris unguicularis cretensis, Orchis coriophora* and *Colchicum macrophyllum* (leaves only, of course, in April), we found the yellow *Fritillaria sibthorpiana*. On the bare limestone slopes above Bozburun you can find *Mandragora officinarum, Bellevalia dubia, Ornithogalum montanum* and a large-flowered red *Ranunculus asiaticus*.

The other, westerly tending, peninsula (the Reşadiye, Datça or Cnidus penisula) is composed of soft, red-brown conglomerate serpentine rock, eroded in places into weird shapes. Although it never rises very high above sea-level, its narrowness makes it rugged terrain. Among the scrub (mainly *Cistus salvifolius* with some *Cistus parviflorus* and *Arbutus unedo*) we found *Orchis anatolica, O. italica, O. morio, O. provincialis* ssp *pauciflora, Ophrys fuciflora, O. fusca, O. lutea, O. speculum, Neotinea maculata, Serapias vomeracea, Limodorum abortivum, Gynandriris sisyrinchium,* red *Ranunculus asiaticus, Lavandula stoechas, Ornithogalum nutans, Oxalis pes caprae, Linum arboreum* and Onosma. In the sand dunes on the north coast of the peninsula we found *Matthiola sinuata, Legousia speculum-veneris*, a small pink Silene, a prostrate white Paronychia and a prostrate bright yellow "pea flower" with grey-green leaves; we also found *Cyclamen trochopternanthum* leaves on the peninsula but the flowers were over.

After the turning to Marmaris, the main road from Fethiye to Muğla turns north towards Muğla and winds up the mountains lining the northern shore of the Ceramic Gulf to the Çiçeklibeli pass, where you can find *Fritillaria bithynica, Romulea linaresii, Fumana thymifolia, Anemone blanda, Nonea pulla, Daphne sericea, Orchis anatolica* and Vinca. Muğla is a pleasant little town with a good hotel and restaurants; in the hills nearby we were fortunate to stumble upon a superb Mediterranean rock garden – an example of what you can achieve by taking pot-luck along the by-ways of Turkey, provided you can stand the strain of driving on such badly maintained roads. On the edge of the road and among the pine woods across the top of the ridge beside the road was one of the most remarkable profusions of flowers we have ever found: *Cyclamen trochopteranthum* in great numbers among sheets of *Galanthus elwesii* and also encrusting the tops of boulders, *Crocus biflorus* in various patterns and hues including ssp *crewei, Crocus fleischeri, Crocus chrysanthus,* Gagea by the thousand, together with *Scilla biflora, Ranunculus ficaria, Ornithogalum sibthorpii,* Aubrieta and *Anemone blanda* – in very large clumps of fine, large, deep-blue flowers.

The next port of call (unless you intend to drive north to Aydın via Çine, as described above) is the town of Milas. On the way you pass the ruins of Stratoniceia around the village of Eski Hisar. If it has not yet been swallowed up by the open cast mine that threatens it you may see *Gynandriris sisyrinchium* and *Hermodactylus tuberosus* growing here. Milas is a fascinating little town with many interesting buildings and monuments. It has a presentable hotel but makes no concessions to the foreign tourist. It is a useful base, however, for exploring the area; you can visit the ancient sanctuary at Labraynda, the city of Iasus on the

coast and the exceptionally well-preserved temple of Zeus at Euromus. The ancient gods seem to like *Ophrys* as much as we do: virtually within the precinct of one temple we found the following *Ophrys* species – *bombyliflora, fuciflora, lutea, scolopax* ssp *orientalis, speculum* and *sphegodes*, not to mention *Campanula ephesia, Bellevallia ciliata* and *Gynandriris sisyrinchium*. Elsewhere in the area we also found *Orchis anatolica, Serapias vomeracea, Adonis annua, Alkanna primuliflora, Lavandula stoechas* and a bright cerise *Anemone coronaria*.

A further excursion from Milas can be made to Bodrum, which is a regular tourist resort with hotels, restaurants and souvenir shops. The area is picturesque but not especially rewarding botanically. The purple *Iris germanica* is very eye-catching among the old turbaned tombstones in the graveyard at Ortakent and along the road between Milas and Bodrum we found Cistus in profusion (*C. parviflorus* and *salvifolius*), a Gladiolus and *Ophrys omegaifera*.

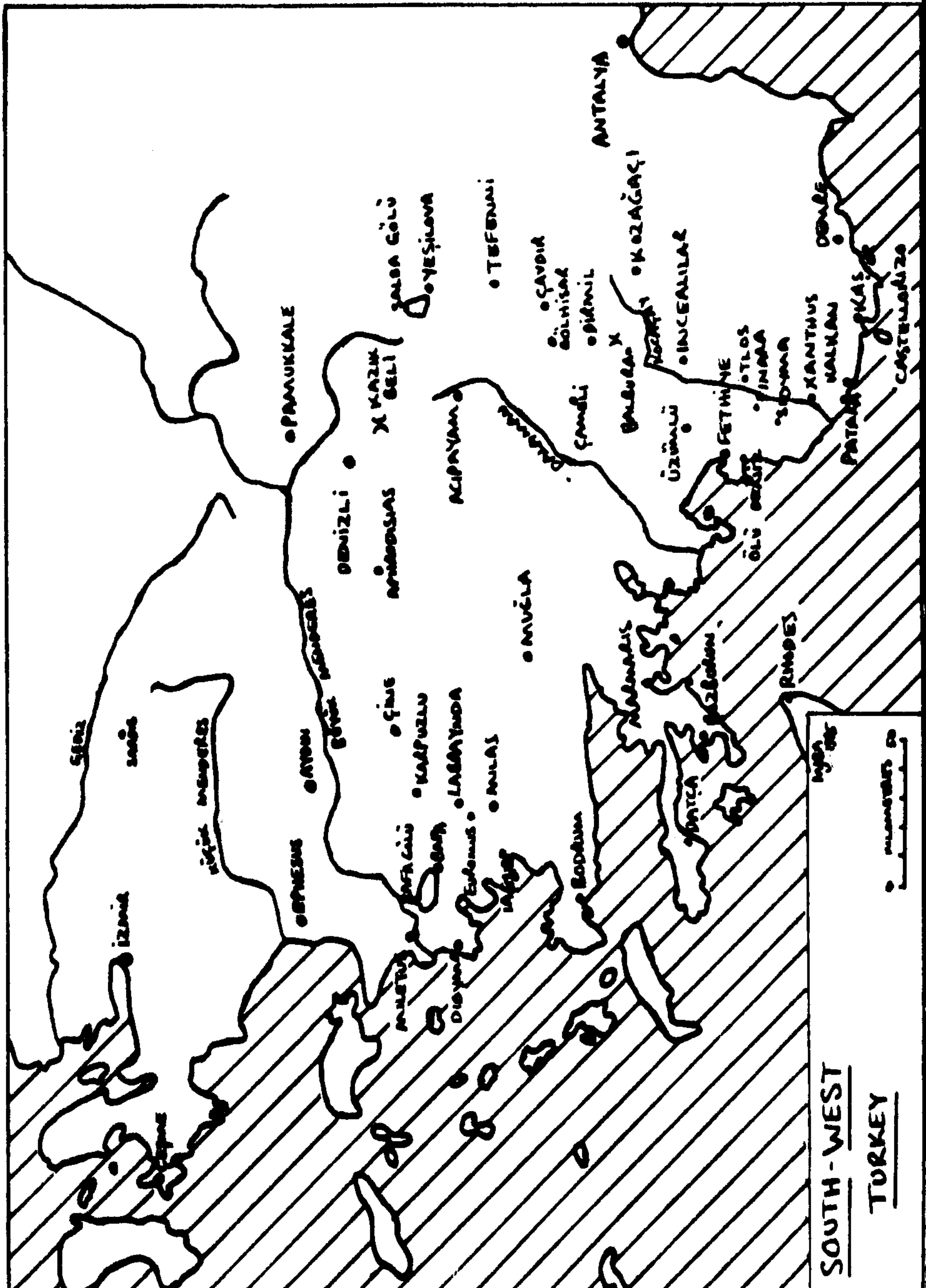
Back on the main road from Milas north towards İzmir, after the temple of Zeus at Euromus the road is lined for a while with purple and white lupins (*Lupinus angustifolius* and *L. albus*) and occasional patches of *Anemone pavonina*. At the village of Bafa, on the shores of the lake of the same name, a sign-post directs you right along a rough track to the village of Kapıkiri, which sits in the middle of the ancient city of Heracleia under Latmus. The city walls march up the boulder-strewn flanks of Mount Latmus (Beş Parmak Dağ) above the village and cattle graze in the overgrown auditorium of the theatre. Here you can find *Scilla hyacinthoides, Papaver rhoeas, Urtica pilulifera* and *Muscari comosum*.

The main road continues west, parallel with the lake shore, through the olive groves, past the flag-decked and green-painted tomb of a Muslim holy man and eventually up on to a cistus-covered heath (*Cistus parviflorus* with patches of pink *Convolvulus althaeoides* ssp *althaeoides* beneath it). You can then turn off left to reach Didyma and Miletus. These two great sites, expecially the massive temple of Apollo at Didyma, are worth visiting in their own right, but the road along the coast to Didyma also provides an interesting flora. Lots of *Cytinus hypocistus* can be found beneath the cistus scrub and between the bushes are various orchids – *Ophrys fusca iricolor, O. lutea, O. scolopax* ssp *cornuta, O. speculum, Orchis coriophora* and *O. morio*. In places the roadside verges are completely covered with thousands of *Gynandriris sisyrinchium* forming a purple haze.

Ephesus is managed for tourism and its splendours are fairly well tended, with all that that implies. If you search carefully, however, you can still find *Campanula ephesia* and orchids, and the ancient theatre forms a good backdrop to the sea of *Asphodeline lutea* on the excavators'

spoil tips. The verges of the main road near Ephesus can also be a happy hunting ground for Ophrys and in one place (where we had stopped simply to photograph a magnificent specimen of the Judas Tree, *Cercis siliquastrum*) we saw *Ophrys sphegodes* and *O. speculum* with large, handsome, perfectly formed flowers and in greater profusion and density than we have seen anywhere else.

West of İzmir, the Çeşme peninsula reaches out almost to touch the island of Chios. The flora here is very interesting. There is a wealth of orchid species in the pine woods that line the main road (we found *Orchis anatolica*, in its usual pink and also in a white form, *O. coriophora*, *O. italica*, *O. morio* ssp *picta*, *Aceras anthropophorum*, *Ophrys ferrum-equinum*, *O. fusca*, *O. lutea*, *O. scolopax* ssp *heldreichii*, *O. sphegodes*, *O. tenthredinifera* and *Limodorum abortivum*) and *Orchis laxiflora* ssp *palustris* grows in marshy areas near the sea. Along the road we also found *Alkanna tinctoria*, *Globularia alypum*, *Tuberaria guttata* and *Cyclamen hederifolium* leaves. On the cliffs above Çeşme, *Cyclamen persicum* and *Anacamptis pyramidalis* bloom among the *Cistus albidus* and *Asphodelus fistulosus*, and in the fields beside the main road you can find the small red *Tulipa undulatifolia*. Çeşme is a pleasant little town, its waterfront dominated by the old fort and a modern hotel. It is a good place to sit down and get your breath back after such a whistle-stop tour of a fascinating but exhausting area of country as we have given you in this article.


SOUTH-WEST
TURKEY
ANTALYA
DENİZLİ
MUĞLA
BODRUM
RHODES
FETHİYE
KAŞ
XANTHUS
PATARA
DATÇA
İZMİR
EPHESUS
AYDIN
MİLETUS
DİDYMA
TEFENNİ
YEŞİLOVA
KORKUTELİ
ELMALI
ÇAVDIR
ACIPAYAM
TLOS
KALKAN
DEMRE

Seed Exchange

ONE OF THE attractions of the SRGC seed list, I understand, is its early production. This can only be achieved if you send your seed, or a list of seed to come, by 31 October. There were more than a few late packets this season

Many of you used the seed proof packets illustrated in the '84 June Journal. I would like some of you to re-read the instructions particularly the first one – a DOUBLE FOLD and then turn over. If you don't put your name on, or in, the packets you cannot get donor's privileges. We could not use some of the items sent as we couldn't read, or even guess at, the names, so please print these. We want seed of garden worthy plants and if pushed for space annuals and biennials are taken out and used elsewhere. Paeonia seed is large and black, the soft red things are not fertile seed. We are reasonably certain that the *Boykinia jamesii* seed in the last list is not true, it is probably *B. aconitifolia*. *B. jamesii*, now *Telesonix jamesii*, is about 15cm tall and the flowers are pink. I have asked Jim Christie to write a plant portrait of it as he is the only one I know who grows it well in his garden (see page 282).

I am sure those of you who use the exchange will wish me to thank the many donors of seed and those members of the Angus group who work so hard on your behalf. One of them tells me that they do about 90 hours a week when we are busy.

Seeds or lists of seed to come must reach me by *31 October*. All overseas members will receive a list – have you paid your subscription?

All donors will receive a list. Home members who are not donors should fill in the label included in this Journal with your name, address and, of course, a stamp. The collection of various sized envelopes and sticky labels is becoming unwieldy, so please use the label.

Donors who want their list sent first class should also use the label and send to:

Miss Joyce Halley
16 Abercrombie Street
Barnhill
Dundee DD5 2NX

Many thanks for the letters and cards sent, we do appreciate them.

Two autumn gentians in Nepal

HEATHER SALZEN

IN THE COURSE of a six-week trek across north-east Nepal in the late autumn of 1982 two gentians were found in flower. The first, *G. ornata* Wall, grew in open turf at 3,500m at the summit of the Salpa Pass, where rhododendron forest gives way to rhododendron heath. The Salpa is the easternmost of three ridges which divide the farthest north-east area of Nepal between the Tamur and Arun valleys from the great ravine of the Dudh Kosi which drains the Everest massif – the Khumbu Himal.

G. ornata

Fig 129 *Calypso bulbosa* – a little slipper orchid of North American forests where its eye-catching pink is in marked contrast to the drabness of the surrounding conifers. It grows in pine litter a few feet from paths where the shade under the trees becomes too dense for the carpeting *Cornus canadensis* to flourish. The flower is said to be variable but colonies found flowering in late June near the Mistaya Falls, Alberta and in the Mount Robson area of British Columbia were identical with a small amount of carmine spotting and a crest of bright yellow hairs on the pouch lip. Painting by Anne Chambers


AMC

In bright sunshine on the 25 November *G. ornata* was in full bloom, its almost stemless sky-blue trumpets studding the short turf in which it grew in a rather open association with *Hemiphragma heterophyllum*, a small silver-leaved potentilla and sedges. A fine clump growing at eye-level on a bank beside the sunken eroded trail showed off the dark blackish-brown stripes on the outside of the corolla and the short narrow leaves. *G. ornata* must have only recently come into bloom for no capsules could be found.

A week later, on 2 December, the second gentian, *G. depressa* D. Don, was first seen at 3,600m beside the steep trail which leads from the Dudh Kosi ravine to the Sherpa village of Namche Bazaar. A recent light snowfall was melting in the bright sunshine. A few pale blue flowers were open on the wide mats of cruciform shoots which make this gentian an attractive plant even when not in flower. The tubby flowers are sky-blue with large white plicae between the corolla lobe and attractive dark red bracts subtending the flowers (Fig 129). During the following week *G. depressa* was found throughout the Solo Khumbu area north and east of Namche. It was especially abundant, and fruiting prolifically in the valley of the Bhote Khosi leading to Thami village and the Nangpa Là Pass. This runs west to east and thus lies in the monsoon rainshadow and is dry.

G. depressa

G. depressa grew always on gravelly banks in what must be very well-drained and dry conditions, with rainfall only during the summer months. The area experiences little snow below 6,500m so this gentian survives very low night temperatures and a very dry winter climate with daytime sunshine.

Fruiting capsules were abundant and I collected seed. On returning home in February 1983 this was offered to Aberdeen members and some was distributed elsewhere. Seed sown in March 1983 produced a number of seedlings. In late summer these were planted out in a trough and raised beds in my Aberdeen garden. Three of the young plants were covered with an open-ended frame during winter 1983/84, grew away well the following spring and by the autumn each were some 25cm across. Two formed flower buds which remained tantalisingly closed until a day of late sunshine in mid-October when two flowers opened. Other seedlings, left unprotected from winter wet, have not thrived but survive as very small non-flowering plants.

In its native habitat high in the Himalaya at an altitude of 28°N, which is that of north Africa, *Gentiana depressa* receives a much greater degree of insolation, both summer and winter, than it ever will in a Scottish garden. Perhaps a sun-lamp is the answer!

I would be interested to hear from anyone who had my Nepal seed of their experience of growing this beautiful little gentian and persuading it to flower well.

Heathers for the small garden

J. N. AITKEN

IT IS NOW THIRTY YEARS since the virtues of the heaths and heathers were extolled by the late Norman Webster in a series of five articles (SRGC, Volume IV, Parts 1–4 and Volume V, Part 1). Most of what was written then is still true today. In his introductory article the author mentioned six main groups of heathers and they are perhaps worth mentioning again here. His list contained winter flowering heaths (*Erica carnea*); tree heaths (*Erica arborea*); bell heather (*Erica cinerea*); cross leaved heaths (*Erica tetralix*); Cornish heath (*Erica vagans*); common heather (*Calluna vulgaris*) and the hybrid heaths such as *Erica X darleyensis*. It is curious that the list omits the Dorset heath (*Erica ciliaris*) the Irish heath (*Daboecia cantabrica*) and the Portuguese heath (*Erica umbellata*) though some mention of them is made later in the series.

The object of this article is to offer guidance in the choice of plants to those members interested in starting a collection to provide all the year round colour, an attribute that few other plant groups can claim. However, such a claim must be taken with some reservations. Heather catalogues often specify that a particular variety will flower in December for example, but in northern gardens and indeed at higher elevations flowering will generally be much later. In these circumstances colour may be obtained by the use of foliage varieties.

There is no doubt that mass planting of groups of individual varieties, together with dwarf conifers, will produce the natural effect which so many of us would like to see in our garden. This method of planting is entirely suitable for larger gardens of an acre or more.

But it is in the smaller garden, and there are many more small gardens than large ones, that the mass planting of a single variety can become flat and uninteresting and inevitably because of lack of space leads to the exclusion of the many varieties required to provide all year round colour. In such circumstances a heather bed may be constructed using single plants of as many different varieties as possible. Provided that a choice has been made from winter flowering, late spring flowering; mid-summer; autumn flowering and coloured foliage plants, it naturally follows that colour will be provided throughout the year. Further interest may be given by the use of dwarf conifers to give

height. The many different habits of growth and the many shades of green foliage also provide additional interest.

In my own garden which extends to about one acre I have used both types of planting. A long bed of about 100 dwarf rhododendrons has its front edge planted with twenty heather varieties in groups of five. This ensures some colour in the bed during the period when there is no rhododendron in flower. Another bed has been planted with heather in groups of three. Additional interest is provided by planting a group of seven red maples. These provide colour in June which is at the end of the main spring flowering season – and before the start of the mid-summer flowering of the cinereas. In another bed single plants of heaths, heathers and daboecias blend harmoniously with *Picea pungens* 'Kostleri', *Abies koreana, Pinus nidiformis, Rhododendron yakushimanum, R. camtschaticum, R. forrestii* and many other plants not normally found in a heather bed. The use of such plants as clematis as companions for heathers, as has been suggested in a recent TV programme, does not appeal to me. The large brightly coloured flowers must look slightly incongruous and the sprawling stems from October to February can do nothing to enhance the appearance of the bed.

Many would argue that the use of maples in a heather bed would also look odd, but it should be made clear that they were grown from seed and the heathers from cuttings. The growth of each has been in proportion and after eight years they still do not look out of place. In winter when the carneas and their hybrids are in flower the deciduous maples are hardly noticeable.

In the small garden and even in the smallest heather bed the use of concordant species can do much to improve the architectural appearance, the botanical interest and the maintenance of colour for long periods. The enthusiast is well advised to experiment.

The site

The site should be open and preferably away from trees. Soil should be lime-free and although some of the carneas can tolerate lime they will never produce of their best. Before planting, perennial weeds should be eliminated and where there is a suspicion of lime as in new gardens which were previously farm land, some peat should be incorporated in the top layer of soil. In very flat beds it may be an advantage to vary the contours. This may be done by the use of peat blocks. However, this is not absolutely essential as height variations may be achieved by the correct choice of plants. Plantings should be staggered and straight rows avoided. In isolated beds surrounded by paths or grass, taller growing varieties should be confined to the middle of the bed. In beds

where there is no access to one side, eg beds which have the garden boundary as one edge, taller varieties should be placed at the back. Distances between plants will vary according to variety. Many of the carneas will require at least 50cm whilst some slow growing callunas need as little as 30cm. It is obvious that beginners will need some help in making a choice of varieties. With this in view the remainder of this article will be devoted to a description of my choice of the best.

Varieties

Since 1954, when the first of the original series of articles was published, many new varieties of *Calluna vulgaris* have been introduced. This makes my selection rather more difficult. Choice is further compounded because many white forms for example flower at different times, or the grower may require a form suitable for the front and another taller growing form for the back of the bed. In view of this it seems perfectly reasonable to list my selection first of all under colour of flower and, within this category, under season of flowering (ie early, mid-season or late).

Calluna vulgaris

White varieties

The most outstanding introduction of recent years is 'Kinlochruel'. This double flowered white is a sport from the better known 'County Wicklow'. Very free flowering and of medium height the flowers are a glistening white. It is best planted mid-way between the highest and lowest growing varieties. With me this plant is at its best in September. 'Mullardoch' makes rounded hummocks of mid-green, congested foliage and many small flowers. Attaining a height of no more than 20cm it is ideal for the front of the bed. It starts early in July. Where there is need for a taller mid-season variety one can do no better than plant 'August Beauty' up to 60cm with long flower spikes.

Pink flowered varieties

'H. E. Beale' is so well known as to need little in the way of description. It has up to 25cm long spikes of double pink flowers and is an excellent background plant up to about 60cm. In some ways superior with flowers of deeper pink is 'Peter Sparkes'. Both require the same position and flower during September and October. A low growing mid-season variety in this group is 'J. H. Hamilton' with deeper pink double flowers and darkish green foliage.

Red or crimson varieties

In this group there are three forms all worthy of inclusion in any collection. 'Alportii' is probably the tallest growing. 'Beoley Crimson' and 'Darkness' are intermediate. All three are upright growing plants

with brilliant ruby red flowers. So far as I am aware there is no dwarf variety with the same flower colour. The flowering period is August to October.

Mauve/lilac varieties

The common heather would undoubtedly find its way into this group and naturally there are many forms to choose from. First and foremost I would choose 'Hiemalis' not because of the flowers but because it bridges the gap between the autumn flowering callunas and the early winter flowering 'carneas'. In some gardens it has been known to flower into January. My second choice would be a slightly taller plant 'Silver Rose' with grey-green foliage and pale mauve flowers, in August and September. Worth including in this group, if only to give height variation is 'Mrs Ronald Gray'. It is very prostrate seldom exceeding 8cm and with purple flowers from August to September.

Foliage varieties

Most of these will give colour over long periods and most will produce flowers as an added bonus. Time of flowering in this group is less important than colour of foliage and habit of growth. In all cases colour will be at its best if grown in full sun.

My first choice in this group would be 'Multicolour', a slow growing dwarf of about 30–40cm, with bright red tips in the spring turning to bronze red in the summer and lilac pink flowers in August. 'Beoley Gold' is a taller plant with gold foliage and looks even more attractive when the single white flowers appear in August. Two unusual foliage shades are provided by 'Inshriach Bronze' and 'Salmon Leap', the latter having a salmon tinge all over in mid-summer. The yellow-gold foliage of the variety 'Sir John Charrington' provides a most attractive foil for the crimson flowers. This is a good middle ground plant. Pink foliage is provided by 'Mrs Pat' which reaches a height of only 13cm. In some gardens it is not reliable and propagation often proves difficult. The grey foliage of the medium sized cultivars 'Silver Queen' and 'Silver Knight' is in distinct contrast to the other foliage varieties. An even more unusual plant is one which I acquired under the name for which I have no authority – 'New Sparkes'. For a long period in summer it looks as though it carries a profusion of white flowers but in fact it is the pale grey foliage which gives it this appearance. Once again propagation has proved difficult.

Erica carnea

With these, the flowering period may extend from December to May

depending on location, elevation and choice of varieties. Heights may vary from 15-30cm so that placement in the heather bed presents no problem. There is no doubt that confusion reigns in the naming of many of these plants and marked similarities in flower colour exist among the many named varieties. Some readers may regret the omission of their particular favourite from any choice for a representative collection but they may rest assured that if the name has been omitted the flower colour has not. The selection has been made bearing in mind the need for as long a flowering period and as wide a variety of colour as is possible. My choice has been made in order of increasing depth of colour from white through very pale pink to ruby red and includes 'Springwood White' (Fig 128), 'C. J. Backhouse', 'March Seedling', 'Pink Spangles', 'Eileen Porter', 'Vivellii' and 'Myretoun Ruby'. It is worth mentioning that in some gardens at sea level 'Eileen Porter' will flower as early as October although in my own garden the true flower colour is not seen until February. Foliage plants of merit include *E. carnea* 'Aurea' and 'Foxhollow'.

Erica cinerea

With well over 100 varieties to choose from selection of the best is difficult. In my garden flowering starts about the beginning of July. Later flowering varieties last through until the end of October. Flower colour ranges from white to dark purple as in the variety 'Velvet Night'. So dark is this form that it needs the white of *E. cinerea* 'Alba Major' to show it off. Both benefit from pruning as in the case with all strong growing forms. Not so with my favourite among bell heathers 'Mrs Dill'. A compact plant of 15cm or so with glowing pink flowers it may be planted at the front of the bed together with *E. cinerea coccinea* 'Smith's Var' and *E. cinerea* 'Apricot Charm' a slow growing plant with yellow foliage tinged apricot. To obtain the full range of colour in a collection, my selection would include the upright growing form 'Cevennes' with myriads of mauve flowers, 'Pentreath' rich plum purple, 'Domino' ivory flowers with a black stigma, 'Eden Valley' a bicolour with pale lilac rose flowers, 'Joyce Burfitt' brick red, 'C. G. Best' rose pink and finally 'Murcar' a plant which I found growing on the Murcar Golf Course here near Aberdeen. This is a bicolour with purple and white flowers over an exceptionably long period. Worthwhile foliage plants include 'Golden Drop' and 'Glencairn' with red tips to the foliage.

Erica ciliaris

The Dorset heath for a long time was thought not to be hardy in

Scotland but the following varieties have survived with me over the past 10 years – 'Corfe Castle' with almost cherry red flowers, 'David McClintock' a rose and white bicolour and 'Mrs C. H. Gill' with crimson flowers. All are good middle ground plants flowering between July and October and require careful pruning.

Erica mediterranea (syn erigena)
The Mediterranean heath is easily distinguishable from its close relative *E. carnea* by its dense erect growth. Heights may vary from 60 to 120cm and their placement in the heather bed presents no problem. Flowering is between the beginning of March and the end of May. Their habit of growth makes them susceptible to snow damage. Outstanding among them are 'Irish Dusk' up to 60 cm with dark foliage and deep pink flowers, 'W. T. Ratcliff' also growing to 60cm with pure white flowers and a sport from it called 'Golden Lady' worth growing for its yellow gold foliage.

Erica tetralix
The cross leaved heath thrives in wetter areas and because of the grey foliage make a useful addition to the mixed bed. Among the best are 'Alba Mollis', 'Constance Underwood' and 'Pink Star'. Heights vary from 15 to 30cm.

Daboecia cantabrica
This is a shrubby plant with leaves and flowers longer than those of the ericas. Some are susceptible to damage in a severe winter nevertheless they are worth growing for their long flowering period from June to October. Among the best are 'Jack Drake' of very dwarf stature and crimson flowers, 'Silverwells' an excellent white and 'William Buchanan' with rosy crimson flowers. A single plant may reach 1m across and be 50cm high. An excellent colour break is 'Donard Pink' a vigorous grower with pink-white flowers.

Erica vagans
The Cornish heath does well on heavy soils. Flowering time is between August and October. In this group a plant much in demand for its clear yellow foliage is 'Valerie Proudley'; the white flowers are not important. A representative collection should also include 'Diana Hornibrook', 'Mrs D. F. Maxwell', 'St Keverne' and 'Lyonesse' with rosy-pink, deep rose, pink and white flowers respectively. The height seldom exceeds 30cm but their spreading habit should be taken into account when planting.

Hybrid heathers

The name *E.* x *darleyensis* (*E. carnea* x *E. mediterranea*) provides blanket cover for a number of important garden plants. They include 'Furzey' (syn 'Cherry Stevens') up to 45cm high. It produces a profusion of rosy-pink flowers from December to April. 'George Rendall', deep pink is also early flowering with mid-green foliage and pink and cream new growth in the spring. 'Silbersmelze' is a plant of German origin which appears in catalogues under a variety of different names including 'Molten Silver' and 'Silver Beads'. About 45cm high the flowers are pure white with brown stamens; it flowers from February to May. 'Jack Brummage' is also useful with yellow foliage and heliotrope flowers.

Good foreground plants are *E.* x *preaegeri* (*E. mackaiana* x *E. tetralix*) 'Irish Lemon'. Lovely lemon yellow new growth in the spring is followed by largish blue-pink flowers. *E.* x *watsonii* (*E. ciliaris* x *tetralix*) 'Dawn' has flowers of similar colour and reddish spring growth. Flowering is from July to September. A must for every collection is *E.* x *williamsii* (*E. vagans* x *E. tetralix*) 'P. D. Williams' with flowers of an unusual shade of lilac in July. *E.* x *veitchii* (*E. arborea* x *E. lusitanica*) 'Gold Tips' is a tree heath with golden yellow foliage in spring and white flowers. The height at the moment is uncertain but may reach 1m. Two forms of *E. mackaiana* are also worthy of inclusion in a comprehensive collection, 'Plena' with pink flowers and 'Dr Ronald Gray' a beautiful white form. Finally the Portuguese heath *E. umbellata*, long believed to be unsuitable for this part of the country, can be damaged by heavy snow or severe frost but despite this it has survived in my garden for over twenty years. When well grown it is one of the most beautiful of all heaths flowering as it does in June a generally poor month for flowering heaths and heathers.

In conclusion I have frequently been asked to name other plants which would complement the heathers and add botanical interest. I have no hesitation in suggesting many of the wind-susceptible cassiopes, all the phyllodoces, *Andromeda polifolia, Phyllothamnus erectus, Bruckenthalia spiculifolia* some of the dwarf berrying shrubs such as *Gaultheria cuneata*, and *Pernettya pentlandii, Menziesia ciliicalyx* and even *Hebe* 'Broughton Gem' will not look out of place.

The huge list of available varieties must surely encourage some owners of small gardens to start a collection. As I look out of the window at the main heather bed on a cold dull day in early march, I cannot fail to be impressed by the ability of the carneas to give of their best when everything around is so damp and dismal.

Slugs

GARTH FOSTER

West of Scotland Agricultural College

THE AVERAGE ROCKERY can support up to ten species of slug. Prostrate plants, good quality soil and rock crevices all combine to provide ideal conditions for the survival and multiplication of slugs. Slugs seem to defy natural laws in that several species can live in the same place doing the same thing. If there are differences between species then they must be subtle. All slugs are nocturnal; they all prefer warm, moist nights for activity and they can all feed on a wide range of organic material, few plants being resistant to the rasping action of their file-like tongues.

Slugs belong to the group of animals known as molluscs. Molluscs are all soft-bodied and most have a shell or, in bivalves, two shells. Most molluscs are marine, such as mussels, clams, oysters, cockles, scallops, whelks, cuttlefish, squids and octopus. Some snails are able to survive on dry land, using an air-breathing lung, and slugs are really special shell-less snails. Of all the animals without backbones, molluscs are the most intelligent, octopus being rated the highest, mainly because of their well-developed sense of touch. The special forms of behaviour seen in some slugs, and their sensitivity, suggest that they too have intelligence well above that of most most lower life forms.

Slugs have a highly characteristic form. They have four tentacles on the head, the top two bearing eyes very similar in structure to those of higher animals. The tentacles are retracted down into the head when the animals are at rest. The back is partly covered by the mantle, a remnant of the stucture that produced the shell in their snail ancestors. The hole leading to the lung is along the righthand edge of the mantle and can often be seen opening and closing when the slug is in difficulty. Like many lower animals, each slug is both male and female but, unusually in animals, slugs are not always self-sterile; a single organ in the body can simultaneously produce both eggs and sperm. The eggs are laid under debris or just below the soil surface; they are rounded, partly transparent and sometimes a little slimy. Some slugs lay them singly but those of the grey field slugs are laid in clusters and are the ones most often seen. Slugs mature within a year but most statements about the life-time cycle are necessarily vague as slugs are difficult creatures to study. The life-span is, for example, unclear but certainly most species

live at least two years in the wild and may lay several batches of eggs in that time. The point of weakness in slugs is undoubtedly their reliance on slime. They move by muscular ripples along the sole of their single 'foot'. Slime is produced all over the body but mainly from just below the mouth as a lubricant for the foot. The slime-trails produced in movement give away the presence of slugs but the real weakness is that slime production involves use of a great deal of water. Slugs are therefore obliged to avoid dry times or places. Thus they are most common in the west of Britain and are found more in gardens than in open country because of the availability of places to hide during the day. Young slugs, or sluglets, are rarely seen because they live almost entirely below ground; not being good diggers, they are not suited to the heavier clay soils but prefer well-worked loamy soil with plenty of dead leaves. Although the slug's rough tongue is mainly adapted for rasping leaves, slugs can use it to tunnel into soft tissues. Contrary to what might be thought, slugs can be devastating pests in years of drought because those which survive do so by feeding underground on bulbs and rhizomes.

Slug species can be easily identified into groups:

Field slugs
Deroceras species – The 'grey field slug' (*D. reticulatum*), as it is known, is the most common slug in Britain but it is more often buff-coloured and dappled with brown spots. It produces white slime when disturbed so that it appears to change colour. The 'chestnut slug' (*D. caruanae*) is very much on the increase as a pest; it is semitransparent and fawn-coloured, with a darker brown mantle, and has clear slime. It is most unusual in that it almost seems to fight back when disturbed, breaking into a sluggish gallop.

Keeled slugs
Milax species – They are also known as 'burrowing slugs' because the adults are more prepared to go underground than most species. The sharp keel runs from the back of the mantle to the tip of the tail whereas other species either have no keel or have only a short one confined to the rear end. Keeled slugs include the most serious pest, a species without common name but by coincidence with a remainder of its status in its Latin name, *Milax budapestensis*. This brown or black slug can be recognised by the dark central stripe on the sole and by its unusual way of curling into a letter 'C' if disturbed, when other species would normally hunch-up.

Garden slugs

Arion species – Several blue-black or brown slugs with flat bodies and a yellowish foot are important pests despite their small size. Just how little is known of these common slugs can be judged from the fact that one species (*A. owenii*) from Ireland, southern Scotland, Wales, and mainly the west of England was first recognised as a distinct species in 1979.

Giant slugs

Arion and *Limax* species – The 'black slug' (*Arion ater*) is the very large species more common in the countryside than in gardens; it is so big that it can move around in daylight hours without suffering from a damaging water loss. Other species in this group share with it a pale fringe to the foot marked with alternating narrow and wide dark stripes. Commoner in gardens is the brown or orange *Arion subfuscus*, which has a very sticky orange slime. On the increase is the 'red slug' (*Arion ater rufus*), a yet larger version of the 'black slug'; one specimen from a garden in Ayrshire weighed over an ounce, thus being heavier than the average mouse! The most interesting of the larger slugs is the 'grey slug' or 'leopard slug' (*Limax maximus*). Up to 20cm long, it is usually marked with darker spots and stripes, and is common around houses where loose paving slabs, piles of rubble or rockeries provide a place for it to return to each morning. Its antics during mating, involving a long climb and hanging down on entwined threads, takes some believing; two slugs were recently caught *Flagrante delicto* in someone's hair as he opened his garage door. The equivalent of a slug heaven was achieved when some growers in the Clyde Valley used plastic channels filled with circulating nutrient solution to grow tomatoes, the so-called Nutrient Film Technique. This results in a luxuriant mat of fully-exposed roots, a superb diet for 'leopard slugs', which achieved some extraordinary growth rates; study of their waste revealed that they had also been feeding on the foam polystyrene matting under the troughs, presumably as a form of substitute roughage.

Slug control

Slug control is still at a primitive level and largely owes to the chance discovery in 1934 that a white solid fuel sold as 'Meta' for use in picnic stoves was both attractive and deadly to slugs. Nearly all of the slug-killers on the market are based on this strange material known as metaldehyde. It does not kill slugs immediately but partly paralyses them and causes the production of large amounts of slime; in wet and

damp conditions poisoned slugs may recover but usually they shrivel up when left stranded "the day after the night before".

Metaldehyde is available in the old-fashioned powder form but the majority is sold as pelleted baits based on bran. Pellets come in two sizes, the smaller 'micropellets' giving more baiting points for the price. Most pellets are coloured blue and there is even one enterprising French form (Helarion) sold as a mixture of red, white and blue pellets! Now that many pets are trained to eat pelleted food there is a risk that they will be poisoned by eating slug bait. The manufacturers have largely overcome this problem by incorporating a dog-repellent into the pellets. The gardener can minimise the risk by broadcasting pellets rather than placing them in heaps. In rockeries, it should be safe enough to concentrate pellets underneath prostrate plants and rocks.

Metaldehyde can now be bought in a special liquid form (Tumble-slug) designed to produce blobs which can be left in the open without fear of poisoning pets. There is also a tape (Imp Slug Tape) which can be used as a barrier to protect specially-valued plants.

Another material sold in bait-form is methiocarb (Draza or Slug Gard). This is a direct poison and is more effective than metaldehyde, specially in the dull and wet conditions when slugs are most active. Unfortunately it is rather more expensive and is not so easy to find in Garden Centres. Again there is a risk in misuse of this material as it is poisonous to birds; and dead slugs left exposed after baiting should be removed and buried in the compost heap. The blue colour of the pellets is the one least likely to attract birds.

In addition to the precautions already mentioned, baiting should not be attempted until you are sure that slugs are active. Warm, moist and windless conditions overnight in spring or autumn are suitable but the presence of the active slugs at other times should be checked by having a dummy run with small amounts of bait applied under slates or tiles around the garden the night before you commit yourself to a relatively expensive overall treatment. Because baits become ineffective when they are broken down and washed away by rain, periods of heavy rainfall should be avoided and bait should be applied in the evening so that it has the maximum chance of being available when the slugs come out. If baits go mouldy they should be replaced.

There are plenty of old wives' tales about slug control. One of the strangest lies in the so-called 'organic' method of control involving the use of aluminium sulphate. Anything less organic would be hard to find and one should remember that a synthetic poison such as metaldehyde breaks down to leave only carbon dioxide and water, something which surely should be more acceptable to the organic grower. Other

remedies also hinge on the idea of "salt on the tail", with applications of soot, ash and lime around plants presumably owing their effectiveness to the release of salts which irritate slugs and cause them to produce so much slime that they are at risk of drying out. A spray of copper sulphate (one pound in three gallons of water), applied when slugs are active, will reduce their numbers. Copper sulphate can be bought from chemists; fungicides based on copper also control slugs. Mulches of fallen leaves, another 'organic' suggestion, may have precisely the opposite effect to control but the large amounts of tannin in oak leaves may account for their proposed use.

Biological control can also be beneficial. Most gardeners now recognise the value of birds, hedgehogs, toads and ground beetles in keeping slug numbers down but how about the torch? A human being armed with a torch and a pair of scissors can be very effective in reducing slug numbers. Trapping slugs with the usual range of used grapefruit halves and other attractive vegetable matter is all very well provided the traps are checked frequently; if not, then all that happens is that slugs get a free feed and go on their way. Slugs get food and shelter from plant litter and the main way of controlling them should be to keep the garden tidy.

Alpines from seed - an alternative view

BARRY McWILLIAM

ALL ASPECTS of horticulture suffer from inaccurate nomenclature, none more than alpine gardening, where so many species are unavailable commercially, or can only be propagated from seed, and where our societies organise most-welcome opportunities for seed exchange.

In growing alpines from seed most of us must have tales of plants which failed to match the label. My own experience began more than thirty years ago with my father's copy of that largest of all seed catalogues and *Hypericum coris*; it germinated well but was undoubtedly *Hypericum polyphyllum*. Oddly enough I suspect that the *Hypericum fragile*, which I obtained from another commercial source more recently, is, in fact, the elusive *Hypericum coris*. Full circle! The same commercial source, incidentally, supplied seed labelled *Androsace lanuginosa*, which turned out to be the much rarer *A. geraniifolia*.

From seed exchanges the examples are too numerous to catalogue. *Allium amabile* at my first attempt produced what seemed to be a pink, microform of *A. cernuum*, but a second try got it right. *Phyteuma hemisphaericum* turned out to be *Ph. scheuchzeri* first time, and so, surprisingly, did *Ph. humile*. Consequently, 1984's seed of *Phyteuma* (*Physoplexis*) *comosum* (Fig 123) was treated with some scepticism, but does appear to be true. *Crepis incana* turned into *Hieracium bombycinum*. Most of the above are errors for which one can imagine an explanation. Much less understandable is how *Lychis flos-jovis* seed came to masquerade as *Petrocallis pyrenaica* (Fig 134).

My latest example gives some cause for disquiet, however. The seed of *Jeffersonia dubia* looked startlingly like Berberis seed. Hardly surprising; Jeffersonia is a member of the Berberidaceae. The seedlings also looked remarkably like Berberis, as I noted in my notebook when they emerged. The sole surviving plant is now undoubtedly a Berberis, probably *Berberis darwinii*. Could this be someone's idea of a joke?

Another result of this sort of confusion is that even our specialist nurserymen, who learn their plants by experience rather than as botanists, offer plants wrongly labelled. One such offered me the same *Allium cernuum* as *A. amabile*, because he, too, had received seed from the

same exchange. Another offered a good form of *Saxifraga oppositifolia* as *S. retusa*, and *Potentilla megalantha* (*fragiformis*) as *Geum montanum*.

A major obstacle to improving the state of our nomenclature is that most of our available books are little more than lists. Consider how much help your own texts would be in distinguishing *Alyssum serpyllifolium* from *A. wulfenianum*, or *Aethionema pulchellum* from *Ae. grandiflorum*. Few of us can run to floras on Europe, North America, New Zealand, the Himalayas, Japan, etc, etc, but we do need more botanical detail from our books, or illustrations which are really diagnostic. If bird watchers can do it in a single volume, surely alpine specialists can manage in several. Publishers please note.

Fig 128 *Erica carnea* 'Springwood White' (see page 280) Photo: D. Wilkie

Fig 129 *Gentiana depressa* (see page 259) Photo: D. Wilkie

Fig 130 *Cyclamen mirabile* (see page 281) Photo: J. Good

Fig 131 *Saxifraga grisebachii* (see page 276) Photo: M. G. Hodgmann

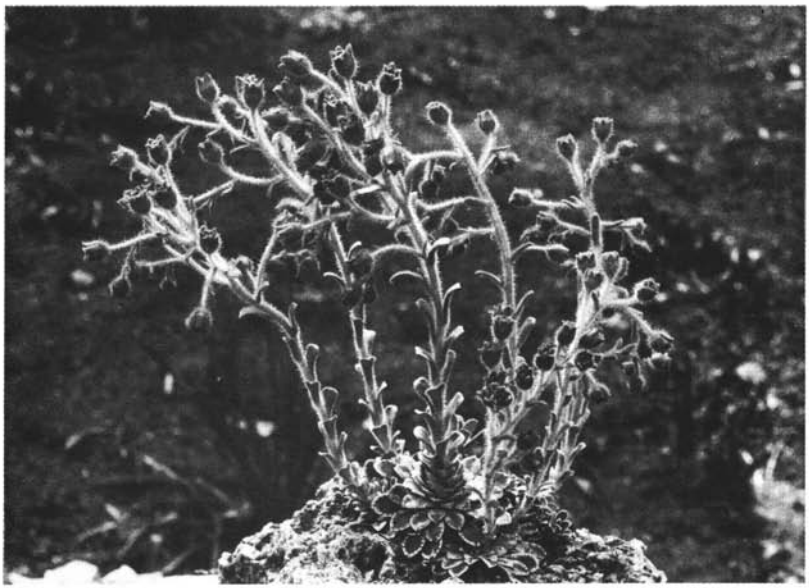
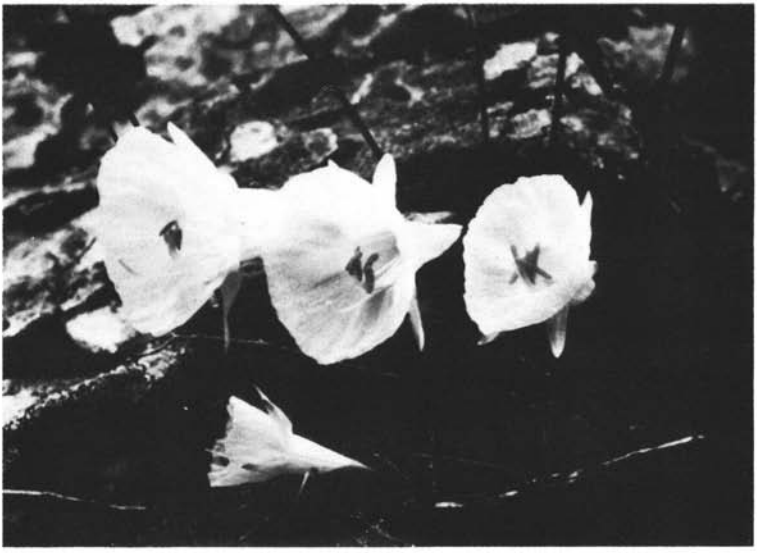


Fig 132 *Helipterum albicans* (see page 229) Photo: Brenda and John Anderson

Fig 133 *Narcissus cantabricus* (see page 310) Photo: C. North



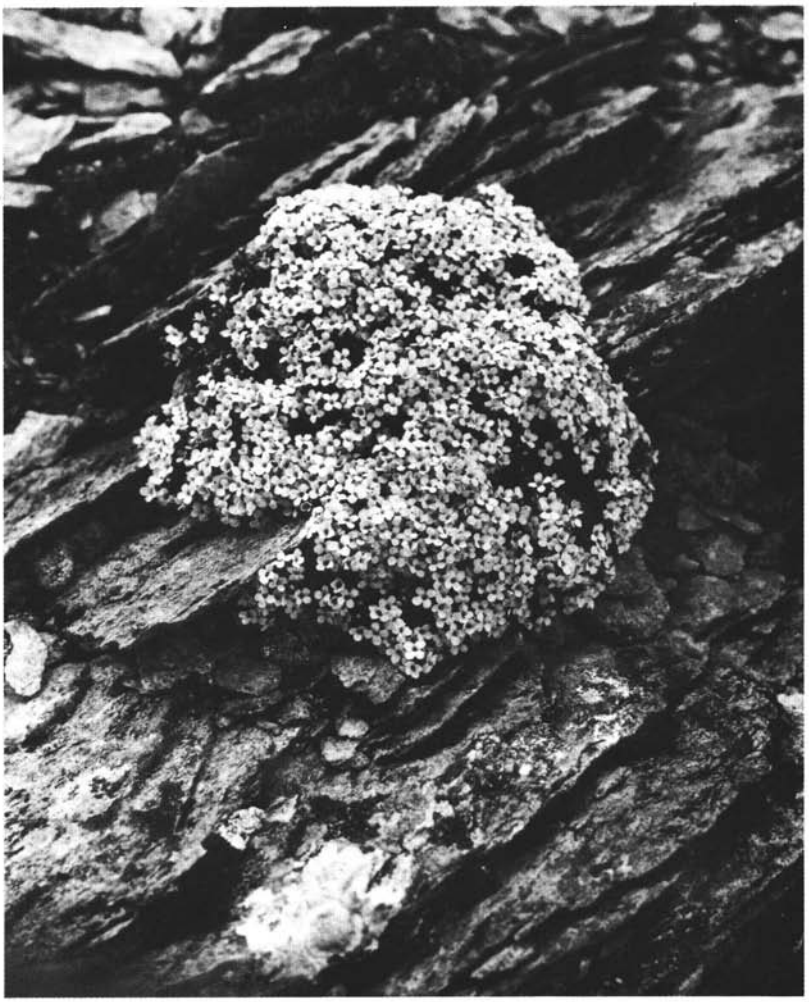


Fig 134 *Petrocallis pyrenaica* (see page 273) Photo: M. G. Hodgmann

Plant portraits

Iris winogradowii

Harold Esslemont

Iris winogradowii, an iris of the Reticulata group, is a native of the Caucasus Mountains, where it grows in high alpine meadows. It is a beautiful species with sturdy yellow flowers, with an orange crest and a few darker spots on the falls (Fig 125).

It is still a relatively expensive bulb, but presents no difficulty in cultivation. One may be tempted to grow it in the alpine house, but my experience is that it does much better in Scotland in a sunny, open situation out of doors. It is a high alpine in nature and has a short period of dormancy. With me, the leaves do not die back until the end of June and new roots are developing at the beginning of August.

Propagation is by natural increase which is reasonable if the bulbs are happy, by seed or by the rice grains which form at the base of the bulbs.

Seed formation is something of a lottery and depends a great deal on the weather at the time of flowering. Hand pollination certainly helps. One year I was lucky and sent over a hundred seeds to the exchange; the next year there were none.

If you have the patience and wish to build up a large stock, rice grains are the answer.

Lift the mother bulbs carefully in June and detach the small rice grains. Prepare a 20-inch pan with a gritty John Innes No 3 mixture and space out a hundred rice grains over the surface. Lightly cover and finish off with a coating of gravel (turkey grit). Sink the pan in an open frame and only cover during winter weather. When growth commences, feed with a diluted, liquid fertiliser every few weeks.

After a year, lift the bulbs when dormant and repot, this time allotting only fifty bulbs to a pan.

By the end of the second year, 100 bulbs should be ready to plant in the open ground and, hopefully, they will flower in another two or three years.

I have grown this iris for some twenty-five years and can warmly recommend it.

Saxifraga grisebachii

Joan Stead

Formerly classed as an Engleria saxifrage, this has now been placed with other Englerias (ssp *media, luteo-viridis, porophylla, stribrnyi,* and *sempervivum*) and with Kabschias, in the section Porophyllum.

It is found in the wild in Albania and adjacent parts of Greece and southern Bulgaria.

Like so many saxifrages, it is an avid lime-lover and is generally found growing in limestone crevices.

The rosettes of flat spathulate leaves have a grey incrustation of lime and are 2-5cm in diameter. Flowering rosettes show a crimson centre early in the year, which elongates to form one or more hairy croziers, bearing purplish-pink flowers towards the tip with matching green-tipped stem leaves as hairy as the stem. The flowers themselves are the least part of the show. The inflorescence remains in beauty for many weeks in spring.

The selected form *S. grisebachii* Wisley var reputedly came from Albania; with its more showy crimson inflorescence, it is the most commercially available form (Fig. 131).

Suggested cultivation methods include – "good drainage, moist soil, good light, with no mid-day sun, atmospheric humidity, with no winter rain, and (usually) Alpine House cultivation." In our conditions (clay soil and 100cm of rain per year), I have found tufa cultivation is foolproof. A seedling or rooted cutting can be inserted in a 2cm deep hole bored in a piece of tufa which must be soaked before planting until bubbles cease to rise from it. There should be just enough compost to fill the hole. The plant's roots quickly penetrate the tufa. All my tufa subjects sit on a 5cm deep bed of sand, outside, facing south. In prolonged dry weather, they do get a good watering, and in winter, they are covered with a pane of glass, raised to ensure good ventilation.

Saxifraga grisebachii has grown like this since 1970, without fertiliser; repotting is impossible, but it has flowered annually, and has increased slowly and compactly.

For those interested in showing, the tufa is simply lifted, cleaned of moss and pressed on to a bed of damp sand in a seed tray, so that the protruding roots are not dried out. Other Engleria and Kabschia saxifrages respond excellently to this method of cultivation.

Primula reptans

Lyn Bezzant

Primula reptans is a member of the section Minutissimae and comes from the north-west Himalaya. It is one of the smallest of primulas, forming

dense mats of tiny, almost sessile, serrulate, deep green leaves. The branching stems of the mat-like undergrowth are shiny and a bright reddish pink. The relatively large, solitary flowers on short scapes are a deep, pure purple (Fig 135). Although not a very floriferous plant, the combination of rich green leaves and glowing purple blooms makes a very attractive picture. Flowering is usually in late May in cultivation. When well suited, *Primula reptans* spreads rapidly by rooting stolons.

In its native habitat it is a high alpine, growing in steep, gritty screes, kept damp and cool by frequent rains and mist, snow covered in winter. Normal weather conditions in the west of Scotland suit it well.

A reference noted in an AGS Bulletin to charcoal as a good growing medium, led to me experimenting with the following mixture as a potting compost for this plant:

Three parts peat and/or leafmould
Two parts sharp grit;
One part loam;
One part crushed charcoal (grind in an old mincer, discarding dust).

Use half grit and half charcoal as top dressing.

A 12cm plant had fourteen flowers in late March 1984, and was repotted after flowering. A fairly shallow pan is best. This primula makes a mass of fibrous roots. In early June the plant measured about 22cm across and bore over a hundred flowers.

Primula reptans should never be allowed to dry out. It appreciates frequent overhead spraying with water during the growing season, especially in hot, dry weather. A little liquid foliar feed is added to the water about once every three weeks. Slugs, caterpillars, aphids and other pests have to be guarded against. I often lift the plant out of the sand plunge to check for creatures lurking around the rim and in the vent of the pan. I keep the plant plunged in a cold frame all the year round, completely open from April to October, and lightly shaded in hot weather. Lights are put on during winter to protect from very heavy rain and severe weather. Other small plants have recently been planted out in a raised bed with ordinary well-drained compost. Propagation is by careful division in the growing season, or by detaching small rooted pieces from the edge of the plant and potting up in the compost mentioned above.

Gentiana froelichii

J. R. Johnstone

This little-known gentian (Fig 136) is a native of the Karawanken Mountains which straddle the border between Austria and Yugoslavia.

It has also been recorded in the Kamnik Alps on northern Yugoslavia. It grows at altitudes of 1,400-2,400m in screes, stony ground and in turf and humus areas overlying limestone. I have found it on the Hoch Obir in Carinthia growing in peaty soil in a well-drained position; the plants grew just below the ridge of an escarpment which dropped away almost sheer some 300m – drainage was, therefore, excellent!

Although its form is superficially that of an 'acaulis' gentian, it is quite distinct and, once seen, cannot be mistaken for any others in this group. *Gentian clusii* perhaps has the closest resemblance, especially in the very narrow-leafed forms which are found in the Karawanken Mountains. *Gentiana froelichii* forms a tufted rosette of upright narrow lanceolate leaves. These leaves are a lighter green than *G. clusii*, about 0.4cm wide by 3.5cm long, inwardly curved and grow in pairs up a short stem. Dead leaves persist on the lower part of the stems, the flower arises from about half-way-down the stem and is off-centre, unlike the 'acaulis' gentians which have terminal flowers centrally-placed on the stem. The flower stalk is about 2cm long and bears a 3cm long solitary flower, occasionally two flowers may be found. There are two or three pairs of leaves on the flower stem, these are broader and more triangular-shaped (0.6cm wide by 2cm long) than the main leaves. The uppermost pair of leaves are immediately behind the calyx; this is different from all the 'acaulis' gentians which have the upper-stem leaves set-down from the calyx.

The flower reaches a height of approximately 8cm and is mid-blue with a white base. It is tubular rather than trumpet-shaped; the mouth does not reflex and has no green speckling inside. The calyx is 1.5cm long with narrow, widely-separated teeth about 0.6cm long. Flowering time is July and August.

It is more difficult in cultivation than other gentians and seems to be better-suited to a pot rather than the open garden. A peaty or humus-rich limestone scree would seem to be the most suitable position in the garden; however, it is advisable to try plants in different locations until a place is found where they do well. Protection from winter wet would seem to be an advantage.

In pots, the plants are not too fussy on the compost, but it must be well-drained. This gentian is very resentful of disturbance so the roots must be disturbed as little as possible when repotting. If the plant can stay in its pot for more than one year, removal of surface compost and replacing with a top-dressing of JI No 2 would be advisable.

The only maintenance the plant needs is for the dead leaves to be carefully removed from the lower part of the rosettes and top-dressing added to cover the bare stalks which have been exposed. It is more

vulnerable to greenfly attack than the 'acaulis' gentians and should be regularly examined for these pests.

The seed ripens very fast; a plant can be shedding seed in late-July only two weeks from the time the flower first opened. Once the flowers have faded, I remove or tear the corolla so that moisture cannot lie inside and rot the seedpod then keep a close watch for signs of the pod splitting when the seed ripens.

Seed is undoubtedly the best method of propagation, it germinates very well, especially if it is sown fresh. Cutting may be taken in the same way as the 'acaulis' gentians, it is advisable to look for 'Irishman's cuttings' (sideshoots with a root already formed) this would be better done in springtime.

Gentiana froelichii is seldom seen in cultivation and due to its summer-time flowering, is rarely, if ever, seen at shows. Very little has been written about it in horticultural or botanical literature; its natural habitat is not in the main tourist areas of the Alps and it is difficult to see in the wild when not in flower. To the best of my knowledge, it is not offered by any nurserymen and does not often appear in seed lists.

In view of the aforementioned difficulties, anyone determined to obtain this gentian may find it necessary to visit the Karawanken Mountains. A visit in September or October or (as in my case) early-June may reward the lucky and diligent searcher with some seed.

Fritillaria minima and Fritillaria carduchorum

Ole Sonderhousen

In 1971 Martyn Rix described and named two new Fritillaria species from the south-east corner of Turkey. They were discovered seventeen years before by P. Davis and O. Polunin who visited this area plant-hunting. The two new species were *F. minima* and *F. carduchorum*.

The latter is rather common from the whole district south of Lake Van from Bitlis east over to the border of Iran. The flower is not always showy, too light in the colour, but a good one is light chocolate-coloured. This gives a good contrast to the yellow-green leaves, which often are decorative and spiralled (Fig 127).

The name *F. carduchorum* should be changed because of the nomenclature rules to *F. minuta* as this should have priority from 1859. As *F. carduchorum* has masses of bulbils, it is easy to propagate, so it has been in commerce for years.

F. minima was found south of Lake Van. For many years it was thought to be restricted only to one mountain and it therefore could be exterminated from this single place if too many persons collected it. But in the past it has been found in other places in the same area. In 1982 my

wife and I visited this corner of Turkey and we found *F. carduchorum* in several places and *F. minima* in two, both times together with *F. carduchorum*, very near to the melting snow on north-facing slopes mostly in grass. The plants from the new place were much stronger growing than those from the other place and most of the plants there had two flowers to a stem. The light-brown coloured flowers in the photo (Fig 127(b)) are caused by the fact that they have started to fade. *F. minima* has not as far as I know, until now, been in commerce.

The whole area is very beautiful and we had wonderful weather in mid-June, but as we had hired the car in Adana it was a very long drive from there, about 1,100km.

Since we collected our plants in 1982 there have been only two growing seasons until now so it is not possible to say anything about how they will do in the garden. Coming from a level of about 2,000-2,500m there should be no problems with hardiness but of course they are covered with one metre of snow in south-east Turkey and we have often only very little snow here in Denmark. But I do not think there should be any problem, as I have about 70 different Fritillaria species in flower from April to June outdoors here in Denmark.

Primula 'Gloria Johnstone'

Ray Johnstone

This hybrid between *Primula hirsuta* and *P. allionii* bears its flowers in umbels like the former whilst its foliage remains almost as compact as the latter. The effect at flowering time is of a ball of flowers completely hiding the foliage. The plant illustrated (Fig 126) was exhibited at Stirling 31 March 1984 in a 9cm (3½in) pot. The 7cm diameter cushion had thirty flower stems bearing a total of 139 blooms (an average of 4.6 flowers per stem). The flowers are similar to *P. hirsuta*, pinkish-purple with a white throat and are carried in umbels of 2-8 flowers per scape, a maximum of fourteen flowers on a single scape has been recorded.

The leaves are 1½ to 5cm long by 1 to 2cm broad. For about half its length from stem attachment point, the leaf is 3mm wide, it suddenly tapers outward over the next quarter length to its fullest width and then the last quarter is rounded but with coarsely-toothed margins. The leaf surface is sticky and is covered with yellowish glandular hairs. The flower stems are also sticky and glandular, about 3cm long from which point the individual flower scapes rise a further 1cm, the calyx and flower tube making up a further 1cm.

The calyx is similar to *P. hirsuta*, glandular and toothed to the middle. Flowering time is slightly later than *P. allionii* and before *P. hirsuta*, ie late March-early April when kept in an alpine house or frame.

This plant was selected from about twelve seedlings raised from a crossing of *P. hirsuta* (seed parent) and *P. allionii* made in 1978. It is kept in a frame or alpine house and given the same treatment as *P. allionii*.

Cyclamen mirabile

John Good

This species was described by Hildebrand in 1906 from a single cultivated plant which died without setting seed. Furthermore, the little herbarium material collected at the same time was lost during the Second World War so that the species was lost both to science and horticulture until rediscovered by Davis and Polunin in W. Turkey in 1956. Further material was collected by Albury, Cheese and Watson in 1965 and by Cheese, Mitchell and Watson in 1966. A further and infamous introduction occurred in 1971-72 when 50,000 tubers (including that shown in Fig 130) were imported by a bulb merchant in the mistaken belief that they were the common *C. hederifolium*. The enraged reaction to such wholesale depredation of a rare species was recorded in the Bulletin of the AGS (Vol.41, 87-88).

Superficially *C. mirabile* bears a very close resemblance to *C. cilicium* and it flowers at the same time of year (September-October). The chief distinctions between the two, apart from microscopic characters of little interest to gardeners, lie in the leaves and flowers. The leaves of *C. mirabile* are more or less rounded and distinctly dentate whereas those of *C. cilicium* are spoon shaped and have smooth margins. Furthermore, the silver markings on the leaves of Hildebrand's species are usually suffused with pink on unfolding, remaining so in some individuals, soon fading in others, whereas those of *C. cilicium* start silver and remain so. The flowers of the two species are very similar but, whereas in *C. cilicium* the petal margins are nearly entire, in *C. mirabile* they are distinctly toothed or even, in extreme cases, lobed. The small purple blotches at the mouth of the flower are more distinct in *C. mirabile* giving the flower as a whole a more striking appearance. Neither species has much scent but what there is is similar in both – distinctly sweet.

Cyclamen mirabile is as easy to grow as *C. cilicium*, requiring when grown in a pot only that the compost be well drained and reasonably rich and that it be kept fairly dry during the dormant period. I have not tried it outside but *C. cilicium* is easy enough here (N. Wales coast) and *C. mirabile* should succeed also. A cloche or other protection would probably be advisable in very cold weather, although it is unlikely that this species would be killed outright by temperatures experienced in Britain.

Propagation is by seed but this is rarely available. This is because *C.*

mirabile, unlike many other cyclamen species, is almost if not completely self-sterile. If several plants are grown in pots then either they can be hand cross pollinated or the pots can be stood outside close together for a few days when in flower so that the insects can do their work. The seed should be sown fresh if possible as stored seed has a habit of germinating over a long period, seedlings appearing in ones and twos over several seasons. Seedlings should be individually potted when two or three leaves are formed and growth can be speeded up by regular feeding during the growing season with a liquid fertiliser. In this way plants can be brought to flowering size in three years. Thereafter they will go from strength to strength, living for many years and flowering ever more freely.

Telesonix jamesii (Boykinia jamesii)

James Christie

Telesonix, a name given by the brilliant but somewhat erratic and eccentric American botanist, C. S. Rafinesque, belongs to the Saxifrage family and contains only one species, a perennial herb native to the mountains of N.W. America. It was introduced into cultivation around the middle of the 1930s as *Boykinia jamesii* from one of its better known stations, Pike's Peak, Colorado.

From short thick rhizomes rise tufts of kidney shaped, coarsely toothed, sticky leaves about 2.5cm across occasionally having reddish margins and on fairly long petioles, 2.5-3.75cm. The flowers are carmine pink, four or five to a raceme on 10cm fairly stout sticky stems and have 5 calyx lobes, 5 petals and 10 stamens. Boykinias have 5 stamens.

It is still rather a rare plant in cultivation and little seems to have been written about it. This may be because of its reputation for being difficult to flower. I grow it in the alpine house and in the open garden where it is in full sun, in fairly neutral light clay soil with added peat and grit, wedged between stones. It needs a restricted root run, regular feeding and moisture during the growing season and I feel that it is important that all these conditions are met if flowering success is to be achieved. Grown in pots, it is kept pot bound and fed regularly, repotting not oftener than every third year. Potting soil is John Innes No. 3, peat and coarse sand or grit in equal parts and kept just damp during the dormant period. Under these conditions the plant grows and flowers well. The withered leaves persist and retain their stickiness throughout the winter. Soil composition does not seem to appear to be critical as it has been reported growing and flowering in widely differing conditions. Gritty limestone in the wild, tufa and normal alpine mixture

of loam, leaf mould and coarse sand in cultivation. Seed listed as *Telesonix jamesii* appears each year in the SRGC seed list but I have yet to see a true plant grown from this seed or indeed any Telesonix plant grown from seed, and I doubt very much if seed is set in cultivation. None of my plants have set seed during the past twenty years and I would be very interested to hear if any club member has a plant that does set seed, or has been able to raise a true plant from seed.

However, it is easily divided and this is probably best done as the dormant period breaks in mid-March. *Telesonix jamesii* is a true perennial, very long lived but rather difficult to obtain and does not seem to be commercially available at present.

Phosphate fertilisers

JOHN PARSONS

Department of Soil Science, University of Aberdeen

THE ONE FERTILIZER which most gardeners use regularly, whether they are organic gardeners or not, is phosphate fertilizer. This is as it should be because phosphate is required for the normal growth of plants; it forms an essential component of both the genetic material and the energy transfer system of all plant cells. It is present in all plant tissues, although it is more highly concentrated in seeds, where it provides a reservoir for the newly germinating plant before the roots can supply the plant's requirements from the soil. In acid soils virtually all the phosphate is adsorbed on to mineral surfaces, mainly on to the hydroxides of iron and aluminium, or is present in the organic material, the humus; only trace amounts are found dissolved in the soil solution. Because of the strong affinity for phosphate displayed by these mineral surfaces, the phosphate ion cannot diffuse through the soil solution from one area of soil to another. This means that, once plant roots have depleted the phosphate supply in their local vicinity, they must grow into a new volume of soil to obtain further supplies. However, many plants form a symbiotic relationship with a mycorrhizal fungi in which the filamentous threads of the fungi grow out from root cells into the surrounding soil and, as they extend much farther than root hairs, they can explore a much larger volume of soil and therefore supply more phosphate to the host plant.

In calcareous or chalk soils, phosphate forms insoluble calcium salts which also maintain the concentration of phosphate in the soil solution at a very low value and much of what was said above also applies to these soils. The result is that phosphate is least available in acid and calcareous soils and is most available to plants in near neutral soils but even in these soils there is little found dissolved in the soil solution.

Phosphate in the organic fraction of soils is not immediately available to plants as it must first be converted to inorganic phosphate ions by the action of soil micro-organisms. If the product is not immediately taken up by plant roots, it will pass out of solution for the reasons given above. Microbial activity will be greatest in near neutral soils and the action of earthworms in mixing soil micro-organisms with plant residues leads to increased availability of phosphate in the worm casts.

The growth of plants depletes soil reserves of phosphate which must be replenished by the addition of either organic manures, such as farmyard manure, or inorganic fertilizers. Although not totally understanding the reasons for doing so, Chinese and Roman farmers are reported to have applied plant ashes and bones to growing crops. Writers in the 18th century in this country mentioned the presence of "phosphate of lime" in animal and plant residues and the advantages to the growth of subsequent crops of applying bones to soils. Phosphate in animal bones and teeth is present in the same mineral form, apatite, as occurs in rock phosphate mined in many parts of the world. Apatite is a hard, water insoluble material and so the phosphate is not immediately available to plant roots when it is added to soils. The practice of crushing bones to smaller fragments or a powder, to increase the surface area of the particles and thereby increasing the solubility in water, was introduced towards the end of the 18th century.

From the beginning of the 19th century the increasing demand for bones led to their importation from the Continent and eventually the British were accused of scavenging the battlefields of Europe to satisfy their requirements. Sensitivity to this criticism and a growing, insatiable demand caused importers to look farther afield for their sources of bones and the trade spread to India and South Africa. Eventually the supply could not equal demand and bones, as a source of phosphate, were replaced by rock phosphate imported from North Africa.

Bone contains a small amount of fat and cartilage and the latter prevents the production of an even, fine powder on grinding. Steaming under pressure removes the fat, which can be used for tallow production, and much of the cartilage for glue production. The residue was then ground to a fine powder and sold as a fertilizer – steamed bone meal or flour. Despite this treatment, steamed bone meal remains insoluble in water and therefore relatively unavailable to plants except when added to acid soils. In the late 1830s various people were experimenting with the idea of making the phosphate in bone meal more soluble by treating it with acid. It is not clear who first developed the idea but we do know that in 1842 Mr J. B. Lawes, the owner of an estate in Hertfordshire, later to become Rothamsted Experimental Station, was granted a patent for the production of superphosphate by treating bones with sulphuric acid. The process produces a mixture of a water soluble calcium phosphate and calcium sulphate. In 1852 John Miller and Son set up a plant to manufacture superphosphate in Aberdeen and in 1902 the first continuous moving floor plant was installed at John Milne's Artificial Manure Works at Dyce. These two companies were later joined with two others to form

Scottish Agricultural Industries, which still manufactures fertilizers at their Sandilands works.

Towards the end of the 19th century, the quality of steel produced by the Bessemer process was improved by the removal of phosphorus through the addition of lime to the molten steel. The biproduct, basic slag, was sold as a useful phosphate fertilizer but unfortunately modern processes do not produce it and only small quantities of imported material are available.

The import of bones gradually diminished while the import of rock phosphate increased. Considerable deposits have been found in this country but they are too thin and widely dispersed for economic mining and so we have to rely on imports from North Africa for most of our requirements, with smaller imports from the USA and the USSR. Rock phosphate is used directly as a fertilizer but to meet statutory regulations it must be ground so that 80% of it passes through a 100 mesh sieve (approximately 0.15mm diameter) and it is then marketed as ground mineral or rock phosphate. As stated earlier, this material has a very low solubility in water and is only of value when applied to acid soils where the acidifying affect increases its solubility. For a long period of time, rock phosphate was converted to a water soluble form (single) superphosphate, by treatment with sulphuric acid but, in the search for more concentrated fertilizers, this has given way almost completely to the production of triplesuperphosphate, manufactured by treating rock phosphate with phosphoric acid.

Super and triplesuperphosphate are sold as 'straight' fertilizers, intended to supply one nutrient, but in fact they also contain calcium and, in the case of super, sulphur. The change to the more concentrated triplesuperphosphate is one of the contributing reasons for the appearance of sulphur deficiencies in agricultural crops in parts of Scotland in recent years. They are also used in the formulation of compound, NPK, fertilizers but many of these are now based on the water soluble ammonium phosphates. Another fertilizer, perhaps of more limited appeal, is magnesium ammonium phosphate, Enmag, produced by SAI at their Sandilands plant. This has the advantage that it supplies a number of nutrients including nitrogen and magnesium.

The sale of fertilizers in this country has always been strictly regulated and new legislation was introduced in 1978 to implement an earlier EEC Directive on the Marketing of Solid Inorganic Fertilizers. The specifications required for phosphate fertilizers include:

(i) total P_2O_5;
(ii) % P_2O_5 soluble in water;
(iii) % P_2O_5 soluble in neutral ammonium citrate.

The value for water soluble P_2O_5 indicates the amount immediately available to plants but, for fertilizers with a very low water-soluble value, the amount soluble in neutral ammonium citrate indicates the amount of potentially available phosphate over a long period of time or in an acid soil. The difference between total P_2O_5 and neutral ammonium citrate soluble P_2O_5 is an indication of residual phosphate which will not become available to plants.

The expression of these values in terms of P_2O_5 is antiquated and misleading because phosphorus pentoxide does not occur in fertilizer material. It persists because it has become ingrained in the system. Mr T. Jamieson, Director of the now defunct Aberdeen Agricultural Research Association, castigated fertilizer manufacturers for persisting in the use of $\%P_2O_5$ rather than the more logical and acceptable %P. That was in 1898!

Phosphate fertilizers can be classified in two groups based on their solubility in water and thus their availability to plants.

WATER INSOLUBLE	WATER SOLUBLE
Steamed bone meal	Single superphosphate
Ground mineral phosphate	Triple superphosphate
Basig slag	Mono ammonium phosphate
Enmag	Diammonium phosphate

Ground mineral phosphate is rarely available in gardening shops now and steamed bone meal has been replaced by sterilised bone meal. Sterilisation by heat treatment removes any possible risk of disease transmission but does not remove the cartilage. Enmag is usually mixed with potassium chloride and sold as a rose fertilizer. Superphosphate, the less concentrated single rather than triple, is available in gardening shops, but ammonium phosphates are restricted almost entirely to the production of compound fertilizers and are not available in small packs.

Gardeners on the whole tend to use the water insoluble forms, of which bone meal is the favourite, giving a liberal sprinkling around the base of the plant each spring. Although the phosphate is not immediately available to the plant, unless applied to an acid soil, a reservoir of phosphate builds up in the soil which slowly becomes available. Addition of phosphate in excess of a plant's requirements represents a waste in economic terms but little, if any, is lost from the soil, even when water soluble phosphates are applied, and most becomes available to succeeding crops. Unlike nitrogen, phosphate contributes to the overall growth of the plant and particularly the roots, but does not stimulate vegetative growth in an unbalanced manner. Cartilage, a protein, is no longer removed from bone meal and accounts for the small amount of

nitrogen (3 to 5%) present. However, this nitrogen will only become available to plants over a long period of time and is therefore harmless. Fertilizer phosphate is not a potential hazard to the environment as it is not washed out of soils into drainage systems although small amounts may be lost through surface run-off in heavy winter rainstorms.

Many gardeners adopt the practice of applying bone meal to their gardens each year. There is a stronger case for doing this on the vegetable garden than the flower bed and I suspect that on most well established gardens the exercise contributes more to the gardening shops' bank balance than to the plants. An application once every two or three years provides sufficient for the plant's requirements and a little extra to top-up the soil reserves.

The decision to apply phosphate fertilizer in the garden rests on a number of factors. Where a plentiful amount of farmyard manure, other than poultry manure, has been applied there is little need to add extra phosphate. Vegetable crops remove more nutrients from the soil than flowering plants and root crops, such as potatoes and turnips, and legumes, such as peas and beans, in particular do require phosphate to be added. This can either be applied in a 'straight' form, either water soluble or water insoluble, or in a compound fertilizer. Personal preference probably determines the choice between water soluble and water insoluble forms but the latter tend to be slightly more expensive and should be applied in a heavier dose. Few rock gardeners use lime so that the soil tends to be acid and either form would be acceptable.

Soil test kits are available for diagnosing phosphate deficiency in soils but they tend to be expensive. Phosphate is required in the early stages of plant growth and should be applied to the seedbed before sowing or, in the case of perennials, applied before growth begins; there is little response to phosphate fertilizer applied to a growing plant. Deficiency symptoms are not easily identified because the plant generally retains a healthy green colour but growth will be stunted. In severe deficiencies leaves take on a red or purple colour but these symptoms are easily confused with other factors.

What are the long term problems with the use of phosphate fertilizers? They have been applied to soils in this country on a wide scale for the past fifty years and, as we might expect, they show no harmful effects either to plants or soils. It is true to say that over that period rather more has been added than has been removed by crops so that a reserve has been built up which we could coast along on for a few years without further additions. Flower beds only require infrequent additions but acid soils supporting heath type plants may require rather more, perhaps applied once every two or three years.

World phosphate reserves are finite; they are mainly sedimentary in origin and therefore have accumulated over geological periods of time as a result of mineral weathering and translocation. There are large known reserves but the quality of some is well below those at present being mined. New deposits are still being found so that estimates predicting exhaustion of resources range from 20 to 1000s of years. Even with the present world consumption of phosphate fertilizer running at about 11 x 10^6 tonnes of P per annum and inevitably increasing, realistic estimates indicate that reserves will last for many hundreds of years but costs of production will increase as the quality of the rock phosphate deteriorates.

Kashmir Botanical Expedition 1983

CHRIS CHADWELL

WHILST AN OVER-INDULGENT MONSOON was troubling members of the AGS Sikkim expedition, another team was enjoying the sunshine at the western end of the Himalayan range. We were four: two recently qualified horticulturists, David Howard, Edinburgh Botanic Garden and Tony Powell, Askham Bryan College; Naomi Wright, a botany graduate from Oxford University and myself, a botanist on the Southampton University Ladakh Expedition 1980, as leader. The rest of the team, on their first visit to India, were in for a few surprises.

Travel 'economy-style' proved quite a shock. A robbery on our second day left one member without a camera, airline ticket or passport, and the team lighter by a quarter of its funds. This was not the ideal way for the victim to celebrate his twenty-fifth birthday! I could sense my fellow travellers wished they had never come to the sub-continent.

The following extracts from the expedition's full report should give a taste of the rich alpine flora seen during our stay from mid-July until late September:

We camped beside the Sind River and rather too close to an elder patch that was serving as the local lavatory. In Sonamarg (2,750m) we found a ponyman called Habib, aged 19 (though he looked much younger) and rather inexperienced. Our first day's walk to Lashpatri was a long, steep climb, often stalled by the rucksacks being adjusted on the backs of the ponies by a frantic Habib. On route we had splendid views of the 'valley of the seven glaciers' to the south-west. Most of the vegetation was heavily grazed pastureland. A heady fragrance filled the air from thousands of creamy-white blossoms of *Sambucus wightiana*. This ornamental elder, resembling the European Danewort, formed gregarious clumps 1-1.5m high, later in the season producing flat-topped clusters of globular orange or red berries, which eventually turn black.

Next day we woke with the sun and set off for Vishansar Lake (3,600m) over the Nichinai Pass. The first part of the journey led us into dense birch (*Betula utilis*) forest through which we kept getting glimpses of snow-capped mountains and long winding valleys. An expanse of waterlogged ground recently cleared of snow along with the glacial stream-beds were a mass of rosy-pink *Primula rosea*, a

Fig 135 *Primula reptans* (see page 277) Photo: Lyn Bezzant

Fig 136
Gentiana froelichii
(see page 278)

Photo: R. S. Johnstone

familiar early-flowering primrose in cultivation, interspersed with butter-cup yellow and white *Anemone obtusiloba* (the yellow form of this variable, spreading perennial being commonest at high altitudes in the western Himalaya). Occasional clumps of the 'Snow-Primula' (*Primula macrophylla*) were to be seen displaying dense heads of purple flowers with darker eyes, set off by erect, strap-shaped leaves edged with a brilliant white farina (mealy covering). Near the head of the valley we negotiated a wide 'snow-bridge', then moved on to the top of the pass, surveying the surrounding mountains now partly hidden in cloud. A rich-yellow flowered Saxifrage (*Saxifraga moorcroftiana*) some 10-15cm high was scattered across the sparsely vegetated rocks. Over the pass we encountered a markedly richer flora, having so far escaped the ravages of sheep or goat, with millions of golden-yellow blooms of Himalayan Avens (*Geum elatum*) carpeting the alpine pastures. Solitary, nodding yellow flower-heads of *Cremanthodium decaisnei* were borne above crenate, kidney-shaped leaves, a species quite common and gregarious beside streams. *Primula elliptica*, rare in cultivation, grew nearby, its pinkish-purple or mauve flowers held in lax umbels contrasting with sharply toothed, elliptic leaves. Compact clusters of dark blue stars peppered the short turf. Closer examination revealed them to be *Gentiana carinata*, a small annual bearing spreading, seemingly 'ten-lobed' flowers (due to smaller lobes in between each corolla lobe) on branching stems 2-5cm long. Brilliant blue miniature 'Snow-Columbines' *Aquilegia nivalis* could be seen for some distance, the inner petals appearing almost blackish-purple.

The following day required us to climb over the Razbal Gali Pass (4,166m). It was extremely hot and the path seemed to go on forever. Gravel slides and loose screes supported the succulent, blue-green leaves and clusters of large violet to pinkish-white flowers (later replaced by balloon-like pods) of *Corydalis crassissima*. A pink spiky-headed chive, *Allium carolinianum*, thrived in this unstable habitat – the previous day it had formed a vital ingredient in the 'almond and chive' sauce accompanying a trout caught in Vishansar Lake. We soon found this to be the home of many high-altitude specialities. Rock Cinquefoil (*Potentilla curviseta*) formed extensive mats of tight wedge-shaped leaflets and short-staked yellow flowers, along a jagged ridge. Tony had taken a parallel route to the top and there was an excited shout: "Paraquilegia – tons of it!", a delight to us all and a spur to our flagging bodies, as it was a popular request amongst shareholders. Large clumps of glaucous, ferny foliage, grew in profusion from rock-crevices, being topped by up to 70 delicate white-tinged blue blooms. No wonder this plant has received so much success on the show benches in recent years.

To heighten our excitement two other gems grew in the gravel between. *Pseudomertensia moltkioides* var *primuloides* (formerly *Mertensia tibetica*) carried terminal clusters of long tubular flowers with blue lobes. To complete this outstanding trio were firm cushions to some 30cm across of the 'White-pitted Saxifrage' *Saxifraga pulvinaria*, although admittedly largely as withered remains. Snow still lay at the top of the pass but diminutive, golden-yellow or bronze, many-petalled blooms of *Oxygraphis polypetala* peeped from the rapidly melting edges, apparently sprouting out of bare rock underneath. They would need to set seed quickly as the first falls of autumn snow would not be long in coming.

To explore the north-side of the Kolahoi Valley we had to cross over the West Lidder River by means of a natural 'snow-bridge', the only available way as the water was deep and fast-flowing. During the winter, snow had filled in and bridged over this section of the river. A torrent of spring glacial meltwater had then forced its way through as a tunnel underneath. Crossing the 'bridge' was always a careful operation, since to fall through would have meant being swept away by the swirling current to meet an untimely demise downstream. Our reluctance was fully vindicated when, on return just four weeks later, our 'structure' had completely melted. The steep slope on the other side was largely a thin forest of birch, with an understorey of rhododendron and willow scrub. Here we found an incredibly rich herb layer, columbines, aconites, salvias, monkshoods, anemones, louseworts and fritillaries in abundance. A large, showy, honey-suckle-scented columbine *Aquilegia fragrans*, the colour of fresh cream, was marvelled at – clearly this should be widely cultivated. Rock outcrops were frequent, jutting at awkward angles, as I discovered by grazing my forehead whilst bending to inspect the scarlet berries of a stone-bramble (*Rubus saxatilis*). The rocks were covered with *Bergenia stracheyi*, a smallish species having drooping clusters of white flowers tinged with pink (though its outstanding feature is its leaves which turn bright red in autumn) accompanied by *Anemone tetrasepala*. It was a sickening sight the following month, to observe hundreds of decapitated heads. The culprits, a herd of goats, were not far away. On these steep slopes the birch trunks grow with a characteristic curvature caused by avalanche snow; the goats exploit this to climb some way up to admire the view. Few of our precious alpines seemed safe after that!

Kashmir's common 'Blue-poppy' *Meconopsis aculeata* grew amongst the boulders at regular intervals but never in great quantity – its pale blue petals carried on bristly hairy stems. The plant was introduced into cultivation in 1864 by H. F. C. Cleghorn, who sent seed to Kew from

north-west India. Despite its monocarpic shortcomings this and the rarer *M. latifolia* deserve to be more widely grown. This end of the Himalaya can only boast three species of rhododendron, all to be found in the Kolahoi Valley. Of greatest appeal was the dwarf *R. lepidotum*, proudly exhibiting deep pink to near scarlet flowers. In the light shade beneath, springy cushions of mosses were spangled with cobalt blue fruits of *Gaultheria trichophylla*, its ripe capsules reputedly tasting of wintergreen. Nothing, however, could match the sky-blue *Corydalis cashmiriana* growing nearby. This genus is well represented in the western Himalaya, with the noteworthy spike-like clusters of dense yellow flowers of *C. govaniana* gracing the rocky slopes on the way back to camp.

Despite early set-backs, not to mention a late summer causing fears that little seed would set before our departure, an impressive haul was amassed. So productive were the later treks that the drying and cleaning of seed became a daunting task. Fortunately none of us knew what we were letting ourselves in for. Over 370 collections were made, enabling some 140 packets (most with a healthy quantity of seed) to be sent to full shareholders. Germination results to date have been encouraging, with many more starting to appear in the second season after sowing. As the specialist growers amongst you already know, most western Himalayan plants are perfectly hardy in British gardens and more importantly it is Scotland that offers the best conditions available in the UK. Future expeditions and collecting trips are being planned, giving a regular supply of fresh seed and providing the opportunity for every member of the SRGC to grow some of Kashmir's beautiful flowers.

Should readers wish to hear about the expedition, a full report (103pp, 47 photos) containing a lengthy narrative is available from the author at 81 Parlaunt Road, Slough, Berks SL3 8BE, for £5 including p&p.

Fun with seeds

P. H. HAINSWORTH

LIKE MANY MORE gardeners I am a compulsive seed sower. For me those tiny, shiny, black beads are magic. That so much predetermined shape, size, symmetry and colour can be packed into so small a space makes me marvel. Notwithstanding chromosomes, meiosis and mitosis, DNA and the rest, I still marvel.

Thus, after early retiral from nursery work one of my major pleasures has been raising plants from seed. Not nurseryman's plants any more, but things with strange and fanciful Latin names from the backwoods of British Columbia and misty mountains of Burma. Plants which would hardly be found on a nursery list and perhaps, to be objective, not all that attractive to many.

As a member of the RHS for many years I have dabbled every year with their seedlist, but plants from south-east England are not often at home here. Seeing the SRGC and AGS lists for the first time was a revelation and after throwing in a few dozen packets from the Hardy Plants Society as well, some 250-300 packets were being sown every years. Not an alpine enthusiast you'll understand – I just like anything with leaves. This comes to a lot of packets over six years or more and it was realised early on that memory would never cope, so records have been kept of sowing and germination dates and conditions at the time.

So far as germination is concerned it seems that about half the species come up within a month, about half the remainder the following spring, a very few after two years, leaving about a quarter that fail altogether. I take the philosophical view that if they don't want to grow for me then they are best lost at this stage. Then, illogically, I sometimes have another go next year.

A few do not get past the seedling stage, damping-off suddenly and irrevocably. Again no regrets; they are obviously not suited to the moist conditions they will have to endure. Some, like Hostas, go yellow and refuse to grow despite feeding. A change of compost often does the trick. Meconopsis and candelabra primulas go yellow about a week after a particularly hot day, or strong sun on them. I suspect that hot compost does something to the roots. They look sick for about a month usually recovering but time is lost. Dodecatheons respond to such conditions even more dramatically by going into suspended animation until next spring.

Seedlings are pricked out into boxes when one or two true leaves are formed, about an inch each way, until they are an inch or two high, when they leave the greenhouse and are lined out in a nursery bed outdoors. Then they are covered with birch twigs to stop birds and other livestock from dancing on them. When only one or two seedlings of a species are available they get VIP treatment by being potted, and they stay, shaded if appropriate, in the greenhouse.

Another month or two and many are ready to face the competition of the outside world, often, regrettably, without any knowledge of their needs. Inspired guesswork from plant details helps; broad leaves suggest they need sun, cut leaves shade. Long stringy roots suggest a dry, stony place, fine fibrous roots a moist soil. Leaves thick or thin, woolly or smooth, all these give indications only, with plenty of exceptions. The Seedlist Handbook is an enormous help, giving height and country of origin amongst other details. If only it would give plant habitat too there would be no need to buy another book. Sometimes looking through old copies of the journals helps, with their occasional monographs on particular genera.

From then on they usually get scant attention. An eye to slugs perhaps and encroaching neighbours, until the exciting day arrives next spring or summer – what are those strange leaves, that spike of flowers? Just a few minutes excitement after waiting twelve months? (Or much more sometimes.) Not really, they are exciting from the moment they are picked from the seedlist!

Some problems with seeds

The reasons for failure to germinate are several that we know about and some more that we can at present only surmise. Many perennial plants from temperate and cold climates have built-in devices to prevent germination at the wrong time, which require the process of the seasons to break – a subject in itself. Another possibility, especially with composites, is that the 'seed' is not seed at all in the true sense, but just empty husks. I have just been looking through the seed heads of Ligularia species hopefully but only one seed had developed out of several hundred possible florets in one species and in another there was no true seed at all. Celmisias are another uncertain group, giving plenty of seed one year but few another. One can imagine that the design of the composite flower must render it susceptible to damage by wet weather. The whole head becomes a sponge in effect. When collecting their seeds one needs to look for the thick or round ones; the flat ones are infertile husks.

The need to sow seeds fresh is often stressed with good reason but this is not possible through a seed exchange. Perhaps we can go some

way towards solving the problem however. Seeds of meconopsis and Asiatic primulas (and many alpines) from seed exchanges nearly if not always germinate badly or not at all. My own seed nearly always germinates abundantly, and I am inclined to think that the difference lies in the storage of such seeds. Mine is kept in a cold shed in the shade of the house and from December to April inclusive the temperature seldom rises above 5°C and it occasionally freezes. The excellent book by the staff of the National Vegetable Research Station "Know and Grow Vegetables" has shown a quite remarkable relationship between temperature and seed longevity of vegetable seed. Stored at 5°C seed will remain viable for a long time. For every 5°C rise above 5°C the life of a seed is halved. If this is true of seeds generally, and there is no obvious reason why it should not be, then keeping seed in a very cold room in a house at 10°C will reduce its life to half. Keeping seed in an average cool room of 15°C will reduce its life to a quarter. Seed designed to last outdoors under natural conditions until the following spring, say nine months, will only last, under normal house storage, for about three months. Maybe the Seed Exchange's answer to the fresh seed problem is a whip round for a fridge for Joyce Halley. (Incidentally this year I sowed two year old seed of *Primula vialii* and it germinated thickly.)

The same authority stresses the need for low humidity for stored seed. This is evidently true for vegetable seeds which are mostly derived from Mediterranean plants or others from places with a dry season. They have built-in provision against prolonged drought and the potential to develop as soon as moistened, provided the temperature is right. Thus dampness would arouse some degree of 'awakening' in the seed. But what of those plants which live in frequent rain and mist such as meconopsis and primulas and many alpines? Nature never wastes energy and material providing protection (against drought) that is not required, and such seeds may not stand prolonged low humidity – such as occurs in our houses, especially in winter. For what it is worth my own seed is kept at around 85% humidity, so too are my vegetable seeds but they are cold as well. Room for some research here for anyone interested.

Every enthusiastic seed exchanger comes up against naming problems sooner or later. Meconopsis is one genera where confusion reigns supreme. Trying to sort out *M. grandis* from *M. betonicifolia* and *M. regia* from *M. napaulensis* from details given in various gardening reference books made it fairly obvious that the authors were confused too. In the end I had to resort to the RHS library for botanical details. All my *M. grandis* and *M. betonicifolia* from nine reputable (?) sources

turned out to be *M. betonicifolia* or near hybrids. Likewise my *M. regia* and *M. napaulensis* turned out to be near *M. napaulensis*, except that some had yellow flowers.

This raises an awful problem when returning seed to exchanges. Do they go back under the name under which they were received, or as *M. napaulensis* hybrids (or *M. regia* hybrids) or do we refuse to return anything, however attractive, about which we are uncertain? Taking the view that our club consists mainly of amateurs to whom names mean little in a botanical sense, and who garden for fun, it would be wrong to deprive them of a good plant. My own solution is to put the nearest name with an X in front of it, which may not be botanically true but at least gives the recipient a good idea of what to expect. Perhaps others can suggest something better, bearing in mind the need for brevity in the seedlist. In the long term the problem will probably get worse, I am sure hybridisation will always keep well ahead of tabulation.

Sometimes one receives seed under a name one knows to be wrong but the true name is not known. Even worse is to discover that the name one has always used is wrong and the latest seed packet is right! And one has unwittingly passed the error on to others!

Seed Exchange "Finds"

Now for a few plants which I might never have seen but for the SRGC Seed List.

First a couple of Calceolarias. *C. chelidonoides* is now a delightful late summer and autumn flowering weed in my garden and invading fresh areas every year. Half-hardy, but minute seedlings appear in thousands every year, seldom competitive but grow rapidly where space allows. They take over from the Asiatic primulas which are disaster areas by August. It also came to me under the name of *C. scabiosafolia* and *C. filicaulis* but think someone must have been nodding.

Then there is *Calceolaria fibrigiana*, not in the Seed List Handbook, but which came to me from SRGC in 1982. Four plants survived and were planted out, not apparently doing very much for the rest of the year. However, it had been busy suckering in all directions and a thicket emerged next spring of sticky hairy aromatic leaves and stems, smothered with clusters of tiny yellow bubbles at the end of June.

Aralia racemosa is something different (SRGC '79). It was slow to develop but after four years became a handsome tripinnate leaved plant a yard across with a fluffy inflorescence followed by tiny purplish berries.

Mertensia pterocarpa, acquired in 1980, is a lovely light-blue like the rest of the family, a sprawling patch about a foot across which flowers for months in a half-shady spot.

Related to the Epimediums, *Vancouveriana hexandra* (who could resist such a name) is a mound of diamond-shaped pale-green leaflets and occasional spikes of small white umbrellas. One of the myopes.

Saxifraga rotundifolia is one of that group described as of "negligible horticultural importance". Fortunately fashions change and I like it. It is growing on a stony bank and might be short-lived but seeds freely. Thick round pennies of leaves in an overlapping pile all winter and a 45cm loose panicle of 1cm spotted stars for a long period in early summer.

Polygonum nakai comes from a family full of surprises. This makes a tight bush annually, now 60cm across and 45cm high spreading slowly by suckers, covered with small fluffy sprays of flowers for months in late summer and autumn. The leaves die away bright yellow.

A most imposing plant for the bog garden is *Ligularia speciosa*, sending up sturdy two-metre rods of yellow flowers and large, thick, round leaves, turning shades of dark-purple in autumn.

At the other extreme is a dainty plant *Codonopsis convolvulacea* which I have not yet dared to plant outdoors. Like most Codonopsis if a shoot gets damaged it gives up until next year. It is in a pot twining over twigs with large blue flowers like *Campanula isophylla* on bits of thin wire.

There are many, many more that I would not have met but for the Seed Exchanges but the Editor must be running out of patience.

Letters to the Editor

Woodside, Higher Raleigh Road,
Barnstaple, Devon

Cassiope wardii

Dear Sir,

I was intrigued with the reference on page 39 (Vol XIX, Part 1), suggesting a *moist sheltered*, sunny spot. We have had the plant for about 10 years in a raised, south-sloping bed (we face and slope to the south) deliberately given quick drainage with plenty of chippings and grit plus a top dressing of more fine chippings to assist winter-time protection from excessive damp for the plants in this bed. The plant must absolutely bake during the summer and, as for the droughts of 1976 and this year, has not turned a hair. At times I cannot believe it, when in very close proximity *Celmisia ramulosa* and *Hebe epacridea* have both succumbed to the drought. Cassiope is usually difficult here, even in a special peat bed (although the garden has a very acid soil). I am so reluctant to disturb it to gain rooted pieces for propagation and simply hope that it will just "keep going". I've never thought to study under a microscope but apart from the unusual foliage it seems to have minute hairs to the naked eye.

Labels

You omitted to mention that the first advantage of the aluminium labels (even when coated in polyurethane) is their flexibility when "trampled on". Also the chinagraph seems to leave a permanent integral legibility after very many years in the garden.

A splendid publication, most expertly edited by yourself.

Yours sincerely,
M. T. Feesey.

Flinterei 6, D-2943 Thunum,
West Germany

Labels

Dear Sir,

I read the various contributions regarding labelling. I think I should mention to you, that for five years now I mark my plastic labels with an

electric engraver (Powerline, Model 172 of Burgess Power Tools Ltd, Sapcote, Leicester. There are other makes too.)

On engraving, the label must lie on a hard surface, e.g. a piece of sheet-iron, to make the writing more visible. I rub some loam on the engraving. These markings do not wear off. Of course one can use this tool also for engraving on metal labels.

There is one disadvantage: the engraver is a bit noisy.

Yours sincerely,
I. Arnold Nyberg.

25 Rubislaw Park Crescent, Aberdeen

A further note on labels

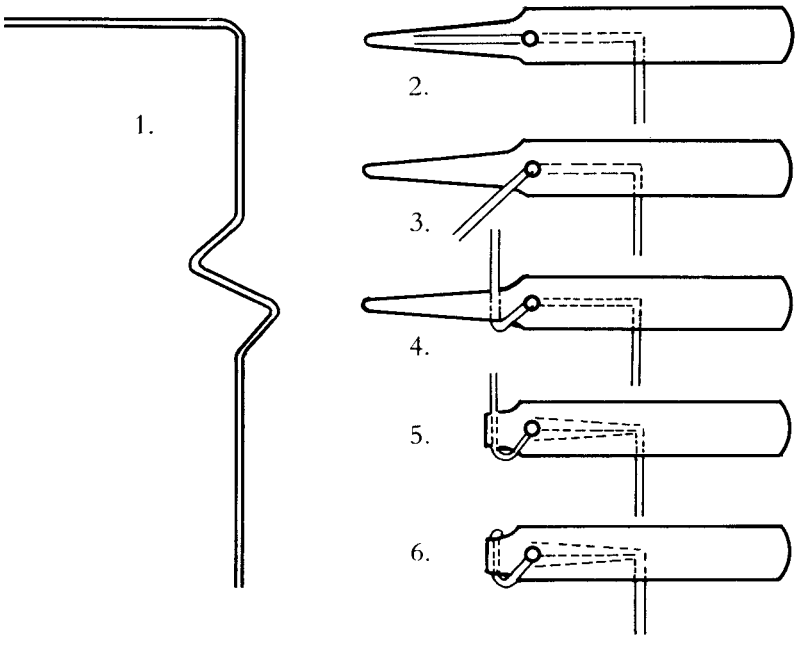
Dear Sir,

I was interested in the note on "Label Stalks" in the last issue of "The Rock Garden" (January 1985, pp113-115) as I had just bought metal labels from Andrew Crace Designs and was experimenting with ways of affixing a stalk. These labels are very similar to the Hartley aluminium labels. I had tried both galvanised wire and the thicker kind of plastic-covered wire sold in reels as straining wire. The latter is easy to bend but the green plastic does not match the metal label. As very little of the wire is visible in the method I finally evolved this may not matter. By bending back the label 'tail' a neat finish and firm attachment is obtained. The accompanying diagram illustrates the method.

The measurements refer to 3in labels for pots. For larger labels for use in the garden the lengths of wire should be increased proportionately:

1. Cut a piece of wire about 20cm long, bend 6cm at one end at a right angle and make a Z-bend in the longer portion.
2. Thread the 6cm portion through the hole in the label, from the back.
3. Bend this end downwards at an angle of 45°.
4. Bend this end upwards vertically behind the label 'tail'.
5. Bend the label 'tail' over the wire and along the back of the label.
6. Bend the remaining short end of wire downwards over the label 'tail' and, using pliers, press the wire and 'tail' firmly together.

Yours sincerely,
Heather Salzen.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Shinjukukita
Tokyo, Japan
February 1985

Dear Sir,

This book, "The formative arts of wild alpine plants", is the book of my collected works more than ten years. The meaning "The formative arts of wild alpine plants" is to reproduce with rocks and other materials an atmosphere of wild plants found in mountains and fields.

In Japan there is a form of bonsai called "grass bonsai" which is different from "tree bonsai". Grass bonsai is often put beside tree bonsai to complement the tree bonsai when they are on display. Most plants of grass bonsai are comparatively not perishable and in harmony with tree bonsai.

Not for such a small purpose as using grass bonsai as an addition to tree bonsai, but rather I've wanted to produce grass bonsai as an independent art to capture gentleness, loveliness, simplicity that wild plants have with the natural environment.

I've made the grass bonsai in this book and about a hundred others that I am going to publish next year. I am publishing them successively in a monthly magazine.

I wonder if these works of mine will be recognised as art, and I wonder if this new form of "the formative arts of wild alpine plants" will take root among Japanese people like flower arrangement and bonsai. Recently in Japan, works of "the formative arts of wild alpine plants" are gradually on the increase – that encourages me very much.

I hope that growers of wild alpine plants will be able to obtain the materials of "the formative arts of wild alpine plants" easily and make works like those pictured in this book. I hope that this book will be helpful in that regard.

After you look at each of the pictures in this book, please let me know which you prefer, to make works like the pictures (if you can make them as easily as you grow plants in the pots) or to grow plants in the pots as before.

I would appreciate hearing any additional remarks about this book.
Yours sincerely,
M. Akikusa.

[The fascinating book referred to in this letter is now in the Club Library and can be borrowed. Although written in Japanese the constructional diagrams and the superb colour plates make it reasonably easy to follow. *Ed.*]

A conservation reminder

EVERY YEAR more and more of the world's wild flowers disappear. Travellers have a special responsibility to leave undisturbed the wild flowers of the countries they visit. Plant collecting can lead to the extinction of plants already rare naturally or made so through modern changes in their environment. It may seem that where there are hundreds of flowers still, to take "only a few" can do no harm. This is not so. If many people take "just one", even a large colony may finally disappear. Along many of the well-trodden tourist tracks today the wayside is lamentably bare of flowers. Many of the horticulturally-worthwhile species are already in cultivation and available from specialist plant nurseries. Gardeners ought to use these sources and should not exploit further the wild. To collect rare plants for personal gain is morally indefensible.

Find out and observe the law

Remember that National Parks, Forestry Parks, Nature Reserves and other protected areas provide local protection for specially selected parts of the natural heritage. Many countries now also have national or regional plant protection laws to safeguard decreasing species outside the protected areas. Conservation laws differ from country to country and in many cases are complex. If you have a special reason for collecting, then the local laws should always be observed.

Details of foreign conservation legislation covering plants can be obtained from: Conservation Unit, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE.

Import and export controls

1. Certain plant species are protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an agreement signed by many countries worldwide. Plants covered by the Convention include all orchids, cyclamen, cacti and certain other succulents. Permits from the country of origin are required for the export of such plants.

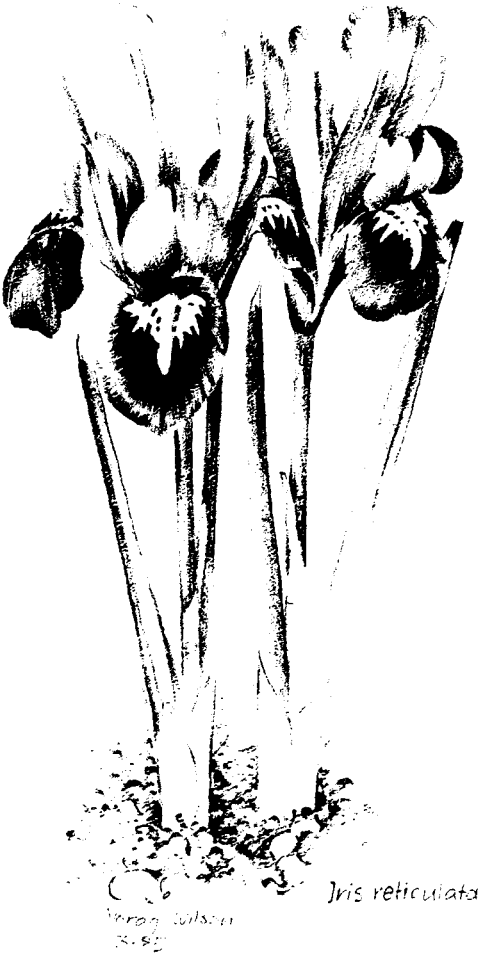
   In Britain the provisions of CITES are administered by the Department of the Environment through British and EEC legislation.

Import permits are required to bring CITES plants into the country. Seeds are not covered by the legislation. Further details can be obtained from: Department of the Environment, International Trade in Endangered Species Branch, Tollgate House, Houlton Street, Bristol BS2 9DJ.

2. The importation of living plants into Britain is subject to phytosanitary regulations.

Don't be selfish, please leave wild flowers for others to enjoy and help save them from extinction.

This conservation reminder was prepared by the Botanical Society of the British Isles.



Mojacar in Almeria

CHRIS and MARIE NORTH

ALMERIA (pronounced Almereeia – with the accent on the final vowel is the most easterly province of Andalusia and constitutes the extreme south-east corner of Spain. It is the driest and sunniest part of the Iberian peninsula and, in spite of its bare, steppe-like appearance, carries a very rich and interesting flora with some 100 endemic plant species found nowhere else in the world. There is a well-balanced and helpful summary of the flora of the region in "Flowers of South-West Europe" (Polunin and Smythies 1973). The region has not been "developed" for tourism to anything like the extent of the Costa del Sol but package holidays are available to and around Mojacar and it was there that we stayed for the month of March in 1984.

The small town of Mojacar is perched on a hill with white-washed, flat-roofed, Arab style buildings. Although the site is of ancient origin, many of the buildings are recent for much of the town has been rebuilt since it was almost entirely destroyed during the civil war. From the hill one has a magnificent view northwards over the wide valley of the River Aguas to the fishing village of Garrucha. An earthquake, about 300 AD, lifted this valley so that there are extensive sandbanks now isolated from the sea; some have been flattened, cultivated and irrigated but a few remain untouched and have been covered with sparse natural vegetation. The earthquake was, presumably, accompanied by extensive volcanic activity for there are heaps of cinder-like volcanic slag forming extensive hills, especially to the north and east of Mojacar. One visitor from Yorkshire on arriving at the hotel commented that it looked like home with the coal mining spoil heaps – which aptly describes the appearance of the hills nearby.

From Mojacar one can easily climb southwards onto the Sierra Cabrera – The Goatherds' Mountains. These are wild limestone hills and reminded us of a poem in a Spanish grammar which described certain hills in Spain as being "sad and uncommunicative". However, once one gets used to them the Sierra Cabrera seem to be charming and not hostile. A short scramble to the broadcasting station which is visible from the town, revealed many interesting plants in the garrigue consisting of the following species:

Anthyllis cytisoides
Fumana procumbens
Globularia alypum
Helianthemum almeriense
Launaea spinosa
Lavandula dentata
Lavandula multifida
Lavandula stoechas
Lycium intricatum
Lavatera maritima
Phlomis purpurea
Rhamnus lycioides
Ruta chalepensis
Thymelaea tartonraira
Withania somnifera

Of these, *Helianthemum almeriense* is an endemic rock rose with white petals blotched yellow at the base. The commonest of the three lavenders here was *Lavandula dentata* with notched leaves. *Lithodora fruticosa* is a small shrub with beautiful gentian-blue flowers and, having been grazed, it had twisted bonsai-like small trunks. It is similar to *Lithodora diffusum* (*Lithospermum diffusum* of gardens) but, unlike the species, it will thrive on limey soils. *Launaea spinosa* is a prickly netted shrub with small yellow dandelion-like flowers. The specific name is that quoted by Polunin and Smythies (1973) but is not recognised in Flora Europaea where it probably comes under *Launaea lanifera*. *Lavatera maritima* is a truly beautiful small shrub with large flowers that are a pale shell pink colour in the form growing on the Sierra Cabrera. *Lycium intricatum* and *Rhamnus lycioides* look superficially alike; both are small prickly shrubs with tiny succulent leaves. However, the flowers of the two species are quite different; the Lycium has dusky mauve tubular flowers and the Rhamnus tiny, four-rayed, greenish-yellow stars. *Withania somnifera* is an unusual spreading shrub with somewhat privet-like leaves and hanging yellow bell-shaped flowers followed by small tomato-like berries. It is poisonous and has a foetid smell like many other members of the *Solanaceae*.

Amongst the shrubs listed above grew many interesting herbaceaous and bulbous rooted plants:

Arisaram vulgare
Astericus maritimus
Calendula arvensis
Cynoglossum cheirifolium
Echium albicans
Eryngium maritimum
Fagonia cretica
Gagea sp
Psoralea bituminosa

Here were also good specimens of *Orchis saccata* including one with pure white flowers, *Ophrys fusca* and masses of the tiny *Ophrys speculum*. Further up the hill in the bed of a dried up stream grew *Lapiedra martinezii* a curious, rare and interesting bulbous plant allied to narcissi. The flowers were over and there were some unripe fruits but it was easily identified by its strap-like leaves with a broad pale stripe down the midrib. Its tiny star-shaped flowers are carried in an umbel during the

summer; they are greenish and sweetly-scented. Still further up the hill one comes to a plateau with fine views eastwards to the sea and here we saw – at first in ones and twos and then in hundreds – *Narcissus gaditanus* which is a small jonquil some 10cm tall with 2-6 yellow, jasmine-scented flowers typified by the curved corolla tube. It grew under very dry conditions often poking out of holes in the bare rock. Other plants with it included *Chamaerops humilis, Quercus coccifera* and bulbous and tuberous rooted species including *Gladiolus illyricus, Muscari comosum, Ophrys tenthredinifera* and small plants of what we believe were non-flowering specimens of the local *Androcymbium gramineum* which resembles an Ornithogalum with greenish-white flowers close to the ground.

Walking down the road from Mojacar towards the coast one passes down a cultivated valley where oranges, broad beans and potatoes are grown. Here was a large batch of *Kundmannia sicula* a showy umbellifer rather like our bishop weed but with yellow flowers. Another interesting but weedy plant here was the climbing *Aristolochia baetica* with sinister little Dutchman's pipes. Cutting across the hills by footpaths in a south-westerly direction one passes through a desolate cinder-like area where there are ruined, arab-style farmhouses surrounded by Opuntia and Agave – usually *A. americana* but sometimes the equally impressive *A. sisalana* which has no teeth on its huge leaves and is grown near Almeria city as a crop to produce sisal.

Some of the "cinder heaps" were covered with plants of the charming little spiny carpeter *Fagonia cretica* and *Gynandriris sisyrinchium*, both beautiful plants, either of which might be chosen as the floral emblem for Mojacar. Here also were large areas covered by *Anthyllis cytisoides* and *Launaea spinosa* many plants of both species being dead owing to the ravages of a scale insect. Likewise, there were plants of an Artemisia species crippled with swollen insect galls and *Helianthemum almeriense* weighed down by orange or blood-red threads of dodder – a sinister place! But, there were many hoopoes and some interesting plants such as the tiny toadflax-like *Chaenorhinum villosum*, much *Lavandula multifida* and *Asphodelus tenuifolius*. The last mentioned is a scaled down *A. fistulosus* easily recognised from that species when the two are growing side by side for it is half the size in all respects. The Flora Europaea does not recognise *A. tenuifolius*; it lumps it with *A. fistulosus*. There were also plants of *Ophrys tenthredinifera* and a good stand of *Iris chamaeiris*.

Along the edge of the beach and within the sandy area rarely covered by the sea grew:

Cakile maritima
Centaurea sphaerocephala
Convolvulus althaeoides
Lobularia maritima
Moricandia arvensis
Pancratium maritimum
Reichardia tingitana
Silene littorea

A few miles along the coast from Mojacar one comes to the Indalo Hotel surrounded by a hedge of the privet-like *Myoporum tenuifolium* – a native of Australia with white, scented flowers. Indalo is the name given to a local prehistoric rock painting of what looks like a stick man holding up a rainbow and has been adapted as the logo for the area. South of the hotel the route becomes a corniche road with spectacular cliff and sea views. It is not easy to park a car along here but when we were able to stop we found the curious *Periploca laevigata* which is a climber or loose shrub with green and maroon flowers and strange 6cm long horn-like fruits in pairs. It belongs to the milkweed family Asclepiadaceae and like the other members of that group it exudes a sticky white latex when parts of the plant are broken. Other species in this area were:

Antirrhinum barrelieri
Cistus albidus
Coronilla juncea
Lathyrus clymenum
Lavendula stoechas
Lygeum spartum
Limonium insigne
Nicotiana glauca
Ononis speciosa

Antirrhinum barrelieri is a snapdragon with a curious habit of climbing amongst the undergrowth by twisting its petioles around twigs and stems. Both the Ononis and the Coronilla are showy, yellow-flowered, shrubby legumes, the latter with beautifully scented flowers. *Lathyrus clymenum* is a vetch with rather large mauve flowers reminiscent of *L. tingitanus*. *Lygeum spartum*, the false esparto grass or "albardine" is easily recognised by the boat-shaped bract near the end of the inflorescence; it is collected as a minor industry and used in the same way as true esparto grass. *Limonium insigne* is a very beautiful endemic with horsetail-like foliage and 60cm branched inflorescenses of numerous small mauve flowers – one of the most sophisticated and impressive plants of the region.

The corniche road ends near the small port of Carboneras and from here we drove, on more than one occassion, to Nijar and over the Sierra Alhamilla to join the main Almeria-Lorca road N-340 and return to Mojacar. The Sierra Alhamilla seem to be mainly composed of acid rocks and have a different vegetation to that of the Sierra Carbera. Here were large areas covered by the broom-like "retama" *Lygos sphaerocarpa* with an undergrowth of *Anthyllis cytisoides* and the beautiful *Matthiola lunata* in flower.

If one walks north-eastwards along the coast from Mojacar for a few kilometres one comes to the mouth of the Rio Aguas which has little water and ends near the beach in a lagoon surrounded by reeds. Here grew the spectacular *Cistanche phelypaea* parasitising the roots of Atriplex bushes. It is like a gigantic broomrape with yellow flowers. The whole of this area is pleasant and we sat on the beach eating our lunch and watching a marsh harrier quartering the lagoon. A few kilometers further along the road one comes to the fishing village of Garrucha and by the roadside on the approach is a ruined castle. However, what is more interesting is an extensive "estancia" up on the hill nearby. It has a Moorish palace-like building with what looks like a church nearby and extensive carefully terraced fields. It is, in fact, the former country residence of an American ambassador, now abandoned and in ruins. One can walk in style up the avenue of palms to the building and admire the wrought iron work and ceramic tiles of this bygone glory. The garden at the back of the building is full of 2m tall, geriatric Pelargoniums and the building that looks like a church is in fact the most enormous pigeon loft we have seen – it must have been a veritable factory for the production of eggs, meat and fertiliser.

We went further along the coast by car to Aguilas and also past the deserted cave houses of Almanzora to Huercalovera and over the border of the province of Murcia to Puerto Lumbreras and the cultivated valley of the Rio Almanzora. Here were few plants new to us though we saw some magnificent groups of *Limonium insigne* far away from the sea and the pale-flowered *L. thouinii* growing on the beach. In a cultivated field there were showy weeds, mainly *Hypecoum pendulum, Glaucium corniculatum* and an annual Adonis with rather large straw-yellow flowers that seemed to be a form of *A. annua*. In places there were quite a few butterflies, mainly brimstone, small copper and Bath white.

A rather more interesting sortie by car from Mojacar was westward towards the Sierra de Filabres. By the roadside not far from Mojacar were *Brassica repanda, Daphne gnideum* and the relatively huge mignonette *Reseda lanceolata* which grows to one metre tall and can be seen from a passing bus. A short distance further, near the village of Turre, there is a gorge through which the Rio Aguas passes, though it is nowadays not much more than a trickle of water. Here we found many small bulbous plants including Gynandriris, a Romulea with mauve flowers, Gladiolus and the plant we identified earlier as *Androcymbium gramineum*. Ravens were nesting in the gorge which is a charming place within walking distance of Mojacar.

Turning eastwards on the main N-340 road one comes to the picturesque small town of Sorbas perched on a hill and further to the charming, unspoilt village of Bedar. The countryside to the north-west of the main road and the foothills of the Sierra de Filabres is very colourful with red, pink, yellow and mauve soils and rocks and there are many almond orchards with some olives, peaches, apricots and a few vines. In places by the road grew a Genista we identified as *G. spartioides* though it had no scent – a difficult genus! The local *Rosmarinus eriocalyx* was being collected by the cartload; it is said to have a very high camphor content and is being examined as a possible source of that commodity. With the rosemary grew groups of the rather uncommon *Cistus clusii* and also *C. albidus* and *C. salvifolius*.

The highlight of the stay in the region was when we went further on to the ridge of the Sierra de Filabres past Uleila del Campo and northwards along the C-3325 to the pass of Puerto de la Virgen (1,070m). Near the top were clumps of *Barlia longibracteata* and by the road, and up the hills, thousands upon thousands of *Narcissus cantabricus* (Fig 132). They grew amongst a scrub of *Lygos sphaerocarpa, Ulex parviflorus* and *Cistus albidus*. They covered the mountain like snow and would have impressed Wordsworth.

Mojacar is in a developing, but as yet underdeveloped, tourist area and we hope that these notes may be of interest to readers who might be tempted to go there for a holiday in an area that is different. The plants are the main attraction for local towns such as Almeria have little to offer the tourist though Lorca, over the border in Murcia, is said to be quite fine. There are better places in the south of Spain for birds and the list of species to be seen in the region held at the hotel was not large. It included the canvas-backed duck we had never heard of and thought might be a visitor's hoax – one of the hotel guests joked that it might perhaps refer to "green duck". However, we discovered later that there is, in fact, an American species of that name which has become established in the region. We would like to go back and look for it as well as some of the special plants we missed. Next time we will try to get to the celebrated Cabo de Gata which is noted for its flora.

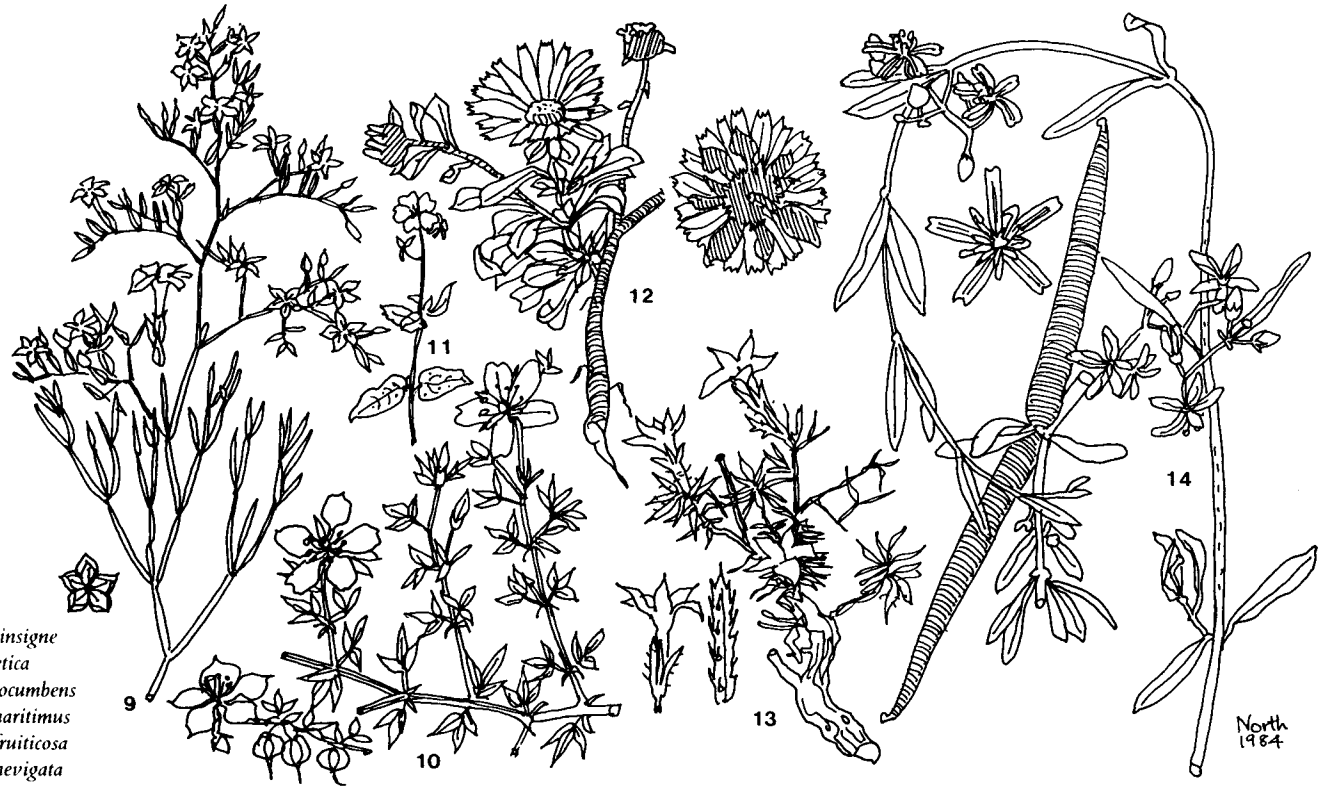
REFERENCE

Polunin, O. and Smythies, B. E. (1973). Flowers of South-West Europe. University Press, London.

1 *Ononis speciosa*
2 *Rhamnus lycioides*
3 *Lavatera maritima*
4 *Lavandula multifida*
5 *Narcissus gaditanus*
6 *Lycium intricatum*
7 *Reichardia tingitana*
8 *Helianthemum almeriense*

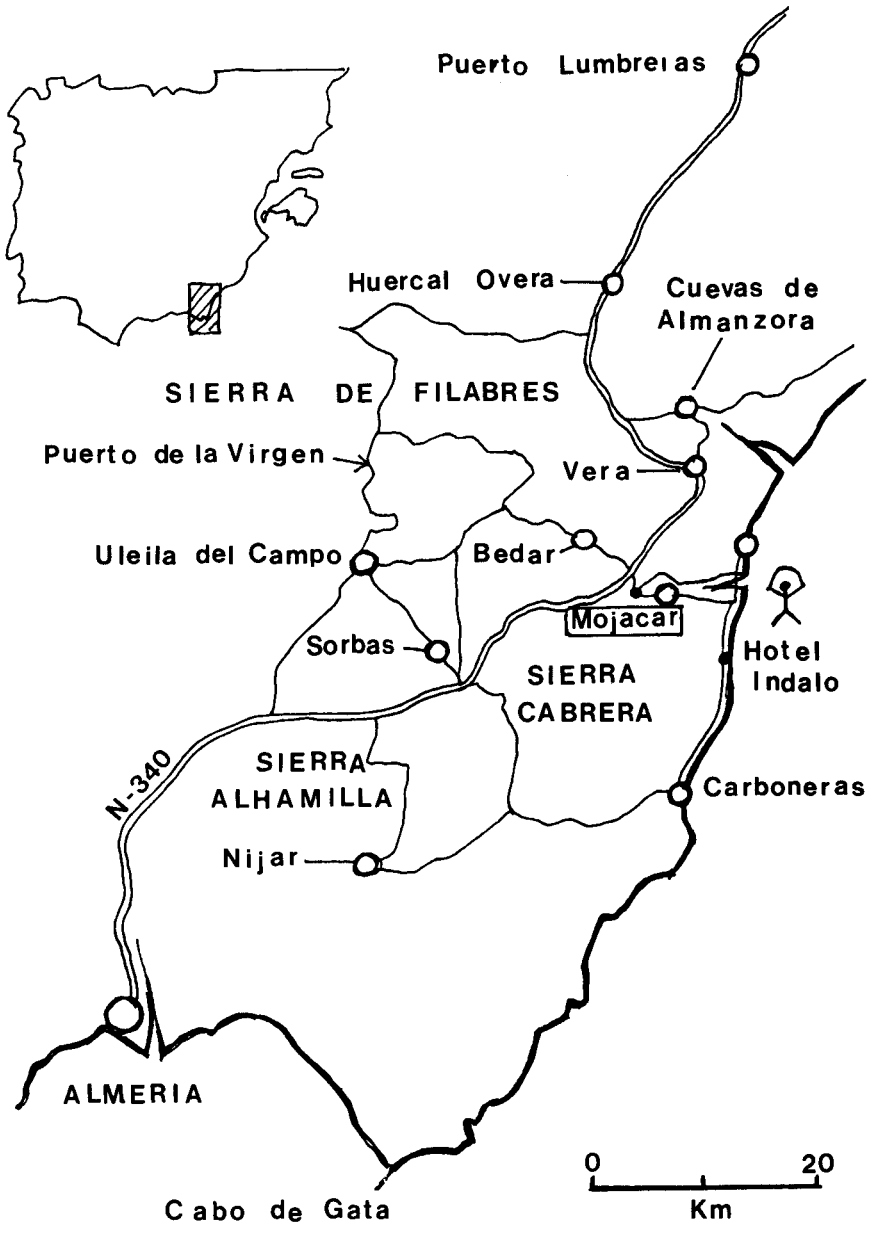
Flowers of Almeria

Flowers of Almeria



9 *Limonium insigne*
10 *Fagonia cretica*
11 *Fumana procumbens*
12 *Astericus maritimus*
13 *Lithodora fruiticosa*
14 *Periploca laevigata*

ALMERIA


Puerto Lumbreras
Huercal Overa
Cuevas de Almanzora
SIERRA DE FILABRES
Puerto de la Virgen
Vera
Uleila del Campo
Bedar
Mojacar
Sorbas
SIERRA CABRERA
Hotel Indalo
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Book Reviews

Flowers of the Himalaya
by OLEG POLUNIN and ADAM STAINTON
OUP, £29.50, 1984

Twenty-five years ago Oleg Polunin wrote "Flowers of Europe" to help the ever increasing number of tourists identify flowers discovered on their travels. Now together with Adam Stainton he has produced "Flowers of the Himalaya", as a help to more adventurous holiday makers. "Flowers of Europe" weighs 1.4kg and is not a rucksack book. "Flowers of the Himalaya", at 1kg, is a little lighter to take to the mountains especially if one can enlist the help of a porter. Priced at a little under £30 it could be an expensive risk in monsoon rain with dripping oak and rhododendon forest.

The 19 pages of introduction are most helpful, the area covered is defined and the very important topographical effects of aspect and rainshadow are described. I had thought of the Himalaya as running east-west but in fact it is aligned north-west south-east and covers eight degrees of latitude (36°to 28°N). Two major climatic types occur: Mediterranean with winter rain and a light summer monsoon in the west and the classical summer monsoon in the east. These are factors of major importance to gardeners. The areas of more persistent monsoon and perhaps rich floras of Sikkim, Bhutan and Assam through to China and Burma are excluded. The title is, therefore, a little misleading.

Two-thirds of the books, 580 pages, contain descriptions of 1,500 species (a fact gleaned from the dust cover). The remaining third consists of 80 pages each with four to five plant drawings, 128 coloured plates covering 700 species, a glossary and index. We are told that the area holds some 9,000 species so with only 1,500 plants described, what about the 7,500 omissions? Many of these occur below 1,200m, the level at which selection started, and thus much of the sub-tropical and some of the warm temperate flora is excluded. Looking at individual genera, 15 species of oak and chestnut occur of which 11 are included in the text, all five junipers are there but with the difficult willows only nine plus four exotics are mentioned out of a total of 35. Of genera of greater interest to British gardeners, 29 out of 30 rhododendrons are there, the primulas score a poor 38 out of 66 and the androsaces are fairly complete with 18 out of 22. On the whole, this gives a very useful coverage. The plant descriptions and names are based on the recently published "Enumeration of the Flowering Plants of Nepal", and there have been name changes. Two flagellate saxifrages with large yellow flowers are illustrated, one *Saxifraga stenophylla* is probably the attractive *S. flagellaris*, the other is named *S. mucronulata*, so we may have both or perhaps all three in cultivation. Another flagellate with smaller flowers and linear leaves is illustrated and named *S. brunonus*; no doubt this is the plant generally named *S. brunoniana*.

The colour plates are variable in quality probably because a representative set of good photographs is just not available. The better shots, *Paraquilegia microphylla*, for example, reflect the very special quality of the plant, whereas it is hard to believe that *Delphinium viscosum* on the same page is quite so dull as the photograph indicates.

The field covered by the authors is very large indeed and this book is most helpful in giving a picture of the Himalayan flora. It will add a great deal to the pleasures of the gardener, plant hunter and traveller.

W.D.H.

Mountain Flowers
by S. STEFENELLI. Trans. by Lucia Wildt.
David & Charles, £7.95, ISBN 0 7153 8339 6

This book has been around since 1982. It is stoutly bound, obviously for a hard life in rucksack or anorak pocket. The page edges are colour coded in 9 colours to represent approximately the flower colours.

One hundred and sixty-eight plants are represented, the colour plates of almost all of them being of good quality. The names of the plants are given in the usual Linnaeus nomenclature with the common synonyms, family, colour of flowers, distribution and frequency of occurrence.

Much other information is crammed into the page in the form of pictograms. Those details appropriate to the plant being coloured yellow. For convenience a loose card is inserted in the book with the pictogram interpretations, and this may be moved to the appropriate page.

More information about the interpretations of the pictograms is given in the body of the text at the beginning of the book. It is, undoubtedly, well designed for its purpose, as a field guide.

T.G.S.

The American Rock Garden Society

Probably most members are aware of the existence in the U.S.A. of a Society comparable with our own. Some members may have wished to join this Society, but have been deterred by the apparent difficulty of transmitting their subscription. United Kingdom members may now pay in Sterling cheques. In practice it would probably be best to consult one's Bank, which could supply advice and the appropriate forms.

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

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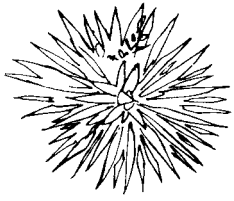

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Plant lists, together with a simple map, available on request.

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