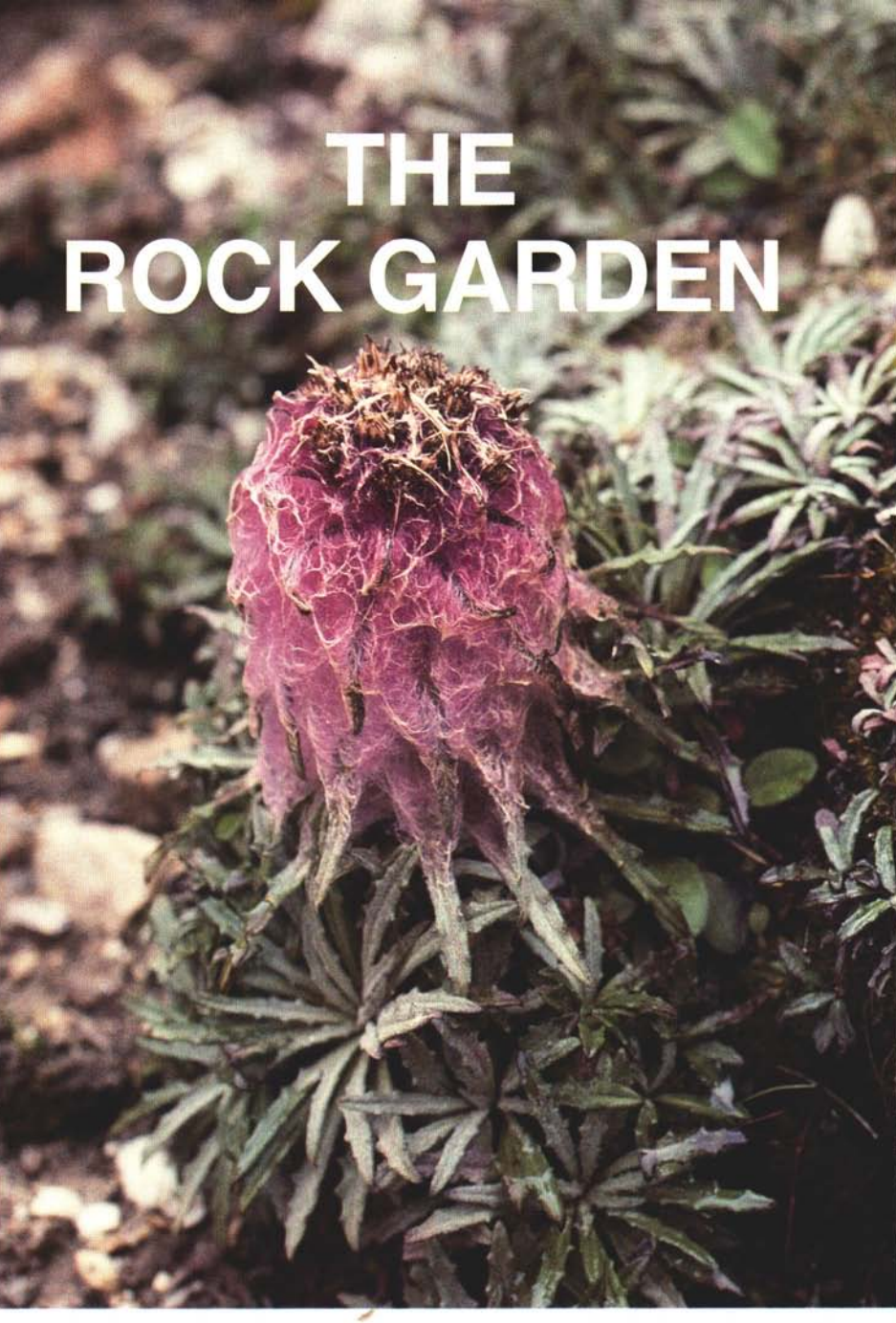

THE ROCK GARDEN

THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XXII Part 3 Number 88

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The Rock Garden

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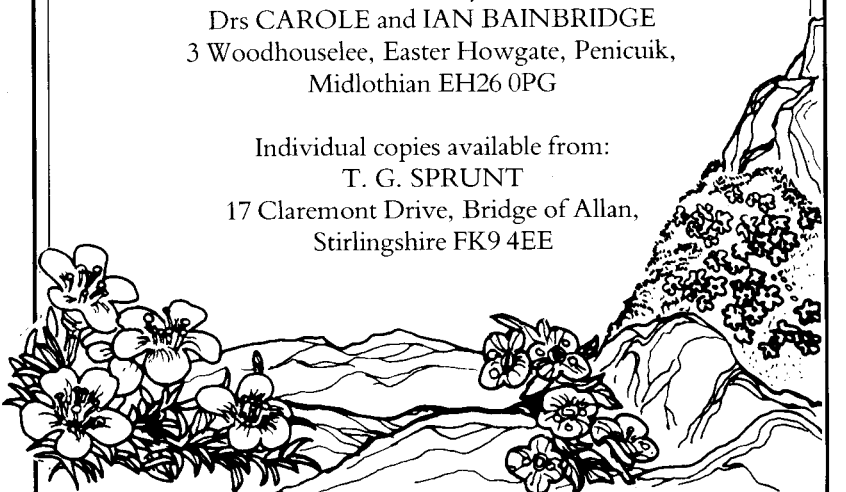

Front cover:
Saussurea simpsoniana, Kanchenjunga, East Nepal.
Photograph Ron McBeath

Contributions to THE ROCK GARDEN

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

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

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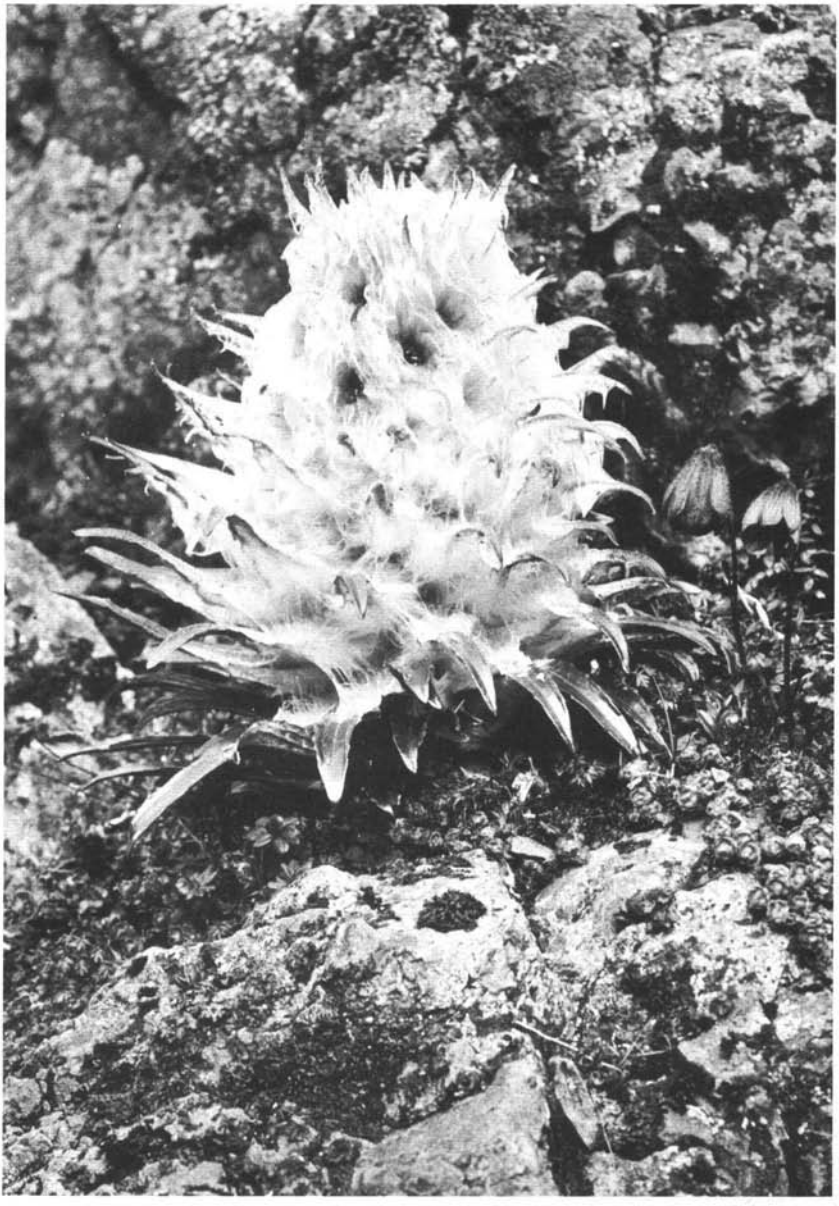


Saussurea laniceps (see p278) Andrew Grierson

Editorial

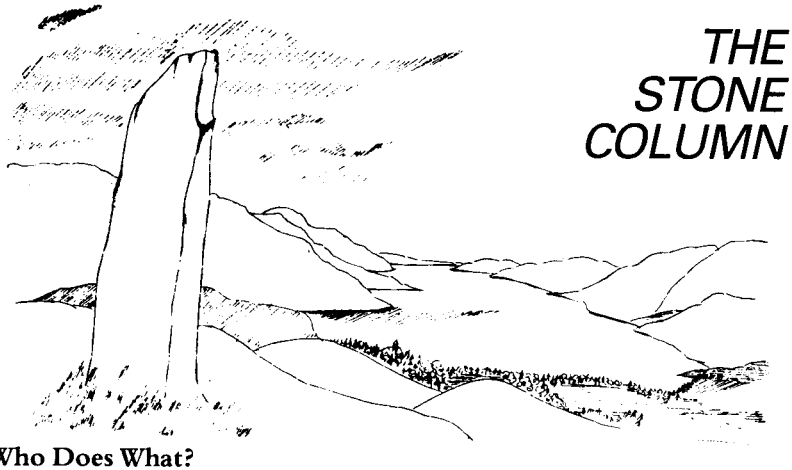
Over the last few months the international nature of rock gardening has been brought home to us on many occasions. The Warwick Conference was a great success, and we hope enjoyed by all. The round of overseas visitors before and after helped to enhance the friendships and emphasise the common purpose we all have in rock gardening. We look forward to meeting new found friends again in the near future, perhaps in their neck of the woods.

The sowing of seeds from the seed exchanges, and from expeditions to China and South America (thank you all) is an enjoyable part of spring. Their germination makes us dream of distant places, and wish we were there to collect them ourselves. Maybe when we retire as editors we'll follow in Alastair McKelvie's footsteps to collect seeds in the Himalayas, and see some of the plants described by Ron McBeath or Anne Chambers in what might be called the Himalayan section of this issue.

If your interests lie closer to home, there are new and different plants as near as Crete, Sicily or Spain. The Mediterranean is obviously a fertile hunting ground for the aspiring botanist, photographer or seed collector. Again, without our planning it, a Mediterranean section appeared in this issue. Perhaps it will give you new ideas for what to do next spring, or even this autumn. Wherever you go though, if you do collect seed, do be sure to do it legally; both in the country you collect, and in complying with import regulations.

If you're going to stay at home, Sandy Leven's article on fritillarias is full of gardening common sense, and Duncan Lowe's Buchanan Memorial Lecture, from the 1990 Discussion Weekend, may inspire you to create raised beds, walls or troughs for your treasures. Of course, now is the time to check you've booked for this year's Discussion Weekend, for more plants and gardening from around the world.

CAROLE AND IAN BAINBRIDGE



THE STONE COLUMN

Who Does What?

There is no question but that one major event loomed large over much of the six month period since I last faced a blank sheet of paper and an imminent Editors' deadline: the International Conference at Warwick, during early April. I suppose we should be thankful that our role, as lecturers, only dominated our thoughts for some three to four months; the organisers of "A Century of Alpines" had been beavering away virtually since the last Interim Conference at Boulder, Colorado in 1986! Both the Alpine Garden Society and the Scottish Rock Garden Club should be very grateful that there are members willing to take on such onerous tasks. When things go right at these gatherings, no-one really notices the effort behind the scenes; when they go wrong, its all too easy to be wise after the event.

Our remit from the Organising Committee requested "an illustrated talk on Alpines outdoors at Fort Augustus". It might be thought that complying with such a broad specification would be easy, but it was, as it turned out, much more difficult than a talk on a narrower subject, for example "Alpine Ranunculus". The first hurdle to be passed in January was a Paper for the Conference Report. I have always been aware of Duncan Lowe's stricture "that long lists of other people's plants tip over the edge of interest into the gulley of boredom". (S.R.G.C. Journal 72, p257). Hopefully this pitfall was avoided by concentrating instead on our basic garden philosophy, the ways in which we attempt to grow alpines outside rather than on individual successes and failures. But how does one translate such a paper into an illustrated lecture without falling into Duncan's gulley?

Poll's first approach was purely pragmatic: she took out the viewer and went through every single slide of the garden, selecting those she considered good enough as photographs. She ended up with around a thousand possibilities! Then the real arguments began. It is all too easy when compiling

any garden lecture to succumb to the temptations of one-up-manship, and show all one's rarest and most difficult plants, even if they only flowered fitfully once before departing. On the other hand Poll would produce a beautiful photograph and I would counter with "but what can I **say** about it?" Poll also wished to include a number of what our children used to refer to as "atmosphere, atmosphere" shots – autumn mists in the Great Glen and the like. Eventually she suggested we adopt the twin-screen technique, which we had first seen in action in 1984, at the Asheville, North Carolina meeting of the A.R.G.S. After railing against such gimmickry for a while, I had to admit that Poll was right. Having mostly local scenery on the left-hand screen provided both a unifying theme, and a context for the plant portraits. It also provoked a smiling enquiry from a certain Stirling member, "Did you get a grant from the Scottish Tourist Board?"

Our discussions would not have been so prolonged, nor so heated, were it not for our equally passionate personal commitments to the cultivation and study of alpines. It is purely fortuitous, for as nurse and student in London, neither of us showed any interest in gardening. The shared passion developed later, in the Highlands. We do have our differences of course, but in the main our tastes coincide. Poll does not rate Veronica and Synthyris very highly, for example, considering their flowers rather formless, and is quite fond of Viola; whereas I like the blue spikes of the former two, but not the shape and colour combinations of most violets. Neither of us really finds Calceolaria attractive. We were once offered, many years ago, a large pan of *Calceolaria darwinii* as was, now *C. uniflora,* by a club member, now deceased. The look on his face has taught us never to refuse such obviously treasured gifts on grounds of taste; but to accept gratefully and then quietly make sure they go to a good home where they will be appreciated.

While we were at the Warwick Conference, we were asked to provide a brief horticultural C.V. The simple answer to who does what, is that Poll is the photographer and propagator while I am the gardener and writer. These distinctions really only hold good during the summer, when Poll is generally found in her potting shed or around the frames, and I do most of the maintenance and any new planting we are able to fit in. In the winter, weather permitting, we are both involved in clearing and construction. Poll is so taken with her leaf-collector (Stone Column Jan '91) that I rarely get the chance to use it, and after the leaves, she does the bulk clearing of the two main herbaceous-type borders in the lower garden, below the house. This still leaves plenty for me, all the troughs, raised beds and terraces, and the bulk of essential pruning. Nowadays the latter seems to consist mainly of cutting back those shrubs threatening to block pathways; the rest are left to fight it out.

After two extraordinarily wet winters in a row, that of 1990–91 was back to normal, if such a term has any meaning in the changeable Scottish climate. January provided sufficient open dry days for Poll to complete the breaking in of her upper herbaceous bed phase II. In an exact repeat of last year, we spent one weekend towards the end of the month spreading a second entire compost heap onto this newly dug area.

There is usually at least one longish frozen spell under a stable anticyclone, and this winter it returned for much of February. No snow cover and a dehydrating north-east wind made for conditions tough on plants, especially evergreens. We suffered browning on a number of conifers, such as *Chamaecyparis thyoides andelyensis*. We should have known better than to plant this towards the east side of the conifer ghetto, as the cultivar *C. t. ericoides* is well known to be sensitive to wind-burn. We were expecting damage on the various pernettyas of the *P. prostrata* complex, exposed on the south-east facing Blue-Ridge bed, but they were unharmed. We have lost *P. prostrata pentlandii* before, in the old original peat wall on the north side of our boundary hedge. The answer here, for obtaining freedom of flower and hard compact growth on many Ericaceae, seems to be to plant them in full sun and keep them watered. As we have seen in the wild, many are plants of open moorland and mountainsides. The entire ex- *Pernettya prostrata* complex which occurs down much of the Andes and up into Mexico has recently been lumped as *Gaultheria myrsinoides* by David Middleton. However sentimentally attached we gardeners are to the name *Pernettya*, I have to concur with its amalgamation into *Gaultheria*, in view of the large number of *Gaultheria-Pernettya* hybrids we have raised over the years. On the other hand, the range of variations within *G. myrsinoides* is so wide, that some labels are required for horticulturally distinct entities. Their foliage can vary from relatively broad and congested, to lanceolate and borne in two distinct rows; the fruits from white through some beautiful lilacs, to black.

Our losses amongst our unplunged plastic pots were surprisingly few, a tribute perhaps to our grow 'em hard and don't overfeed regime. We are more interested in keeping the plant, than obtaining a show-style specimen in the shortest time. We must add that we were lucky in that our winter minimum was −11°C, whereas down in Devon they had −14°C!

When a few snowflakes fell in London, the Government immediately waived the conditions for cold-weather payments, quite oblivious to the fact that much of the Highlands had been well below zero for over a month by that time. Like our alpines we are supposed to be hardy folk up here. The fact that some plants do better in the north and others in the south should tell them something. Plants respond more surely and subtly to the variation of climate within the British Isles. Immediately after the last war,

when the A.G.S. and the S.R.G.C. reactivated, I am told there was an approach from the south with a view to an amalgamation of the two organisations. One recent American visitor had a large notebook prominently labelled "English Gardens". When I pointed out that this was as provocative as calling someone from Alabama a "Yank", the notebook disappeared, hopefully for amendment! (Sorry Guys, we did enjoy your visit, honest!) Both the foregoing may suggest to our overseas members why, within a small island, the S.R.G.C. jealously guards its independence.

Meanwhile, back at the ranch, while the freeze lasted we were trundling our workhorse to the usual stone-mine – a ruined dry-stane dyke. As we said at Warwick, there is a rumour that we are dismantling Urquhart Castle to build our terracing, but it's untrue! The larger foundation stones for our walls, around 100Kg or more, are rolled up a plank into our Land Rover, Grisewald, one of us standing each side. Unloading is a controlled(?) fall into a wheelbarrow. Last year, in Utah, on Skyline Drive atop the Wasatch Plateau, we met up with the "family Hanson from Ephraim way". The father showed me his powerful long-bow, used to hunt deer. When a middle-aged foreign tourist pulled it back with ease, his face was a picture. Not quite what he had expected, but then he was not to know of the long hours spent heaving rocks!

March brought a return to changeable weather, on dry days we finished our clearing, on wet ones the preparations for Warwick. I was even able to edge Poll's phase II and lay the stepping-stone lines within it. Planting up was left until after the Conference; we prefer to be here during the critical after-care period. As things turned out, the week we were away it rained every day at Askival, so the plants would have been O.K., but one never knows. Sean and Bridget, who were looking after things, only managed one day out on the hills.

As we have said before, we much prefer to do any planting out in spring, just as growth is commencing. The converse of a short northern growing season is that the dormant period is very long. This could be why we find autumn planting, other than fibrous-rooted species and deciduous shrubs, much less satisfactory. When planting from pots, mostly seed-raised plants, we dry them sufficiently to allow the roots to be easily shaken free, but not so far as to check growth. This fine line requires regular, careful monitoring of their condition. The current, generally cool late spring is ideal for our purpose, in spite of the regular night frosts in the range 0 to −2°C. Only rhododendron flowers appear to have suffered. I feel the key factor here is "regular", as opposed to a long warmish spell followed the sudden destructive -5°C overnight, which we once had in May. A number of French wine-growing areas were badly damaged by

−7°C on 21st April, all the more so because the vines were well advanced after their mild winter.

The cool weather has extended the flowering period of many plants, especially our extensive collection of trilliums. Fred and "Boots" Case were amongst our post-Conference visitors, and we were particularly pleased to have them here in spring this time, to cast an eye over some of our labels. Many of our trilliums have a 'Case' pedigree, either as seed, or from our fieldtrips together, North Carolina in 1984 and California in 1989, but we did have some queries, especially plants of garden origin labelled *T. erectum* or *T. sessile*. Several of the latter are in fact a red-flowered form of the western *Trillium chloropetalum,* as indeed are many we have seen in other gardens. Quite distinct from these is the Eastern *T. cuneatum.* It is rather shorter than our *T. chloropetalum* forms with more prominent pale mottling on the leaves, and ovate, almost black-purple segments about 6cm long by 3cm wide. Our plant of *T. kurabayashii* was correct, also shorter than *T. chloropetalum,* but stouter, with intense black mottling on the leaves and enormous pointed flowers, almost 12cm long. Our two white sessile trilliums, *T. albidum* and another *T. chloropetalum,* were as far as Fred and "Boots" could tell, true to name.

Turning to *T. erectum,* we are growing large clumps of two quite distinct forms, one having bright green leaves, narrow red segments and yellow anthers, the other, horticulturally superior, with darker green leaves, broad dark purple-maroon segments and purple anthers. Both fall within the general range of variation of *T. erectum,* but the fruit of the former is red and strongly ribbed, which suggests it may have some *T. flexipes* in its background somewhere. The latter, which we call *T. erectum sulcatum* for its segment shape, has the more typical rounded, only slightly ridged, maroon-black fruit, typical of *T. erectum.* All our other pedunculate trilliums are of known origin, and apparently true to name. As we had suspected, one of our *T. rugellii* plants, with pink flowers, is a natural hybrid with the similarly late-flowering *T. vaseyi.*

We cannot leave the subject of trilliums without some consideration of the attractive mottled leaves of many of the sessiles. This beautifully marked foliage is typical of many of the species, and as such differs from a variegated cultivar of a normally green-leaved plant. The paler areas of a leaf lack chlorophyll, whereas red, purple or black mottling can mask it. Thus both forms of patterning reduce the efficiency of the leaf at photosynthesis. This can clearly be demonstrated if a variegated shrub, such as *Eleagnus pungens maculata,* sports back to the normal green form. The reverting branch grows much more vigorously than its handicapped associates, and can take over the whole bush if not cut away (best thing that could happen, short of a bonfire).

In those plants where mottling is the norm, it must convey some advantage to outweigh the lost photosynthesis. An obvious suggestion is that it serves as a form of camouflage, and this is supported by recent American work which has shown that colourblind herbivores such as deer have difficulty locating mottled understorey herbs against the dappled pattern of the forest floor. While it may be true that in the U.S. mottled leaves occur almost exclusively on these understorey herbs, what of our European orchids which can have spotted leaves, for example *Orchis mascula* and *Dactylorhiza fuchsii*? Does the degree of spotting show any correlation with areas which are, or once were, wooded? Perhaps one of our orchid experts can answer this question. Certainly the machair form of *D. fuchsii* has generally unmarked leaves.

Finally, a word of warning for those who were not able to hear Fred Case's comprehensive talk at Warwick. There are in cultivation, forms of *Trillium grandiflorum* with distorted and/or green-streaked or marked flowers. These plants are suffering from an infection of a mycoplasma* which gradually weakens them, causing them to die down early and eventually die out. It can be transferred to other species with disastrous consequences, including ugly deformed, discoloured flowers, especially of red forms. The advice to anyone with one of these abnormally-greened *T. grandiflorum* 'cultivars' must be to burn it forthwith.

We are certainly glad that our general disliking for most variegated plants prevented us from introducing any of these abnormal plants to our garden. Trilliums are certainly in our top ten of garden plants. Apart from the possibility of slug damage on emergence, they are generally trouble-free and very long-lived. They can be left undisturbed for many many years, and usually build up into very satisfying clumps. This is quite surprising as in the wild one generally sees only single-stemmed plants of most species. Quite a number have self-sown, and seedlings of both *T. grandiflorum* and *T. erectum* are turning up all over the garden in odd places. We generally leave them be, to add their own touch of informality to the garden scene.

By way of conclusion, and in case alpines are feeling left out by all the above talk of woodlanders, this has been the best year for quite some time for flower on gentians of the Acaulis group. The large pale-leaved plant of the acid alpine turf, which we still prefer to call *G. kochii*, is treated here as one for the primula border, whereas all the others except *G. alpina* are for limestone scree. Of these *G. clusii* is the most common and widely distributed, but GG. *ligustica, dinarica* and *angustifolia* are equally reliable in flower here. We have a particularly fine sky-blue form of *G. ligustica*, from Rudolf Wurdig. Among the cultivars of garden origin *G. acaulis*

*A mycoplasma is a small bacterium, lacking a true cell wall.

"Belvedere" shows promise. We have only had a plant for three years, but it has flowered well in all of them. What more can one ask, but for the blue trumpets to be blowing in the wind.

A "Challenge" to Paraquat

Recently in the course of a telephone conversation, a friend and Club member enquired of Poll how the Stone Column was progressing. She added that she had gained the impression from reading the Column that I actually enjoyed writing it. As Poll replied, this is only true in part; I hate the idea of having to sit down and start another edition, as our long-suffering Editors know only too well! Once started, I try not to be too serious all the time, but this can leave one open to misinterpretation for, as Poll has often warned me, you cannot put tone of voice down on paper.

I certainly did not intend to give the impression a year ago that I regard Paraquat weedkiller at all lightly. I am well aware that it is a nasty poisonous substance, and treat the concentrate with the same extreme care I take with our chainsaw, when climbing ladders to prune, or in **always** removing the plug lead on our rotary mower before clearing underneath.

That having, I hope, been made clear, I must add that I feel David Simpson's letter posed more questions than it answered. Over what period were the 110 deaths, and during the same time, what was the total number of deaths from poisoning in domestic situations? How many of them were non-accidental i.e. deliberate ingestions of Paraquat, and finally what proportion occurred before Paraquat concentrate was given a very unpleasant smell and a bright blue or green dye? I also fail to see the relevance of a comparison with Thalidomide. People make their own deliberate choice whether to use Paraquat or not, just as they can choose whether to ride a powerful motorcycle or climb mountains. It is not administered to them by an outside authority whose competence they have to take on trust. There were eleven deaths on Scottish mountains in the first six weeks of 1991, but does anyone seriously suggest that mountaineering be banned?

There is however, another potentially serious problem with Paraquat, aside from poisonings by the concentrate, accidental or otherwise. The literature has always stated that Paraquat is 'inactivated' in the soil. I had read this to mean that it was broken down chemically, but not so! Paraquat is immobilised by being bound onto clay particles. If used repeatedly over a long period, the soil may become saturated, to be followed by possible leaching of Paraquat into ground water. I should therefore wish to withdraw some of my previous comments in its favour.

Fortunately, a probable replacement for Paraquat has just been launched by Hoechst U.K. onto the commerical market as 'Challenge'. The active

ingredient, Glufosinate-ammonium, is the ammonium salt of an amino-acid, originally developed from a culture of a strain of the bacterium Streptomyces. This particular strain was found in a soil sample from Cameroon.

It is perhaps unfortunate that the chemical name does sound rather similar to Glyphosate (Roundup, Tumbleweed), for it bears **no** relation to the latter at all. Glufosinate-ammonium is a contact herbicide; like Paraquat it does not enter a plant via roots or through woody stems. There is some movement within leaves but no translocation to roots and rhizomes. It is not as immediately rainfast as Paraquat, requiring six hours of dry weather, but is rather better in this respect than Glyphosate-based herbicides.

From the environmental point of view the good news is that Glufosinate-ammonium has the typical breakdown properties in the soil of a protein derivative, ending up as carbon dioxide, methane, and phosphate. It has been tested under the strict terms of the 1986 Act and is only classified as 'Harmful'. Many household products are in the same category i.e. don't drink them, but they are not particularly poisonous. Unlike Paraquat, the poison register is not required. I certainly intend to give "Challenge" a trial under cool Scottish conditions to see if it lives up to its name.

When I telephoned Hoechst U.K. for the technical information on Challenge, I was told a version for the amateur market is to be launched "later this year". Meanwhile they are keeping the name of this product secret. I spoke to Ian Black, who professed an interest in alpines, having been to the Pyrenees, and he asked whether there was a society devoted to them. In view of where he lives, I gave him the A.G.S. Secretary's address at Pershore, and I believe he has since joined the Society. There you are A.G.S. wasn't that kind of me?

Poisons come naturally

The Paraquat affair described above set me thinking about the whole question of chemical hazards in the garden, and in people's responses to them. The whole business has been so obscured by organic "muck and magic" that I feel rather as Herakles confronted with the Augean Stables. This is an area where one treads very, very carefully indeed! One obvious problem straight away is that the word "organic" has been hijacked and its meaning totally distorted. I have often wondered what an inorganic garden could be like – nothing but rocks, gravel and metal flowers? No plastics, they are chemically organic in that they are carbon compounds. I remember a "Bugs Bunny" cartoon wherein the baddie feeds Bugs an inorganic carrot, hoping he will swallow it, laying himself open to capture with a large magnet.

Mentioning the true definition of the term "organic" runs one straight into the quicksand of the general level of scientific illiteracy in this country. We have Arts-dominated Media, wherein it is considered perfectly acceptable to be completely ignorant of matters scientific. Yet if I quote a children's cartoon rather than some obscure Victorian novel, or admit to prefering Clapton to Chopin, I am quite beyond the pale.

If anyone doubts that this anti-science culture affects gardening programmes then consider the recent "Gardens by Design" series on the BBC. This extended commercial consisted largely of self-promotion by a clique of designers, who, if one listened carefully, used the same, largely meaningless, phrases over and over again. Clearly there is an orthodox school of garden design! Much emphasis was placed on minimum maintenance, and on outdoor rooms for "living" i.e. sunbathing, entertaining one's friends around the barbeque, or reading the latest fashionable novel. Actually growing plants was regarded as a chore, rather like housework.

More relevant perhaps was the Channel Four series on so-called organic gardening. Contained therein were many contentious statements, their unchallenged presence symptomatic once again of the deep anti-science culture that persists in Britain. As someone once said, in another context, "There's no arguing with such people, its much better to run!"

One of the presenters' favourite phrases was "and none of those nasty chemicals". What on earth do they imagine that you and I, and the whole living organic world are made of? Water is a chemical, a compound of hydrogen and oxygen with some rather unusual properties essential for life. Even if one were to assume that the adjective "artificial" was implied in front of "chemicals" they are still open to accusations of illogicality. Do they use plastic hosepipes and watering cans, petrol, and what about cement, an industrial product?

Conversely, in the lexicon of the so-called organic gardener, the word "natural" is often equated with good or safe. The undisputed facts are that many of the nastiest poisons known have their origin in living things; for example botulinus toxin. When one really considers carefully it is quite surprising how very few plants, and parts of plants are actually edible. Some of those, such as red kidney beans, have to be prepared in a certain way to denature the toxins they contain.

The only safe procedure in the garden is to regard all one's plants as potentially poisonous, a clear case of guilty until proved innocent. Some examples are well-known, such as Colchicum, which contains the poison colchicine. A fatal dose is somewhere between 7 and 60 milligrams, depending on the individual, which is not much considering that a single seed can contain 3.5 milligrams. Even half a flower of *Colchicum autumnale*

could prove deadly, especially to a child. Another genus well-known for its poisonous properties is *Actaea*. Way back in January 1984, when describing *Actaea pachypoda* for the Column, we mentioned that we had avoided them altogether while our children were small. Now a number are well-established and seeding around mildly. Our favourite is possibly *A. rubra* whose bunches of scarlet berries flame above dissected foliage in early autumn. We also have an equally beautiful white-fruited form of *A. r.* ssp. *arguta* from California, the berries possibly more rounded, and with just a hint of porcelain blue. As with *Aconitum*, the roots are also poisonous; they kill by paralysing respiration.

In so-called "organic" circles the idea that "natural" equates with "acceptable" has been extended to the use of garden chemicals. Nowhere is the muddled thinking to which this can lead, better illustrated than in the case of the pyrethroid insecticides. Natural pyrethrum contains a variety of pyrethrins which vary in their relative toxicities to insects and mammals. By creating artificial variations on the basic molecules chemists have been able to both increase the toxicity to insects, while at the same time reducing that to man. Thus the safety factors of the artificial variants, such as Decis, are far higher than those of the natural product.

I know which I prefer to use, just as I prefer my mineral water filtered artificially to remove natural carcinogenic benzene, and my food uncontaminated with mycotoxins, the result of attack by natural fungi in the absence of preservatives.

There is so much more I could say, what about artificial antibiotics, and vaccines? And why is our general health better and life expectancy longer than ever before? These would take us too far from gardening so I should like to end with a few words of caution on that other bête noire of so-called organic gardeners – artificial fertilisers. Plants take up their nutrients from the soil as ions in solution. A nitrate ion is a nitrate ion, NO_3, whether it can trace its origin back to atmospheric nitrogen fixed by the Haber process, or to a pile of steaming manure.

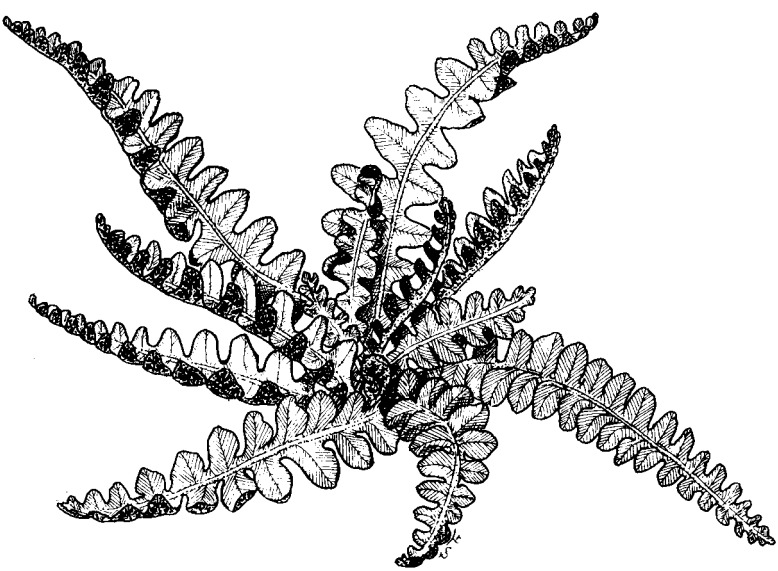
We were recently sent, in error, a large container of liquid seaweed extract. When I telephoned to query this mistake, I requested an analysis, as none was marked on the package. When the levels of the three major nutrients, N P K turned out to be very low (1% or less), I requested its return, and replacement with our usual liquid feed, a high potash tomato fertiliser. This, although based on seaweed for its trace elements, has had the levels of N P K artificially raised until sufficient to promote satisfactory growth.

I assume that because the original extract was not called a fertiliser it did not have to be clearly labelled with its nutrient levels. Presumably the same is also true for products called "concentrated manures" and "soil

improvers", for, with most I have seen, you have no clear idea of how much plant food they actually contain. Sometimes there are problematically high levels of contaminants, for example copper and zinc in pig manure, or heavy metals like lead in sewage-sludge derived products.

Remember that the production of natural anti-vegetarian toxins in a plant confers a definite advantage to it, by deterring grazing by herbivores of all sizes from caterpillars to cows. Similarly nature does not test her natural insecticides for toxicity to humans; there is no evolutionary pressure to avoid these side effects.

The so-called organic growers do have a point when it comes to some farming practices, leading to excessive spraying or deterioration of soil structure. Nevertheless, I still take most of their gardening pronouncements with a large pinch of natural sea-salt, for its all sodium chloride to me.



Ceterach officinarum Heather Salzen

Fig. 63 *Saussurea tridactyla* McB1407 (see p275) R. McBeath

Fig. 64 *Saussurea tridactyla* – flowers mature. (see p275) R. McBeath

Fig. 65 *Saussurea laniceps* (see p275) R. McBeath

Fig. 66 *Saussurea gossypiphora* (see p275) R. McBeath

Fig. 67 *Saussurea graminifolia* McB1460 (see p276) R. McBeath

Fig. 68 *Saussurea stella*, Zhongdian (see p276) R. McBeath

Fig. 69 *Saussurea obvallata* (see p276)

R. McBeath

Some Weird and Wonderful Saussureas

RON McBEATH

As an adaptation to enable plants to withstand the rigours of growing at high altitudes, many have evolved weird and diverse growth forms to help them cope with extreme cold, a very short snow-free period in summer, the poor soils which may be stony and deficient in nutrients, and, probably even more important, the hazard of rapid transpiration and desiccation in the near constant winds which whistle across the hillsides. To survive, plants are often squat and cushion-like to reduce wind resistance, their leaves may be hard, narrow and grass-like to reduce surface area and therefore transpiration, or they may cover themselves with hairs which also reduce transpiration, and may catch and condense the mist which often blows over the hillside, thus providing the plant with water, as well as keeping the plant warm, an important factor in a cold environment. Some plants have also evolved features which to us are attractive, such as paper-like bracts, or modified leaves, which may envelop and protect the developing flowers from the harsh elements, as well as attracting pollinating insects.

One group of plants which are very successful at high altitude and have used all of the above adaptations are the Saussureas. This is a large and diverse genus with some four hundred species found all around the Northern Hemisphere, with one outlier in Australia. A few species can be found down to sea level in the Arctic and at northern latitudes but the vast majority come from high altitudes in the Himalaya and Asia, with as many as thirty seven species recorded from the small kingdom of Nepal. Europe, on the other hand, has only nine species.

The majority of the species are relatively unattractive plants, many resembling knapweeds *(Centaurea),* or thistles. However, contained within the genus are also some of the earth's most bizarre and beautiful plants: some can resemble balls of snow on the high mountainsides, as they are so engulfed in white hairs, while others use the paper-like bracts for protection. Most are so difficult to cultivate that they will tax the skills of the most dedicated and persevering growers, if success can ever be attained.

One species is native to Scotland, *Saussurea alpina.* It is widespread throughout the Highlands, especially on herb-rich mountain ledges. It grows upright stems up to about 30cm, with clusters of a few purple, knapweed-like flower heads in July and August. The shallowly lobed leaves are often light

grey with short hairs. This is a long-lived perennial but has little appeal to the alpine gardener.

Four species of 'snowball' *Saussurea* are fairly common along the Himalaya above 4500 metres, *Saussurea simpsoniana, S. gossypiphora, S. tridactyla* and *S. laniceps,* the latter two extending east as far as Yunnan in China.

Saussurea tridactyla (Figs. 63, 64, p270) is probably the most attractive species in this group of four species. At first it forms a flat rosette of leaves, each of which may be up to 7.5cm long and 1-1.5cm wide, lobed at the tip with three or more blunt teeth. The leaves are completely covered in silky white hairs which makes it a very attractive rosette. After several years growth, when the plant is mature, its energy goes into producing a rounded flower head up to 15cm across, which is completely engulfed in dense white hairs. When the purple flowers are ready for pollination the hairs part to allow access to the nectar and pollen for pollinating insects. As the season develops so the flower stem elongates and the inflorescence turns into a grey, flat-topped cylinder, some 20-30cm high, before releasing the wind-distributed seeds. It is a perennial with a creeping, wood rootstock, and, although a flowering rosette will die after setting seed, other rosettes will continue that plant's existence. In its native area it is found in very open stony and sandy habitats, where there are few other plants for competition, and will reach an altitude above 5200 metres.

Saussurea simpsoniana (= S. sacra) (see cover plate) is a perennial which will produce a low clump of grey-leaved rosettes. Each leaf is linear with teeth all along the margin. The flower heads are again up to 15cm across, dense and woolly, with white hairs flushed pink or red, often darkening as the flowers mature. Like *Saussurea tridactyla* the head elongates as the seeds develop. This species grows in open habitats and is frequently found in crevices in rock outcrops and on cliffs up to 5200 metres.

Saussurea laniceps and *S. gossypiphora* have often been confused in the past, the chief point of differentiation being the positioning of the flower heads on the stem underneath the ball of hairs. *Saussurea laniceps* (Fig. 65, p271) has a conical stem with the flowers on the sides as well as on the apex of the cone. These flowers are interspersed with hairs and leaves which provide several openings to the exterior for pollinating insects. *Saussurea gossypiphora* (Fig. 66, p271) has all its flowers in a dense, flat-topped head, again interspersed with hairs and leaves, but with only a single opening to the exterior. To distinguish the two species, it is often necessary to cut a flower head in two vertically, to see the arrangement of the flowers amongst the white hairs. In both species the leaves are dark green, toothed and have only a few hairs on the surface. Flower heads may be up to 30cm across at flowering time in large specimens and again elongate before releasing the seeds. Both species die after flowering. Although they can be found amongst stones and on cliffs in open habitats

they are most frequently found amongst grass in high alpine meadows, especially on the wetter sides of the mountains.

As its name suggests, *Saussurea graminifolia* has fine, dark green leaves resembling grass (Fig. 67, p272). This is a clump forming perennial which can be found in alpine meadows, growing in rich brown earth, in the drier inner valleys of the Himalaya. It is prominent near the path on the popular tourist route on the Annapurna circuit above Manang. This species sends up a stem 7-15cm high, topped with a ball of white hairs like cotton wool, from which protrude a few short green leaves. The flower capitulum is solitary and purple in colour. I am quite sure that, if introduced into cultivation, this species could be tamed and induced to grow in a raised bed, scree, or as a pot plant in a cold frame.

Only a few species have the paper-like bracts to protect the emerging flowers and attract pollinating insects, and of those, probably the best known is *Saussurea obvallata* (Fig. 69, p273). It is a native to the Himalaya and western China, where it can be found in screes and wet meadows above 3500 metres. Although seldom seen in gardens, it is not impossible and has been successfully cultivated to flowering size in a well-drained raised bed, filled with humus rich compost, at Inshriach Nursery, Aviemore. This particular plant soon formed a fairly strong crown of grey, lanceolate to oblanceolate, toothed leaves and sent up several flowering spikes up to about 40cm tall. The creamy white bracts are almost paper-like and enclose the top half of the stem and the purple, thistle-like flower heads. It is a species well worth looking out for in seed lists, and if the seeds are viable they should germinate freely. If you do acquire a plant, remember when positioning it in the garden that it comes from mountain sides which receive the full blast of the monsoon all summer and will be covered with a deep layer of snow for a considerable period in the winter, so it will require sufficient moisture throughout the growing season, but protection from excessive wet in winter.

One quite different and attractive species to the 'woolly heads' and 'papery bracts' is *Saussurea stella*. This species has long been cultivated and is occasionally available from commercial sources and through seed exchanges. It is easily raised from seed and grown on to flowering size. In its native habitat in Western China it can be found at around 4000 metres on the Chungtien Plateau in Yunnan where it grows in very wet meadows and on raised mounds in bogs, often surrounded by shallow water, growing alongside and flowering with *Gentiana sino-ornata* in the autumn. In cultivation this species is often grown as a pot plant in a cold frame, or out in the open garden in the scree, a complete contrast to the conditions it favours in the wild. This is a monocarpic species – that is, it will die after flowering and setting seed. It will normally take several years to reach sufficient size to flower. The flowers form a compact crown of stemless purple heads, but much more attractive than the

flowers are the grass like leaves, which grow about 7-10cm long, broaden out and prostrate themselves, and turn a rich pinkish red at flowering time, somewhat resembling a starfish (Fig. 68, p272).

Seeds of all the above mentioned species are occasionally brought back and they will normally germinate reasonably well. It must be remembered that they are very high alpines which will be covered with snow for long periods. This will protect them in a state of suspended animation from severe frost, desiccation, pests and disease. They will all receive plenty of moisture throughout the growing season and certainly the ones from cliffs, scree and the stony areas will have perfect drainage and a very lean soil in which to grow. I know of one batch of living seedlings of *Saussurea tridactyla* which were thrown out by a tidy-minded individual, when cleaning up a frame in the winter to make more space, as the grey shrivelled leaves looked more dead than alive. They are not impossible to grow, and to prove the point a young healthy plant of *Saussurea tridactyla* appeared on the show bench at the 1991 International Conference show at Warwick. It is up to you, the growers, to solve the problem of cultivation and gain success.

More on Saussureas

ANDREW GRIERSON

There are two types of what the late Oleg Polunin (1962) called "cotton-wool plants" – the thistle-like members of the Compositae genus *Saussurea* from the Himalaya, with the capitula aggregated near the top of the stem, and bearing much long whitish tomentum. Those in which the flower heads are clearly visible through the hair form one type, for example *Saussurea gnaphalodes, S. simpsoniana* and *S. tridactyla.* In the second type the flower heads are completely obscured by the leaves and fluff; to this type belongs *S. gossypiphora,* a species that has been somewhat confused.

Polunin was correct in 1962 by describing *S. gossypiphora* as having "the flowers completely enclosed in enveloping cottony leaves with a small hole left at the apex for insects". He certainly did not illustrate this species: what his plate clearly shows is a plant of the other type, in which the flower heads are visible through the fluff, perhaps *S. simpsoniana.*

Roy Lancaster (1981) was also correct in his description of *S. gossypiphora* and is to be commended for illustrating it with excellent drawings (by Paul Chester). The latter clearly show the hole between the uppermost leaves and the flower heads aggregated at the apex of the swollen flattened stem.

There is another plant which has been confused with *S. gossypiphora,* for the two look almost exactly alike. However, the stem in the second species is conical and not greatly swollen, and the flower heads are aggregated on the sides near its apex. Leaves and hairs are interspersed between them and a number of holes are left to the exterior for insects.

The Austrian plant collector and botanist Heinrich Handel-Mazzetti confused these two plants as his early papers show, but he later (1937) recognised the second plant as a distinct species from Western China, *S. laniceps.* He correctly identified as this species the excellent photograph that George Forrest published in 1912 (erroneously appearing as *S. gossypiphora*) showing a number of holes in the woolly hummock. Christopher Grey-Wilson also mistakenly illustrated this plant in 1974 but described correctly the holes left for the visiting humble bees.

As recently as 1979 Siro Kitamura described *S. spicata* from Central Nepal and ended with the words "this species differs . . . by the heads arranged spicately in the upper part of the stem, while the heads of *S. gossypiphora* are aggregated at the top of the dilated stem". In other words, *S. spicata* is another name for *S. laniceps.*

Earlier it was thought that *S. gossypiphora* occurred along the Himalayan range into Western China but it now appears that it is confined to Western

Himalaya, Nepal and Bhutan. *S. laniceps* by contrast, at one time thought to be confined to Western China, is now seen as extending from there to Nepal, including Bhutan and Sikkim.

There is a third member of this group of species which Kitamura named in 1969. *S. nishiokae* was described from Bhutan and Western Nepal and differs from *S. gossypiphora* by the lack of scales between the individual flowers, a character which is not unknown in a genus in which receptacular scales are common.

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A. J. C. GRIERSON 1929–1990

Andrew Grierson worked as a research botanist at the Royal Botanic Garden Edinburgh from 1954 until his death in September 1990. Over the years he became an acknowledged expert on Compositae, especially those of the Middle East, India, Ceylon and the Himalaya. The genera Aster and Erigeron particularly interested him. He also published a major revision of the genus Incarvillea (Bignoniaceae).

His first field work overseas was in Aden in 1952. His work on the "Flora of Ceylon" project took him there in 1969. In 1975 he was the initiator of the "Flora of Bhutan" project at Edinburgh and from then on that became his main research activity, including two major expeditions to Bhutan in 1979 and 1982. His most recent achievements included revision of Compositae and Primulaceae for the "Flora of Bhutan".

The above text was written shortly before his death, and it seemed only fitting to publish his work and resolve another taxonomic problem in the Compositae.

David Long.

Bhutan's Autumn-flowering Pleiones

ANNE M. CHAMBERS

Bhutan has two recorded autumn-flowering *Pleione* species, and I would like to suggest that it may have a third, as yet unrecorded.

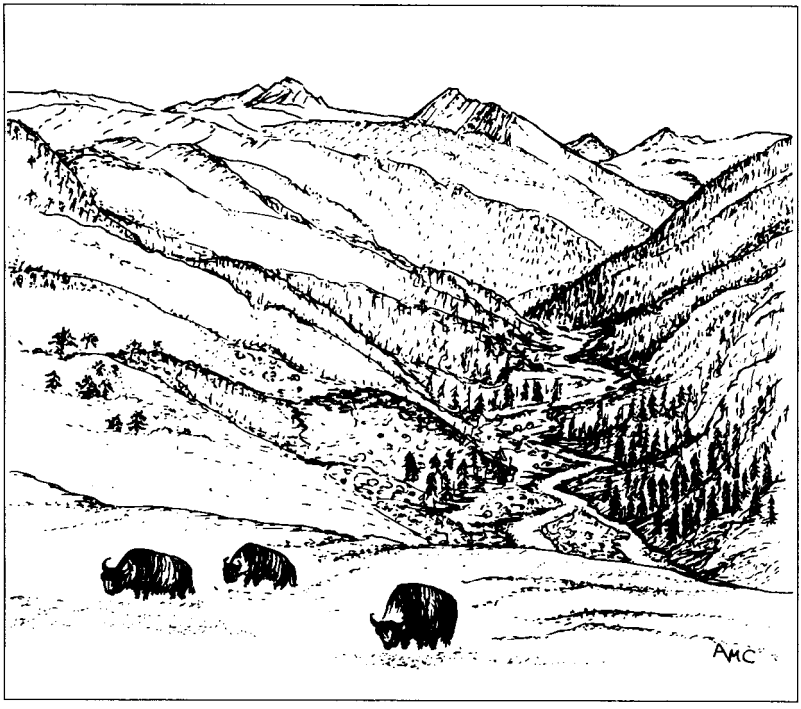
In October last year I joined a hastily-arranged botanical trip to Bhutan. Our original destination was to have been Namche Barwa and the gorges of the Tsangpo in SE Tibet, but as departure date approached and visas were not forthcoming, the trip had to be cancelled. Though the romance of the Tsangpo was denied us, Bhutan is certainly not a 'second-choice' destination. It is an exciting country with a wonderful eastern Himalayan flora, and I was more than happy to follow in Ludlow and Sherriff's footsteps (their several journeys in Bhutan and SE Tibet between 1933 and 1949 are described in Fletcher's 'A Quest of Flowers').

The two *Pleione* species which flower in October are *Pleione maculata* and *P. praecox*. The first has small white flowers, strikingly marked on the lip with purple and yellow, but it is a plant of lower elevations which probably explains why we did not see it. The other, *P. praecox*, (Fig. 70, p290) we saw in central Bhutan at altitudes from 2150 to 2950m. It favoured shaded vertical rockfaces. The flowers are large and of a lilac-pink colour with yellow on the callus ridges. In October the broad, ribbed leaves are suffused with autumn colour. One of the plants had six flowers clustered together, their number and size contributing to the luxuriant, rather exotic aspect of the species.

We eventually reached Tashigang Province in eastern Bhutan and our aim was to walk into the remote Mera Valley, inhabited for only a few months of the year by the fascinating Bragpa people whose economy depends on the herds of yaks they graze on the high pastures; Sherriff described it as "the prettiest part of Bhutan I have ever seen". We had suffered long and hard to get that far, so, faced with a 1500m climb to the top of the intervening pass plus an unknown distance to Mera village, my thoughts that morning were on the destination, not the approach. But halfway up the pass at about 2800m was a patch of orchids, very different both in appearance and habitat to *P. praecox* (Fig. 71, p290) - just a few single flowers of deep rose-pink with darker magenta markings inside the lip and some yellow on the three callus ridges. The single leaves were long and strap-shaped, and the comparatively small pseudobulbs, smooth and very dark green in colour, were grouped in clusters on an open bank of short turf. Just time for a cursory identification - *"Pleione,* check species later, no problem, pity no one else is around to enjoy these."

Incredibly, none of my nine companions saw the orchids on the ascent and we did not descend by the same route, and, of course, back home, the Kew Magazine Monograph 'The Genus *Pleione*' reminded me that this species, if it was a pleione, was certainly not recorded in Bhutan. The staff of the RBG Edinburgh who were very helpful in identifying many of the plants in my photographs did not recognise it and suggested the genus *Bletilla* might also be appropriate. I sent illustrations to David Harberd, an expert on *Pleione*, with whom I searched for the true *P. forrestii* in the swards of *P. bulbocodioides* in Yunnan's Jade Mountains! Independently we have tended to the same possible conclusion that the plant may be identical to the *P. saxicola* described briefly in the monograph chapter 'Little-known and Doubtful Species'. It is known from one unspecified location in Yunnan (at least 400 miles east of the Bhutan site) and is very similar in size and form to the Bhutanese plant. David saw herbarium material of *P. saxicola* in Beijing and confirms that it is indeed autumn-flowering which was not actually stated in the description!

Another *Pleione* for Bhutan? – perhaps!



Yak grazing in the Mera Valley, eastern Bhutan. *Anne Chambers*

In at the Deep End

ALASTAIR McKELVIE

The Journal over the years has seen its share of 'travel' articles describing expeditions or even just summer holidays to mountain regions. The aim is usually to see and photograph plants or, in some cases, to collect seed. Thankfully the days of digging up basketfuls of plants are long since over.

The resulting articles generally fall into three categories. The first is simply an account of the travel and its problems plus notes of some plants seen en route. The second is more of a botanical listing of species found with little or no description of them, combined with brief notes on places seen. The third type limits itself to describing a range of species of likely garden merit with notes on how to grow them. Sadly this type is rare, much to the disappointment of editors.

One honourable exception to these categories was Christine Walkden's article in The Rock Garden, Vol XXI, 186 (1989) where she gave much useful information on how to organise an expedition and what members should do and take with them in order to gain the maximum benefit from the trip.

I have subscribed to seed-collecting expeditions over the years and been variously pleased and disappointed with the results. When seed was limited, of poor quality and of a limited range, mainly of unexciting species, I tended to be critical and think I could do better myself.

In 1990 I had the chance to discover for myself just how easy or difficult a seed-collecting expedition was, when Chris Chadwell asked me to go with him to Nepal. I eagerly accepted.

I think I did all the right things in advance. In particular I lost weight and, by regular exercise, reached a level of fitness not attained for years. In addition I read all the articles I could on the plants of central Nepal and made copious notes on all the species we were likely to find. In retrospect I reckon that fitness and a good knowledge of the local flora were the two most important things I did in advance.

Dhaulagiri was chosen as the best area in which to collect seed. Chris decided to go out there in mid-September with a follow-up expedition to the southern slopes of Annapurna, a completely different area, in October. In the event I was unable to get out to Nepal in September and Chris had

to come home at the end of the month so we had two separate but connected treks, Chris to Dhaulagiri and myself to Annapurna.

With hindsight, October was probably a bit late for seed even in the slightly later eastern Himalaya around Annapurna, in what was an early season, with much of the seed eaten or blown away. September was about right; any earlier, particularly around the wet southern slopes of Annapurna, would have been in the height of the monsoon with real problems of transport logistics. As it was both Chris and I experienced some monsoon-type weather which was certainly not conducive to seed collecting.

At the end of the day, for a variety of reasons, we did not collect as many high altitude alpines as our subscribers may have wished, although we did collect many at medium elevations. The records of other collectors show that many of the high altitude plant collections were of plants rather than of seed. We were, of course, not in the business of collecting plants.

Sheep are taken up to the high pastures in early summer and brought down in September. I was dismayed to find the vast scale of sheep grazing as high as 4200m. Alpine plants were grazed hard with no trace of seed and the ground was littered with sheep droppings. Because it was autumn there were naturally few plants flowering anyhow, so that I was pleased to see considerable quantities of *Gentiana depressa* flowering freely on rocky ledges with its beautiful petals striped white and blue (Fig. 72, p291). It was a pity we could not find seed because this is a species where a good reliable free-flowering form is awaited eagerly in our gardens.

Personal problems are inevitable, even although many expeditions gloss over them. In our case, Chris had collected an excellent lot of seed on the drier slopes of Dhaulagiri, west and north of Annapurna before I was able to come out and join him. Then, for a variety of business and health problems, Chris had to return to the UK just as I was coming out. I received full instructions as to the route and had all the necessary collecting equipment plus the same guide as Chris, so I managed to collect quite a lot of good seed. Instructions, however, from Chris to the trekking company had become somewhat distorted by the time they reached me through my guide, so that I did not always manage to get to the right spot to collect seed. In addition, several times I wanted to collect seed but was told by my guide, wrongly as it turned out, that Chris had already collected masses of seed of a particular species so I did not need to bother.

The climate and altitude have quite a definite effect on one. A week where it rains every day from noon until evening brings out the leeches in their hundreds, prevents seeds and herbarium specimens being dried and has a debilitating effect on morale. Concentration is difficult and one's dedication tested to the limit. I marvel now at how George Forrest and other collectors managed to stay out in the field collecting for seven months at a time.

Being cooped up in a tent with no-one to talk to from 6 pm to 6 am became tedious, particularly where the only light was a candle. Above 3600m it was difficult to summon up enough energy to write up the notes for the day and arrange seeds and herbarium specimens, while sleep was difficult because of the reduced oxygen concentration. The rugged nature of the terrain meant that much of my energy was taken up with climbing and descending steep slopes, perhaps up 1500m and down 600m in one day. It was easy to daydream at high altitude going up a 700m staircase, so that sometimes my guide had to draw my attention to a plant he thought I might like seed of.

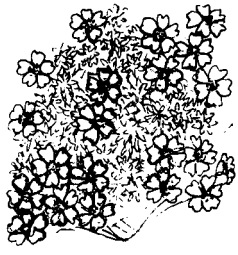
And yet, as sometimes happened, what a joy to get out on to an open ungrazed slope full of fruiting alpines and to be able to spend an hour or two browsing around and collecting seed.

Much time was spent in trekking up to high altitude; despite my guide being aware of a recently improved road system, several days were wasted in the approach march, cutting down the amount of time available for exploring the higher slopes and cliffs. I had failed to appreciate that staff do not always go where you want.

Descriptions of some of the plants of which we collected seed are given below along with a note on their growing requirements. The numbers are the expedition collecting numbers. Few expeditions ever identify all their collections and there is always a delay, although I think we have kept it to a minimum. Considerable difficulties exist in noting distinguishing features from small plants with no flowers and where the fruits and leaves are close to disintegration.

Androsace globifera (CM137) Primulaceae

This is a widespread species growing right along the Himalaya from the Punjab to Assam, from 3500 to 4500m, flowering in June and July. It forms dense cushions of tiny silver-leaved rosettes in short yak-grazed alpine turf in gravelly peaty soils. The flowers are pale mauve with an orange eye on very short stalks. It grows quite readily outside in scree beds with some winter protection. It can readily be propagated by cuttings. It has not proved very free-flowering in cultivation.



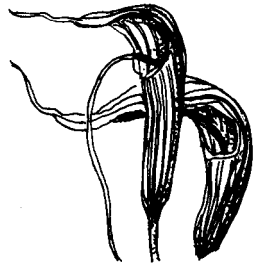
Androsace sarmentosa (CM310) Primulaceae

This well-known garden plant grows in the wild from Kashmir to Sikkim from 2700–3900m in light woodland or open slopes, flowering from May to

July. It is a woolly white plant with leaves in rosettes, stolons with red hairs and umbels of pink flowers on stems to 1cm. Cultivation of this delightful plant is easy on scree or well-drained soils but it does benefit from a bit of winter protection. Propagation is easy by rooting the rosettes on the ends of the stolons.

Arisaema costatum (CM73) Araceae

This species is endemic to central and eastern Nepal growing in light woodland at around 2000-2600m, flowering in May and June. It is difficult to identify correctly the fifteen or so species of this genus which grow in Nepal but *A. costatum* has a dark purple spathe with longitudinal stripes, a blade with a tail-like tip and leaflets with numerous raised veins underneath. It reaches a height of 40cm. It can be grown fairly readily in a lightly shaded moist soil but will probably take several years to flower.

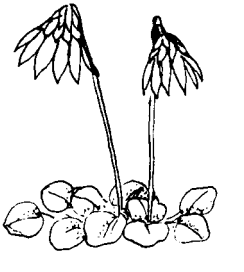


Campanula pallida (CM275) Campanulaceae

This species grows from Afghanistan through to south west China on rocky cliffs from 1500 to 4500m. It is a variable species but is usually a branched hairy perennial with loose clusters of lilac or purple flowers on spreading stems to 50cm, flowering from June to September. It is not often seen in cultivation but should be an attractive plant in the rock garden. It is likely to need winter protection or to be grown in the alpine house requiring freely drained gritty soil.

Cremanthodium aff. purpureifolium (CM136) Asteraceae-Compositae

This miniature cremanthodium is one of the ten species of the genus which grow in the Himalaya, difficult both to identify correctly and to grow successfully. This collection was widespread on peaty turf at 3950m, probably flowering around August. The plants had paired leaves close to the ground and drooping flower heads 10-15cm high. Cultivation should be attempted in an alpine house and the plants kept dry in the winter.



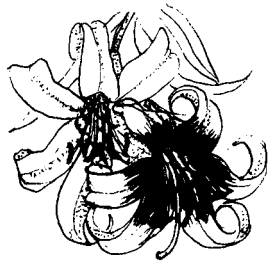
Incarvillea arguta (CM117) Bignoniaceae

This shrubby pendulous perennial grows from Himachal Pradesh to central Nepal and south east Tibet from 1800 to 3500m, flowering in July and August. It is found on dry rocky cliffs at the edge of the Tibetan borderlands. It has many stems with funnel-shaped elegant pink flowers in long terminal clusters. The leaves are finely cut and deep green. Its cultural needs are largely undocumented in the UK but it is grown in New Zealand where its preference in the wild for ledges swept by riverine winds seems to be suitable. It may well turn out to be an easier plant to grow than *I. mairei*. In general, a well drained scree should be appropriate, with alpine house cultivation for a few plants as an insurance.

Lagotis kunawurensis (CM150)
Scrophulariaceae

This is a Nepalese member of a genus of around twenty herbaceous species spread from Europe across to China. It grows on open slopes in damp areas, flowering from June to August. The leaves are basal and fleshy with blunt teeth and the tubular flowers are white in 12cm high dense spikes. In cultivation it grows very slowly and may take five years to flower. It has a long tap root so resents disturbance. It should be grown in a deep pot in an alpine house or in a scree.

Lilium nepalense (CM222) Liliaceae



This lily is common throughout much of the Himalaya on open damp slopes and light woodland, often on clay soils, from 2000 to 4500m, flowering around August. The lower leaves are broadly ovate; the flowers are an attractive deep yellow, usually single on stalks up to 20cm. Cultivation should be straightforward outside but plants are unlikely to be long-lived and seed should be sown regularly.

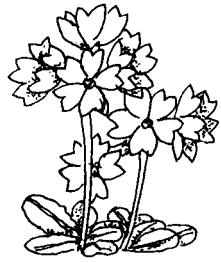
Oxytropis williamsii (CM186) Fabaceae-Leguminosae

This species is restricted to windswept riverside gravels and open slopes in west and central Nepal, common in the upper Kali Gandaki Valley at around 2600m, flowering from June to August. It is a densely tufted, deep rooted

perennial with silvery grey leaves and violet flowers in globular heads. It is rare in cultivation but is likely to need a deep pot in the alpine house.

Primula aff. buryana (CM144) Primulaceae

This Primula is obviously a member of the Soldanelloides Section but it is still to be fully identified. It grew in peaty pastures on Dhaulagiri at around 4000m, probably flowering in June and July and was common along with the cremanthodium (CM136) described earlier. The leaf rosette has flattened silky hairs with flower stalks 6-12cm tall. Germination has been excellent following prompt sowing, using a surface sterilisation procedure.



Primula sp. (CM159) Primulaceae

This species is possibly also of the Soldanelloides section, as was the previous species (CM144), to which it grew closely but at slightly higher altitude on rocky grazed slopes. The leaves are oblong and larger than CM144 with flower stalks to 20cm. The fruiting heads are also larger with prominent calyces.

Rhododendron lepidotum (CM200) Ericaceae

This is a fairly common rhododendron throughout the Himalaya growing in light woodland or open slopes from 2500-4500m, flowering in June and July. This collection was from an open exposed stony hillside at 3050m so it should be hardy. It is a low shrub to 50cm with clusters of dark red-purple flowers about 2cm in diameter. Leaves are small, obovate, about 3cm long and stems are resinous. It should be amenable to the normal cultivation for dwarf rhododendrons.

Rhododendron lowndesii (CM131) Ericaceae

This dwarf rhododendron is endemic to west and central Nepal and is found around 3500m on dryish rocky outcrops along with *R. lepidotum*. It is a slender deciduous shrub usually about 10cm tall. The flowers are pale yellow, spotted with carmine within. It is

recognisable by its bristly hairy leaf margins. It grows readily outdoors in any soil suitable for rhododendrons and is ideal for a raised bed.

Saxifraga aff. andersonii (CM143) Saxifragaceae

This kabschia saxifrage grows from western Nepal to south east Tibet and is often found close to *Androsace globifera* adjacent to a boulder. It produces tight mats of light green lime-encrusted foliage with terminal clusters of white or pink flowers, probably flowering in June and July. It should be amenable to outdoor cultivation in a typical kabschia mixture, well drained but slightly moist with broken limestone incorporated.

Saussurea graminifolia (CM154)
Asteraceae – Compositae

This plant grows from Kashmir to south east Tibet in screes and open slopes between 4000 and 5600m, flowering from July to September. Our collection was made on damp cliffs near the Dhaulagiri icefalls at 4300m. It is one of several species with densely woolly-haired inflorescences which are almost impossible to grow beyond the seedling stage. It reaches a height of 12·5cm in the wild and can be identified by its narrow linear leaves.

Thermopsis barbata (CM121)
Fabaceae – Leguminosae

This herbaceous perennial is found from Kashmir across to south west China from 2900 to 4000m, flowering from May to July. This particular collection was from 2950m in an alpine meadow full of tall perennials. There is a distinctive cluster of dark chocolate-brown flowers above densely rusty-haired long-stalked trifoliate leaves. The height is around 15-35cm. Not a common plant in cultivation, it is likely to need a well-drained slope or scree.

In view of the problems described in this article which are often glossed over by expeditions, it is surprising, not that we did not achieve more, but that we actually returned with 180 different seed collections. We had herbarium specimens for most of these species and also for species of which

we could collect no seed, allowing us to check identities at the British Museum, London and the Royal Botanic Garden, Edinburgh. We are grateful to staff of these two institutions for their practical support and for assistance with identification. As required by the Nepalese Government, a voucher set of specimens and seed samples was left with the Botanical Garden in Kathmandu.

I am grateful to Joan Bacon for preparing the line drawings for this article.

Fig. 70 *Pleione praecox*, Bhutan (see p280) A. Chambers

Fig. 71 *Pleione sp. (?saxicola)*, Bhutan (see p280) A. Chambers

Fig. 72 *Gentiana depressa*, Nepal (see p283) Alastair McKelvie

Fig. 73 *Anchusa cespitosa* (see p304) Nicholas Turland

Fig. 74 *Cynoglossum lithospermifolium ssp. cariense* (see p304) Nicholas Turland

Fig. 75 *Alyssum sphacioticum* (see p306) Nicholas Turland

Fig. 76 *Acantholimon ulicinum* (see p308) Nicholas Turland

Fig. 77 *Prunus prostrata* (see p314) Nicholas Turland

Book Review

Cox's Guide to Choosing Rhododendrons
by Peter and Kenneth Cox
Published by B. T. Batsford Ltd.
176 pages, 125 colour plates
Price £14.95

The considerable expertise of Peter and Kenneth Cox has produced an excellent manual which will be a useful companion for inexperienced growers and an occasional reference source for the cognoscenti of rhododendrons. The first few pages deal with the differences between species and hybrids, cultivation, various methods of propagation with their advantages and disadvantages, and use of the book. The main text is divided into 4 alphabetical listings of over 100 species, 200 hybrids, and many deciduous and evergreen azaleas. Each species entry has, as a heading, the sub-section classification, indications of hardiness in both the UK and USA, growth habit and flowering period. A full description of the rhododendron follows, mentioning not only pertinent physical characteristics but also availability and susceptibility to diseases if relevant. The geographical source of the plant is stated, often with other interesting information such as the origin of the plant name. The best clones and their awards are named, and, under the same heading, related or similar species are listed which makes for easy comparison. Hybrid entries give the provenance of the cross. Generally the information is impressively up-to-date – the recently introduced *R. kesangiae* from Bhutan and recent hybrids such as 'Wee Bee' are all included. The text ends with lists of rhododendrons for specific purposes, a glossary, bibliography, addresses of relevant societies and nurseries throughout the world and an index. Illustrations are of some importance in a book of this kind, and the 125 colour photographs, many of them full page, are of good quality and well printed with few showing unacceptable colour casts.

In summary, a useful handbook with much to recommend it and at a reasonable price.

AMC/VWMC

Unnatural Rock Gardening

DUNCAN LOWE

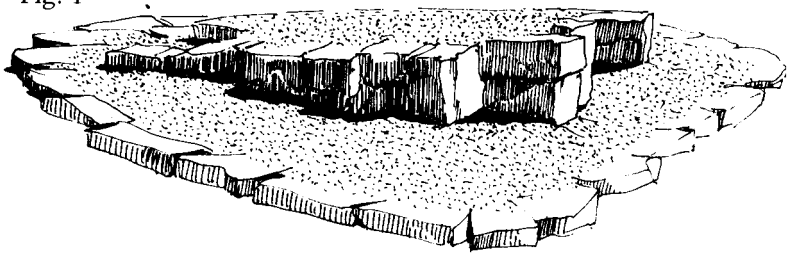
How many of us, when walking or motoring through the British hill districts, have come upon a garden with its own natural outcrops of rock, and how few have failed to say something like – 'Oh I wish I had that in my garden'?

What is it about outcrops that has caused generations of rock gardeners to put so much effort and ingenuity into imitating them, quite often badly and frequently in the most inappropriate settings? If the mountain outcrops excelled in attracting a wealth and variety of alpine plant life, their dominance in rock garden lore might be understandable, but in fact they support only a limited and specialised flora. Crevice-dwelling species are usually foremost in the colonising (unless the rock is persistently wet), and in general are those with a good tolerance to drought, as moisture reserves can be scanty. A few tufts of dwarf, wiry grasses are almost always to be found competing with the saxatile plants and hogging the best of any soil pockets, which about sums up the outcrop's vegetation.

The same state of affairs is true of the garden outcrop and the nearer it approaches the real thing in structure, the less scope it offers for planting. But this love of outcrops lives on and is probably based on what it represents more than anything else. We just want a tiny bit of the mountains outside the window – a human desire which has everything to do with alpine plants and very little to do with their cultivation.

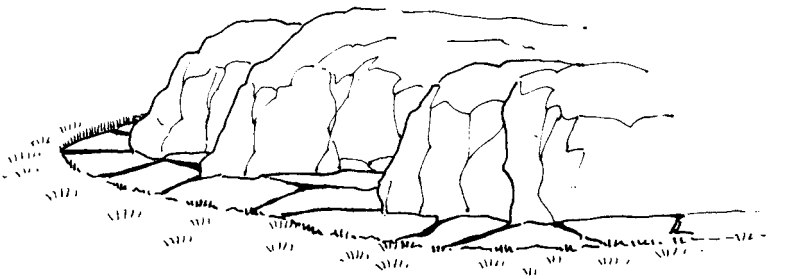
There are golden rules for the building of outcrops, which are passed on to each new generation of rock gardeners, unaltered and unchallenged. The sketch in figure 1 will help in an appraisal of these from a practical viewpoint.

Fig. 1



Great emphasis is placed on the setting up of stones in a manner which will create the impression of exposed bedrock rising from the turf as in nature. Unfortunately, in contriving this feature we create what will become an unendingly demanding task. Lacking the necessary sheep, goat or chamois to nibble the grass down to bowling green level, right up to the foot of each rock, the gardener must achieve the same effect with shears or trimmer. This must be done at least once each week from April to October, otherwise, where lawn meets stone, an untypical fringe of rank grass and weeds ruins the whole arrangement. A solution to the problem is to lay 'mowing stones', like a miniature path, all along the edge of the outcrop but, of course, some of the 'natural' effect is sacrificed.

Fig. 2



There is much insistence on sloping the rockwork back into the ground, which is said to give the essential character of emerging strata. This tilting is also recommended to ensure that rainwater runs back into the bed and not off it. But is that what we really want? Water-gathering tendencies are fine where rain is scarce, but not in our autumn and winter months, when rapid dispersal of excess water is all-important. Perhaps a more worthy reason for inclining the rocks would be to compensate for a lack of sloping ground, which is the case in so many gardens. In natural situations it is common for outcrops to emerge from hillsides, creating the characteristic 'wedge' profile, but when this is transposed to a flat lawn the effect is not the same.

The 'rules' make it clear that no other stone has the importance of that which is first laid, and is referred to as the 'keystone', for which the single best and biggest piece must be reserved. Its place is at the 'nose' of the artificial outcrop, to which all other stone laying is related. The origins of this critical chunk are mysterious. Try to locate its equivalent in a genuine formation and you will be puzzled, which is not surprising because the real thing is not built stone by stone, but is part of a mountain or other colossal

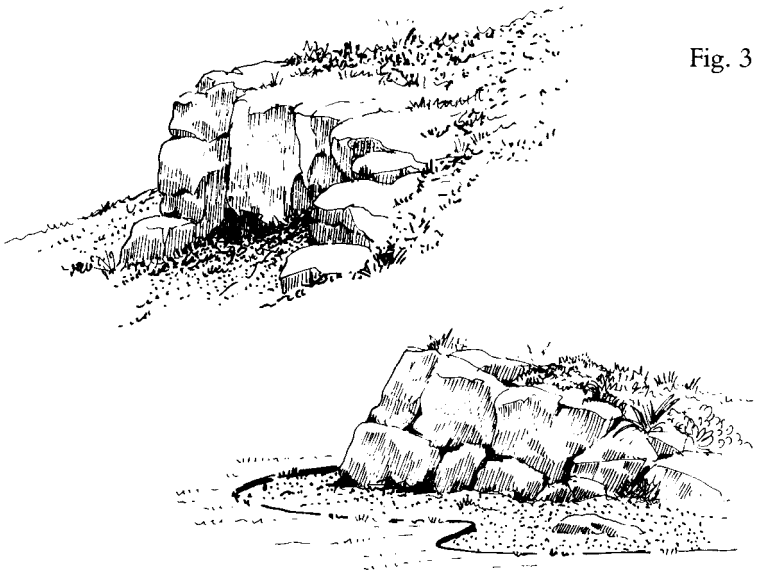


Fig. 3

rock mass – a knob of bedrock bared by erosion or other geological workings. Any suggestion of assembled blocks is due to fracturing, which occurs to a pattern, but is most unlikely to be graded down in size from front to back as our contrived versions tend to be.

In the construction of a rock garden the real purpose at which the work is aimed can become confused. Are we creating an architectural feature to be decorated with alpine plants or a place specially prepared for growing them? Despite its shortcomings, the 'outcrop', built to the rules, often proves to be successful in providing an adequate home for a collection of alpines, but very rarely will it persuade the onlooker that it belongs to the landscape.

Over the past ten to fifteen years the popularity of the outcrop has finally seen some decline. Rock gardening has become alpine plant growing and there is a difference between the two. Whereas, in the past the 'rockery' was just one of the garden's features, today's grower of alpines tends to devote the whole plot to their cultivation, using a variety of bed constructions to meet their varied needs. The gardener starts to specialise, becoming a plantsman and as such is more concerned with providing the best possible growing conditions rather than building a piece of mock mountain terrain.

Raised beds are now prominent in alpine cultivation. They provide the excellence of drainage so essential for mountain plants and permit a degree of control which was not possible in the traditional beds. If kept within

sensible limits on size, all parts can be reached easily from the serving pathways, and the height acts both to reduce weeder's backache and to present the plants closer to the eye. The raised bed is also independent in terms of soil. It can be filled with whatever mixture the grower wishes to use and can make possible the culture of genera and species which would resent the ground offered by the garden.

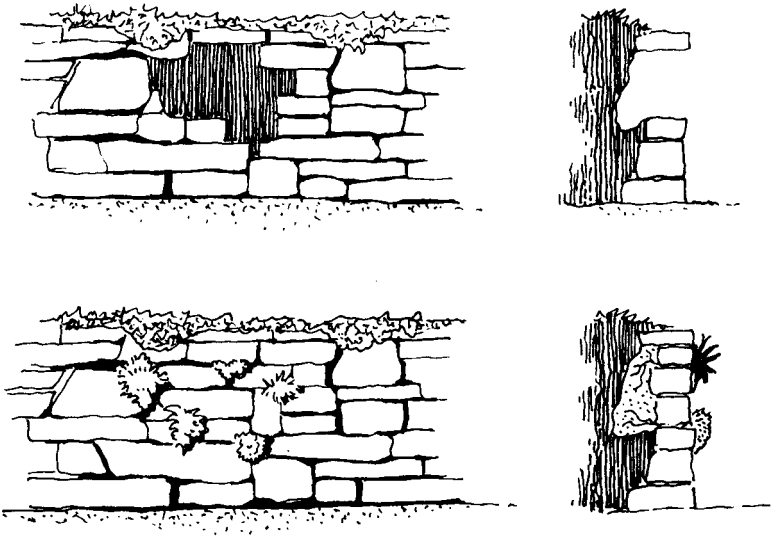
Basically there are two approaches to the building of raised beds. What could be called the rustic approach employs only natural material, such as random stone (as quarried and not subsequently chiseled), river or sea-shore cobbles and logs or peat blocks. The alternative is to use worked or synthetic materials, with no attempt to disguise them, such as bricks, railway sleepers, concrete blocks and dressed stone. Both approaches have their merits. The rustic construction is usually better suited to the larger garden where the surroundings are predominantly composed of living things. Beds built with artifacts can look more in keeping when close to adjacent buildings and other man-made surroundings to urban gardens. Rustic structures in contemporary housing developments never look comfortable.

There are no **natural** raised beds but the features which we follow in building them, and creating specialised conditions, are to be found amongst the wild hills, particularly in limestone terraces. These giant steps in rocky hillsides could be likened to a series of raised beds built into a slope. The escarpments act as retaining walls to stabilise rock and earth in a more or less level state, and it is on these terraces that many fine plants make their homes. In the garden there is little difference between raised bed and terrace; both create the same type of growing platform and root run and both make the work of weeding and plant care much easier. If anything the terraced bed has an advantage in that it is in contact with the ground at the rear as well as the base and will therefore suffer less from drying conditions. Much has already been said and written concerning the detailed work of raised bed building and filling, together with the range of plants that can be grown in these very successful constructions, so we move on.

Alpine roads are frequently supported by retaining walls, usually built from the stone which is immediately to hand and filled in behind with the debris created by the building of the road, which comprises anything from small boulders to dust. After only a short time the local plant life begins to exploit the new 'cliff', finding a multitude of vacant crevices for the taking. With the passing of just a few years some of these walls can be rich in rock-dwelling plants, exceeding the surrounding rocks and screes in population density. Gardeners lucky enough to have similar walls on their properties might be envied as having a ready-made haven for alpines, yet this is rarely

true in practice. For reasons which are difficult to discover, the British wall fails where the alpine version, of very similar substance and construction, excels. The one obvious difference is the climate and this could well be the major influence, but it is possible to improve the plant-supporting properties of a wall. One of the most effective ways is to pull it down and rebuild it, incorporating good rooting material between and behind the stones and, ideally, inserting plants as the building progresses. By no means all of the wall-owners will want to even consider such an upheaval and for them there is an alternative requiring only piecemeal dismantling. Small areas of the wall can often be taken out by removing just a few stones. The cavity is then excavated slightly and cleaned out to make room for a wad of fibrous rooting mixture. This must be fibrous if it is to stay in place and not be eroded by water percolating through the masonry. It is packed behind each stone during the rebuild and at some stage the plant or plants are also introduced. The use of mortar during the rebuild is more or less essential to hold everything in place, but its presence can be disguised

Fig. 4



if the main wall is not pointed. Figure 4 illustrates the steps. A good rooting compound can be made up from a mixture of spent mushroom compost and grit. No, there is nothing like it in the walls of the mountain passes, but it works, somehow compensating for the deficiency in climate or whatever it is that the plants get in the wild but not in the garden wall. An exception to all this can occasionally be found where aubrietas, arabis or sempervivums clothe old masonary in glorious abandon, but it is unlikely that other alpines will respond in the same way in those places.

The literature championing and describing the growing of alpines in troughs must be equal to that for any other branch of rock gardening, and to go into detail here would be mere repetition of what has already been well done. Trough culture is another of the unnaturals and yet it is very successful, to the extent that some would say it is superior to all other methods for choice and difficult species. There is certainly something special about the properties of a trough although just what is never convincingly explained. Because its volume is small compared to a bed, the trough and its contents will warm up and cool down more rapidly. Unless there is a fault at the drainage outlet there is unlikely to be any problem of excess moisture in the filling. It is common for a trough to be free-standing in an open airy situation, away from stuffy or dank conditions. One or more of these three factors may give the trough its unique properties, although this does seem unlikely. We will just have to accept that whatever mysterious processes are peculiar to this form of cultivation, they work to our benefit. In my own experience there is nowhere in the garden or amongst my numerous pots and containers that will satisfy certain plants as well as do the troughs, for example the more difficult gentians, such as *G. brachyphylla*. Whilst this species may still look a little miffy when grown thus, it does at least survive and puts up the occasional flower, whereas in all other situations death comes quickly. Other typical 'troughophiles' in my collection are *Androsace brevis, Campanula zoysii, Helichrysum sessile* and *Gentiana verna*. Nowhere else can I persuade these plants to accept life in captivity for very long.

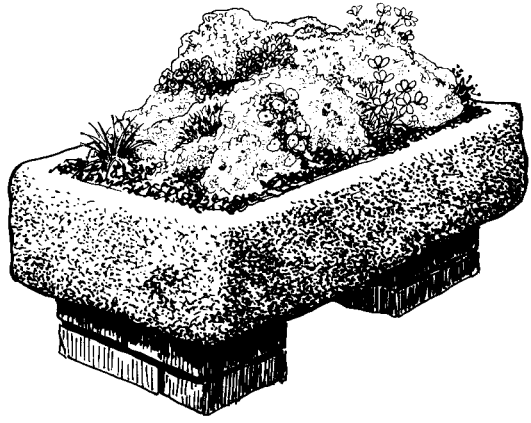
A rock garden scree bears little true resemblance to the debris heaps of the mountains, yet we talk blithely of "reproducing the natural conditions". We are not doing anything of the sort really. If you dig down into the natural stuff for a foot or two, all that you are likely to find is more of the same. Beneath the exposed surface layer of stones there may be a little grime coating the pieces of rubble, but there is nothing resembling soil or humus. The individual chunks making up the heap are usually far bigger than we would dare to use in the construction of our horticultural versions. Although there is an apparent dearth of sustenance and a very hostile root run, a good proportion of the mountain's finest flowers are to

be found on the stone slides and moraines. In the practicalities of garden building a ton of stone chippings has to suffice for simulating the huge mass of detritus accumulated by nature and the meagre pile functions differently to achieve a similar effect. Wild screes are very sparsely populated and by comparison the garden simulation is grossly overcrowded. Whereas the mountain plant may have cubic metres of rooting space to itself, the cultivated specimen may well have only the volume of an average bucket to spread its root system through before it meets up with those of its neighbours. It follows that we just can't expect our cultivated scree-dwellers to survive on the tiny deposits of sustenance offered by authentic stone piles; we must enrich our pebble beds to a very unnatural extent. The garden form becomes an amalgamation of stone chippings and organic material in a ratio of anything from 4 to 1, up to a half and half 'luxury grade'. In such mixtures the plants still enjoy excellent drainage and aeration and a stony seat to support them. It is possible to find deposits in the hills which have a somewhat similar makeup but they are in a very small minority amongst the vast waste heaps of the alpine ranges.

Where tufa occurs in limestone regions it is usually either almost smothered in vegetation or virtually barren. To some extent its flora varies in relation to its hardness; the softer and more penetrable it is the more extensively it is overgrown, although exposure and moisture content are also contributory. Tufa gardens enjoyed their greatest vogue about twenty five years ago when cliffs and outcrops were engineered with this material. The softer and more desirable deposits were easily cut and trimmed, mellowed quickly and possessed a very attractive surface form and texture. Above these merits, however, was the unique ability to support alpine plants rooting in the very substance. For a time tufa was regarded as the ultimate culture base and was even synthesised using mixtures of sand, cement and peat. Where are they now, those expensive and carefully constructed tufa beds? The answer, is that many simply wore away, quite quickly, under the attack of rain, sun and frost, whilst others declined as native weeds discovered a new place to live and overwhelmed the foreign flora therein. We learned our lessons and modified our use of tufa. Cliffs were protected from erosion by a sheltering roof and beds were built differently, again to combat the excessive weathering process. Tufa is now used more sparingly, often as a single feature or to embellish a trough. We now know that weather damage is related directly to wetness; the wetter the material remains the more likely it is to be broken up by freezing and eroded by rain. A further penalty is the encouragement of mosses which can choke the likes of cushion plants to a fatal extent. Boulders and blocks of tufa, set into the bed or trough no more than one fifth of their depth, achieve a happy balance between water uptake in dry conditions, and

water shedding when the weather turns wet. Given this case, a gradual toughening of the surface takes place and renders the tufa more resistant to damage. This and the lower water absorption also act to discourage unwanted growths. Now we can have shapely lumps studded with slow-growing alpines, especially the Kabschia saxifrages. Nevertheless the life of these flowering rocks is a short one. They take two or three years to reach maturity and attractive display, hold this peak for a year or two and then decline. Replanting rarely proves successful as it seems that the original residents leave little for a second generation to live on.

Fig. 5



Any garden can be classed as unnatural, inasmuch as the vast majority of trees, shrubs and plants living in it are not native to our country. Furthermore our energies and aspirations are channelled to persuade those diverse races and tribes to co-habit in one small patch of ground with what is for most of them an alien climate. Rock gardens are structures built to hold small plants in a pleasing setting; they are no less artificial than the rose pergola or the cabbage patch. Let's just accept them for what they are and enjoy them.

This article is based on the 1990 Discussion Weekend William Buchanan Memorial Lecture. The Scottish Rock Garden Club is grateful to Duncan Lowe for giving this lecture, and for providing this manuscript which enables all the members of the Club to benefit. *Eds.*

Hardy Alpine Garden Plants from Crete

NICHOLAS TURLAND

The high mountains of Crete, rising to more than 2400m, are similar in size to those on the Greek mainland and rank alongside such massifs as Taygetos (2404m), Chelmos (2341m), Parnassos (2457m), Timfi (2497m) and Grammos (2520m). This size range is exceeded only by Smolikas and Olimbos, which are Greece's two highest mountains at 2637m and 2917m respectively.

Crete has just over 1550 native species of flowering plant, of which about ten per cent are endemic, i.e. occurring nowhere else. Many of these restricted species are relics of an ancient flora, which became fragmented and isolated by mountain-building processes and the flooding of the Mediterranean Sea. Estimates vary as to the length of Crete's isolation, but it is certainly several million years. The vertical limestone cliffs, especially in the numerous gorges, provide conditions which have been stable for millenia. They are refuges for many of these ancient, relict species, and plants inhabiting them are termed chasmophytes. Further endemism is found at high altitude, above the timberline, where cliffs, crevices and soil-pockets are habitats for a range of interesting, dwarf, often very beautiful plants. The White Mountains, or Lefka Ori, in western Crete, are particularly rich, with a number of extremely localised species.

Winter snowfall is a regular occurrence on Crete above about 1000 metres. Snow may continuously carpet the ground from as early as late October to as late as May, depending upon the season. Drifts and snow hollows may persist into June and it is rumoured that a few tiny sites have permanent patches. As with the more familiar alpines in central Europe and elsewhere, this covering protects the plants beneath from extremes of temperature. However, once Cretan snow has melted, usually by late May, there is exposure to intense sunlight and little rainfall until the following winter. Most species are adapted, therefore, to withstand dry conditions and, although all the species I have described should be frost-hardy, they will not thrive with excessive wetness in a cool, damp, British climate. They should, however, be quite happy in the drier and more freely-drained conditions under glass in alpine houses or frames, or in vertical crevices in rock gardens, retaining walls or holes bored into tufa. The surface rocks of Crete's high mountains are largely limestone or dolomite, and all of the species dealt with here are lime-lovers.

I have extracted from the list of Cretan plants those high altitude species which I consider attractive enough for culture in alpine gardens, although I realise that this selection is a subjective one. Some I have grown myself, and in such cases I have provided any cultural information which might prove useful. Others I know only from observations in the wild, and a few are based solely upon literature sources.

Boraginaceae

Anchusa cespitosa (Fig. 73, p291)

Probably the best known of Cretan endemic mountain plants, growing in flat, loamy places or in pockets of soil between rocks in the White Mountains. It forms tight mats of rosettes of narrow, bristly leaves and bears almost stemless, bright blue, white-centred flowers in spring. My single specimen is of nursery origin, planted in a block of tufa set in a frame. Thick, rope-like roots have penetrated the tufa (actually splitting it in two!) and have sunk deep into the sandy plunge beneath. In cultivation, the leaves tend to grow unnaturally long and hide the flowers, but this might be preventable by denying the plant a free rootrun and providing only a meagre diet of nutrients. Best grown under glass, propagation is by seeds or cuttings.

Cynoglossum lithospermifolium subsp. *cariense* (Fig. 74, p292)

A forbidding name for this most attractive, dwarf, perennial houndstongue. From rosettes of narrow, hairy leaves arise short stems bearing flowers variously described in the literature as a mixture of red, purple, blue and violet. These appear in late spring and summer and are followed by seeds with curiously winged margins. *C. l. cariense* is found not only in Crete , but in Greece, Cyprus and Turkey, while the typical race occurs in Lebanon. The plant is described under *Mattiastrum* in Flora Europaea and some other works, and under *Paracaryum* in the Flora of Turkey. Probably best grown under glass, propagation would be by seeds.

Cynoglossum sphacioticum

Similar to the preceding species, but endemic to the White Mountains of Crete. The flowers are deep blue to violet, followed by bristly seeds without a winged margin.

Campanulaceae

Campanula hierapetrae

A dwarf, perennial bellflower with a stout stock, endemic to Mount Afendis Kavousi in eastern Crete. Its basal rosette of leaves produces slender, unbranched, leafy stems terminating in a few typically blue, bell-shaped flowers in summer. A plant for the alpine house or frame, propagation would be by seeds.

Caryophyllaceae

Dianthus pulviniformis

A fairly recently described, cushion-forming pink, endemic to the cliffs of Mount Kedhros in central Crete. The plants reach 50cm across, with much-branched stems bearing needle-shaped, bluish-green leaves and an abundance of pale pink flowers, which appear in summer. It is related to *D. aciphyllus* and *D. juniperinus,* two other Cretan endemic species also found on cliffs, but with less compact habit. Propagation would be by seeds or cuttings.

Compositae

Bellis longifolia

It may seem rather strange including a daisy on this list! This endemic species has a distinctly refined appearance, however, and is very showy when flowering in spring. The heads are typically daisy-like, with white rays surrounding a yellow disc, and the leaves have conspicuously toothed margins. Propagation would be by seeds.

Centaurea baldaccii

This small knapweed has a stout rhizome, producing flat rosettes of hairy leaves and almost stemless, creamy flowers appearing in summer. It is endemic to the White Mountains and is rather rare. Best grown under glass, propagation would be by seeds, but conservation should be borne in mind, owing to the rarity of the plant, and only a minimal quantity collected.

Helichrysum doerfleri

A beautiful plant endemic to Mount Afendis Kavousi in eastern Crete, where it grows on flat, rocky ground. It is rather like a dwarfed example of *H. sibthorpii,* with similarly grey-hairy leaves, but the flowers are bright pink surrounded by contrasting, white, 'everlasting', papery bracts. A plant for the alpine house or frame, its propagation would be best by seeds sown as soon as ripe.

Convolvulaceae

Convolvulus libanoticus

This dwarf, hairy, cushion-forming bindweed, with much-branched stem and narrow leaves, is somewhat similar to *C. boissieri* from southern Spain and the Balkans. Showy, reddish flowers are carried on short stalks in summer. In Crete it is known only from the Psiloritis massif in the centre of the island, where it grows on flat, clayey ground flooded in winter. It also grows on Mount Killini in southern Greece, as well as in Turkey and Lebanon. Propagation would be by seeds or possibly cuttings.

Cruciferae

Alyssum sphacioticum (Fig. 75, p292)

This densely grey-hairy species is endemic to the White Mountains, where it grows in limestone rock-crevices. The short stems are covered with overlapping leaves and terminate in dense racemes of bright yellow flowers opening in spring. Definitely a plant for culture under glass, propagation would be best by seeds.

Draba cretica

A tiny, endemic whitlow-grass with hard leaves arranged in tight rosettes, producing clusters of bright yellow flowers in early spring as the snow melts. Propagation is by seeds, and my two plants were raised from a collection made in the Lasithi Mountains in eastern Crete. They are now two years old, both still less than 3cm across, growing in a pan, under glass. Excellent for culture in tufa.

Dipsacaceae

Scabiosa sphaciotica

A dwarf, endemic scabious with narrow, densely silvery-hairy, pinnately lobed leaves. Slender stems, growing flat against the ground, bear small heads of lilac flowers in summer. Best grown under glass, but will succeed outdoors in tufa. Propagation is by seeds, although numerous infertile ones may be produced in cultivation. Now more correctly known as *Lomelosia sphaciotica.*

Guttiferae

Hypericum kelleri

A small St John's wort endemic to western Crete, mostly occurring in the White Mountains, growing in clayey depressions between rocks or sometimes on field-margins. It forms a flat mat of slender, creeping, rooting stems bearing small leaves and producing masses of yellow flowers in summer. An easy plant to grow in a well-drained location, it is already established in cultivation, sometimes under the incorrectly applied name of *H. trichocaulon* (another Cretan endemic species). Propagation is easiest by detaching a few of the rooted stems.

Labiatae

Scutellaria hirta

A dwarf, endemic skullcap slowly creeping to form a compact mat, the stems bearing silvery-hairy, green or purplish leaves. Short, upright, flowering shoots carry white or sometimes purple-flushed flowers, followed by inflated, persistent calyces. My two plants were collected as cuttings in the White Mountains and have subsequently grown and flowered well outdoors

in my raised 'scree' bed. Propagation is easiest by cuttings, separated below soil-level so that roots are already attached.

Sideritis syriaca

Perhaps a little tall for alpine garden purposes, at around 60cm, but still most attractive and well worth growing. It is an aromatic, yellow-flowered perennial, with oblong, basal leaves and erect stems all densely covered with yellowish, woolly hairs. The Cretans collect the flowering stems and dry them for making 'mountain tea', an infusion they call *malotira*. Cretan plants belong to the typical race, *S. s.* subsp. *syriaca,* which is possibly endemic; another is found in Turkey. Best grown in a well-drained, sunny spot outdoors, propagation would be by seeds.

Leguminosae

Astragalus angustifolius

A dense cushion-forming milk-vetch with pinnate leaves ending in sharp spines. The flowers are pinkish-purple, yellow or white, usually borne on very short stems so that the spiny leaf-tips protrude further and provide protection from grazing animals. Under garden conditions, however, it might prove difficult to maintain such a compact habit. The species has a relatively wide distribution, growing in Crete, the Balkans, Cyprus, Turkey, Syria and Lebanon. Best grown under glass, propagation is by seeds, which I know are difficult and painful to collect!

Onobrychis sphaciotica

A very localised sainfoin, endemic to a few cliffs in the White Mountains (the specific name means "of the Sfakia region" – a district of Crete incorporating a large part of the White Mountains). It forms clumps up to 100cm across, with pinnate leaves and long flowering stems reaching 60cm. Although certainly not a dwarf plant, it is very beautiful when the ovoid heads of pinkish-purple flowers open in summer. Probably best grown under glass, propagation is by seeds, which are contained within a persistent, spiny pod. Beware though: some pods are empty, so it is a good idea to open them and check while collecting. Owing to the rarity of the plant, conservation should be borne in mind if seeds are collected and only a very few taken. My single plant, growing in a pot, appears to be fairly slow growing.

Linaceae

Linum caespitosum

An endemic, dwarf-shrubby flax forming a compact mound with bright yellow flowers produced in spring or summer. A cliff-dweller, it is related to *L. arboreum,* which grows in similar habitat but at lower altitudes. Best grown

in vertical crevices or under glass, propagation would be by seeds or possibly small cuttings.

Paeoniaceae

Paeonia clusii

This beautiful peony has quite obvious merits as a garden plant. It is not known above the timberline on Crete, but I have seen it growing plentifully in open woodland in the White Mountains at about 1350m, where snow would lie in winter. It grows to about 60cm high, with leaves divided into many rather narrow segments, and has large, bowl-shaped, white or rarely pink-flushed flowers with a central boss of yellow stamens and fleshy, red stigmas. Opening mainly in April, these flowers have a fragrance reminiscent of nutmeg or cinnamon – so strong that it is possible to smell a flowering plant before seeing it! *Paeonia clusii* is endemic to Crete and the neighbouring island of Karpathos, while the related *P. rhodia* is confined to Rhodes. (This is now considered a subspecies of the Cretan plant.) Both are woodlanders with rather sporadic distributions on their respective islands, but colonies may be large where they do occur. The Rhodean plant is definitely rarer and is protected under international conservation laws.

I prefer to propagate peonies by their large, black seeds, sown individually into 7cm plastic pots. Shoots normally appear very early in spring, 11 to 17 months after sowing; e.g. seed sown between September 1991 and March 1992 ought to produce shoots around February 1993. Some seeds may take another 12 months, however, so patience may be necessary!

Papaveraceae

Corydalis rutifolia subsp. *uniflora*

A small, tuberous plant requiring a dryish summer dormancy, so best grown under glass. Its short, upright stem bears a few bluish-green, segmented leaves and one to three narrow, pinkish flowers, which appear shortly after the snow melts. C. *r. uniflora* is endemic to Crete, but the species has other races in Cyprus, Turkey and Lebanon. Propagation would be by seeds.

Plumbaginaceae

Acantholimon ulicinum (Fig. 76, p293)

A very compact, hard cushion plant with tight rosettes of sharply pointed, needle-like leaves and almost stemless, pink flowers freely produced in summer. Widespread in the high mountains of Crete, the southern Balkans, Turkey and Lebanon, this is the only European member of a genus widespread in Turkey and Iran. Propagation is by seeds, but many infertile ones are produced, so any which are not noticeably plump should be

discarded. I have one plant from seed, now three years old and still less than 3cm across. It is an excellent alpine house plant and might also prove suitable for culture in tufa.

Ranunculaceae

Clematis elisabethae-carolae

A rare and very localised clematis, endemic to a few remote places in the White Mountains. Related to *C. flammula,* although tending to be non-climbing, its flowers are about 3cm across and apparently scented of orange blossom. It grows in inhospitable, karstic terrain, in deep, limestone craters with smooth, vertical, fluted walls, the depths concealed in spring by great plugs of snow. Propagation would be by seeds sown as soon as ripe, or by cuttings, but the extreme rarity of the plant calls for any such wild collection to be minimal.

Ranunculus brevifolius subsp. *pindicus*

This dwarf buttercup has a rhizome bearing numerous, long, thick roots and rather fleshy, bluish-green leaves. Deep yellow flowers are borne singly on short, upright stems just after the melting snow retreats from the moist, stabilised screes which it inhabits. *R. b. pindicus* grows in Crete, Greece and the Taurus Mountains of Turkey, while the typical race occurs in central Italy. Propagation is by seeds, which should be sown as soon as ripe, since they tend to lose their viability if stored. A 'scree' type of soil mixture, largely composed of limestone chippings, should prove suitable.

Ranunculus cupreus

Another dwarf species, endemic to Crete, and one of the few buttercups which impressed Reginald Farrer. It produces rounded, deeply-lobed leaves and short, upright stems bearing bright yellow flowers, with the petals flushed coppery beneath – hence the name. Growing from small tubers, it has a dormant period from about May to September, when the soil should be kept dryish. Propagation would be by seeds sown as soon as ripe, or by splitting up the clumps of tubers.

Ranunculus radinotrichus

This is a far more localised buttercup, endemic to the White Mountains, where it grows in rock crevices, or on north-facing slopes of rather fine limestone debris. Like *R. brevifolius,* it has a rhizome bearing many long, thick roots; the leaves, however, are densely covered with silky hairs and yellow flowers appear later in the spring or summer. Probably best grown under glass, propagation would be by seeds sown as soon as ripe.

Fig. 78 *Viola fragrans* (see p315) Nicholas Turland

Fig. 79 *Crocus oreocreticus* (see p315) Nicholas Turland

Fig. 80 *Scilla nana* and *Crocus sieberi* (see p316) Nicholas Turland

Fig. 81 *Tulipa cretica* (see p317) Nicholas Turland

Fig. 82 *Ophrys aegaea ssp lucis* (see p321). B & E Anderson

Fig. 83 *Cyclamen trochopteranthum* (see p322) Lynn A. Almond

Fig. 84 *Muscari macrocarpum* (see p323) B & E Anderson

Rosaceae

Prunus prostrata (Fig. 77, p293)

A deciduous, mat-forming, dwarf cherry bearing pink flowers in spring followed by edible, red fruits in summer. Much nibbled by animals in the wild, some artificial 'grazing' is necessary to maintain a compact habit in cultivation! The species is widespread in the mountains of the Mediterranean region. Propagation is by seeds, which will germinate after a cold period.

Scrophulariaceae

Verbascum spinosum

An endemic, dwarf-shrubby mullein, forming even mounds of much-branched stems bearing narrow, grey-hairy leaves. Yellow flowers are carried near the stem-tips, which are sharply pointed, giving the plant a thorny protection from grazing animals. Easily grown in a sunny site with well drained soil, propagation is by seeds. An accidental cross with the Turkish *V. dumulosum* produced the popular hybrid known as *Verbascum* x 'Letitia'.

Thymelaeaceae

Daphne oleoides

Yet another mounded, dwarf shrub, with evergreen, leathery leaves and terminal clusters of white or pinkish flowers, which are produced in summer and followed by orange-red, fleshy berries. The species is widely distributed in the mountains of southern Europe, north western Africa, Lebanon and Turkey eastwards to Iran. Probably easy to grow outside in a well-drained soil, propagation is best by seeds.

Valerianaceae

Centranthus sieberi

This rare and localised valerian is endemic to the White Mountains, where it grows in crevices of limestone rock. It is very similar and closely related to *C. nevadensis,* from the mountains of southern Spain. I have seen both species in the wild, and have them in cultivation, the Spanish one raised from seeds and the Cretan one from cuttings, which rooted well. The tough, woody stock produces short stems bearing narrow leaves and delicate, tubular, pink flowers, each with a spur. This last feature distinguishes the two species: *C. sieberi* has a spur 13–17mm long, whereas that of *C. nevadensis* is only 4–5mm. Both are excellent subjects for the alpine house, and certainly the Spanish plant grows well outdoors, in tufa.

Violaceae

Viola cretica

This endemic species grows in the mountains below the timberline, often

in moist places. It is rather like the common sweet violet in habit, spreading by runners, but with smaller, more pointed leaves. Flowers are variable in colour, being anything from violet-blue to nearly white. Propagation is by seeds or rooted runners.

Viola fragrans (Fig. 78, p310)

Another violet, but quite unlike the preceding species, growing in rock-crevices and screes at higher altitude, above the timberline. Slender stems bear small, narrow leaves and sweetly scented flowers, which can be white, yellow or violet. It is best grown under glass, in a container, and re-potted into fresh compost twice each year, using a loam-based mixture with a high proportion of limestone chippings. (Like many scree plants, it tends to look moribund if confined to the same site for too long.) Propagation is easiest by cuttings, which may be detached below ground level so that they already have roots.

MONOCOTYLEDONS

All the bulbs, corms and tubers described here have a summer dormancy extending roughly from May to September, during which time the soil should be kept nearly dry. Yellowing leaves will indicate the imminence of this resting period and a thorough soaking in early autumn will bring it to an end. All species except for the *Arum* and *Muscari* are best grown in an alpine house or bulb-frame, where the delicate blooms are protected from battering by heavy rain and other harsh weather.

Araceae

Arum idaeum

This beautiful, endemic species has a white spathe and blackish-purple spadix and was previously included under the yellow-flowered *A. creticum*. A plant-portrait and photograph appear in **The Rock Garden** No. 86 (June 1990). Propagation is by seeds, which should be removed from their fleshy berries as soon as ripe and then sown before November, if possible. I sowed wild-collected seeds in late autumn 1988 and seedlings are appearing as I write, in January 1991.

Iridaceae

Crocus oreocreticus (Fig. 79, p310)

An autumn-flowering, endemic species found in the mountains above about 1200 metres. Related to the saffron crocus, *C. sativus*, it has long, orange-red styles and rather narrow perianth-segments coloured pinkish-lilac. I have two plants growing in containers under glass: one from the Lasithi Mountains in eastern Crete, the other from the Asterousia range along the central south coast. Both regularly flower in November. Propagation is by corm-offsets or seeds.

Crocus sieberi (Fig. 80, p311)

A spring-flowering crocus, appearing as soon as the melting snow retreats, often in large numbers. The perianth-segments are white with a yellow base, and some beautiful forms exist with the outer three stained violet on the outside. Cretan plants belong to the typical race, *C. s. sieberi,* which is endemic; others are found elsewhere in the Balkans and Aegean region. Propagation is by corm-offsets or seeds.

Liliaceae

Scilla albescens and *Scilla nana* (Fig. 80, p311)

These two endemic, bulbous plants are better known as species of *Chionodoxa,* a small genus now considered indistinct from *Scilla.* (The other closely related species are found in Turkey and Cyprus.) They flower in the spring, soon after the snow melts, often occurring in great drifts. *S. nana* is endemic to the White Mountains, and has blue flowers with a white centre, whereas *S. albescens* is found further east, on Mount Kedhros, the Psiloritis massif and in the Lasithi Mountains. Its flowers tend to be paler, with shorter perianth-tubes, and the leaves tend to be broader. Propagation is by seeds or dividing clumps of bulbs.

There has been some considerable confusion over *Chionodoxa* in Crete, since most literature sources, including Flora Europaea, speak of only *C. cretica* and *C. nana,* both apparently found throughout the Cretan mountains, with the latter replacing the former above 1700 metres. *C. albescens,* if mentioned, is given scant coverage or considered synonymous with *C. nana.* This arrangement is incorrect. *Chionodoxa cretica* and *Scilla nana* should be considered synonyms of each other, with the latter the correct name. *Scilla albescens* is a distinct species. The two are separated geographically and not altitudinally.

Colchicum cretense

This tiny, endemic species is a smaller, higher altitude relative of *C. pusillum,* producing delicate, pale pink flowers with narrow perianth-segments. My single plant is from the Lasithi mountains of eastern Crete, and regularly produces numerous flowers each autumn. Propagation is by seeds or corm-offsets.

Muscari sp. aff. *neglectum*

Although this species is listed as occurring on Crete, the plants in question here, which occur in the mountains above about 1200 metres, have features that suggest they may be something different. They are dwarfer, with slightly longer perianth-tubes a less blackish shade of blue, held at right-angles to the axis of the stem, rather than drooping. The bulbs grow in loamy pockets among limestone rocks and flower in April and May, later than snow-melt

species such as *Crocus sieberi*. Propagation would be by seeds or dividing clumps of bulbs.

Tulipa cretica (Fig. 81, p311)

Finally, I am including one of Crete's four or five tulips (the number depends on whether one considers *T. bakeri* and *T. saxatilis* distinct from each other.) *T. cretica* has the widest altitudinal range of Cretan tulips, found from near sea level up to about 1600 metres. Flowers appear mainly in March and April, varying in colour from white to strongly pink-flushed, each perianth-segment with a rich yellow base. Propagation is by seeds or bulb-offsets.

Having read about all these apparently wonderful plants, the reader might be wondering how to set about obtaining them! Some, like *Anchusa cespitosa,* are already well established in cultivation, while others are becoming increasingly obtainable from a few specialist suppliers, either as plants or seeds. The really obscure ones, however, exist only within a few very specialised collections, or in nature.

If material is to be collected from the wild, then one must not only be confident that one can grow the plant, but also be committed to its propagation and subsequent distribution among other like-minded growers. One should confine oneself to seeds or cuttings only, and expect a 50% failure rate with the latter. Collect from at least three widely spaced individuals, if possible, in order to obtain a reasonable degree of genetic diversity, and make detailed field notes. Precise locality, altitude, habitat, aspect and date all should be recorded. (These data may be passed on with any plants which are distributed later.) Cuttings should be wrapped immediately in moist tissue paper, put in a plastic bag and placed somewhere cool and dark. Here they will remain viable for a few days. Plant them as soon as possible, using a sterilised rooting medium, in a warmish position, out of the sun and with a humid but ventilated atmosphere contained around them. Seeds should be stored dry, in paper, and those borne in fleshy fruits extracted as soon as possible. For longer term storage, packets may be sealed in an airtight container, with a sachet of silica-gel included, and placed in a refrigerator.

Importing wild plants and certain seeds into Britain is restricted by law for plant-health and conservation reasons and, like us, other countries have their own laws restricting collection and export. There are also international conservation laws protecting threatened species. Further details, and the appropriate licences, may be obtained from the bodies concerned.

Spring in Dalmatia

RICHARD SIMPSON

The autonomous Socialist Republic of Croatia embraces the old Roman province of Dalmatia in Yugoslavia. Dalmatia was named for one of the original Illyrian tribes of Slavic descent, the Delmati, who migrated here from beyond the Carpathian Mountains.

The coastline of Yugoslavia is always dramatic, not least for the thousand named islands, islets and reefs which parallel the coast. The many fascinating features of the topography are predominantly related to the limestone strata which tend to dip along an east-west axis so forming creeks and bays, plains, valleys and mountains along this alignment. Perhaps the most spectacular combination is in the region of Biokovo, where the mountains plunge steeply into the sea leaving an extremely narrow littoral platform on which the fishing village and tourist centre of Makarska is the principal settlement. Offshore are the larger islands of Brač, Hvar, Korčula, Mljet, Vis and Lastovo, the two furthest out into the Adriatic.

Pines (mainly *Pinus halepensis*), lavender, sages, rosemary and curry plants contribute to that characteristic spicy fragrance of the maquis, the characteristic vegetation of the Mediterranean littoral. Amongst the woody flora are scattered an abundance of perennial herbs, *Alyssum* spp., *Papaver* spp., *Matthiola* spp., *Malva sylvestris, Convolvulus althaeoides tenuissimus* and *Veronica* sp., the last with a solitary deep blue flower. In the sward in general the dominant families were the Compositae, Labiatae, Leguminosae and, particularly striking, many members of the Geraniaceae.

The mildness of the climate throughout the year is proverbial so that coastal Dalmatia has a mean annual temperature of approximately 16°C compared with that at Nice which only attains 14°C. But be warned, it can be very wet; and Yugoslavia is not cheap any more! Noticeable, as always where the climate of summer is dry, are many grey and silver leaved plants such as *Cistus* spp., *Artemisia* spp., and Oleander *(Nerium oleander)*; and also the succulents, in particular the euphorbias including *Euphorbia characias* and *E. dendroides*. But perhaps most spectacular of all in the spring are the lovely bulbous plants (using the term in its broadest sense).

Cyclamen repandum with its delicate starry pink flowers, richly marbled leaves, each leaf with a blood red reverse, was abundant in the stony low banks around cultivation terraces for olives, figs and grapes. Even here there was variation in flower colour from pale pink to a more usual deep magenta pink. The corms grow profusely amongst the stones, particularly where a degree

of shade is provided, so great carpets of floriferous excitement ensue. Unfortunately one particularly exciting site was decimated when I visited the next day since the children were also attracted by the flowers and picked them all! By the old tracks leading into the fields and cultivation enclosures the cyclamen were mixed with the delightful white stars of *Ornithogalum umbellatum* and *O. collinum*, an association made even more spectacular where the tassel hyacinth, *Muscari comosum*, grew in the sward. Other species of Muscari grew along the roadsides, though these could not match *M. comosum* for effect. These tended to grow in association with *Erodium* spp., squirting cucumber *Ecballium elaterium*, and the buglosses, *Echium vulgare* and *E. italicum*. Hillsides were made aglow with Spanish Broom *Spartium junceum* in association with *Cistus salvifolius* and *C. albidus*.

However, it is easy to get a false impression of the vegetation of Dalmatia if one remains beside the sea. Only some 25% of the country's vegetation cover is of the Mediterranean type, and as one moves inland the pine forest and maquis are quickly superseded by vegetation of a more Continental affiliation, but still predominantly scrubland for very many kilometres. As one climbs towards the mountains more fertile pasture appears and it was here that the greeny yellow flowers of *Helleborus* were abundant, though the species could not be ascertained from the bus. Climbing higher the soils become thinner and the bare limestone of the karst more pervasive – a sort of 'grand scale' limestone pavement scenery. I find the karst an exciting place scenically with its caves, grottoes, sink holes, disappearing lakes, and poljes. Poljes are depressions, in the bottom of which collects the fertile soil derived from red clays. The name means field in Serbo-Croat. Some poljes are huge, yet others are tiny. Moisture collects in these depressions and they shelter crops from the searing 'Jugo' wind which sweeps across the countryside in summer.

In the mountains are very extensive plains among the parallel ridges. Next, mirroring the remarkable parallel topography comes deciduous woodland of oak *(Quercus pubescens)* and finally this is superseded at greater height by extensive forests of beech, sometimes interspersed with firs but often almost pure stands. Beech is the characteristic high mountain tree over much of central and southern Yugoslavia. One is reminded of home in this woodland which is carpeted with primroses, violets and wood anemones. *Anemone ranunculoides* was an occasional yellow splash amidst the white flowers of *Anenome nemorosa*. The most exciting find was the rose pink flowers of *Corydalis solida*. In wetter areas within the forest kingcup, *Caltha palustris*, was abundant, a contrast to its habitat in northern England where it grows in wet pasture most frequently. It always comes as a surprise that plants from home are so widespread. Cocksfoot *(Dactylis glomerata)* is a widespread grass of lower altitude

meadow: in higher pastures this is replaced by the sedge *Carex rubica*. For those who are orchid fanciers these were very prevalent amongst the stones and rocks in the coastal strip. I spotted *Orchis laxiflora, Orchis ustulata,* and several 'bee' orchids, though the only one identified was *Ophrys bertolonii.*

Biokovo, where Mediterranean, central European and alpine floral elements intermingle is one of the most interesting botanical areas of Yugoslavia. Unfortunately in a short holiday it is impossible to visit the extensive botanical interest areas. The Velebit Mountains of northern Dalmatia are the home of the rare but lovely *Degenia velebitica.* There are many endemics in Dalmatia. The knapweeds for example include yellow flowered *Centaurea ragunisa, C. biokovensis,* and *C. frederici* var *jabukensis* which only occurs on the island of Jabuka. *Geranium dalmaticum,* that delightful soft pink geranium, and *Campanula dinaricus* are two other endemics. The further one gets from the mainland the more endemic species one finds.

People have greatly modified the flora over the ages, particularly by raising domestic animals. Fortunately goats are not kept to the extent that they are in Greece. The most common animals encountered were sheep, with women shepherds quite usual. The littoral zone includes many introduced species of palm, agaves and prickly pear. But, of all the plants encountered, it was the richness of the bulbous flora that I marvelled at the most.

Morisia monanthos Edith Clark

In Search of *Ophrys aegaea*

BRIAN AND EILEEN ANDERSON

A girlish hand thrust out a bunch of wild flowers, more in hope than expectation. My eyes alighted on them and must have visibly widened the moment *Fritillaria sibthorpiana* came into focus. I stretched out to take the generous bunch and, turning my concentration to the flowers, the bustle and noise of the Friday market around dwindled to nothing. Some twenty to thirty stems of the bright yellow fritillaria made up most of the posy but there were other species mixed in. The purple streaks proved to be the elegant *Orchis anatolica,* whilst the touch of brown standing out against the bright yellow was the bold *Ophrys omegaifera.* 'How much?' I asked the peasant girl in my best Turkish. '100 lira' came the anwser (£1 = 3,000TL) and I must have been in shock because I proffered the money without attempting to bargain. After a time it is easy to accept a foreign currency at its numerical value without relating it to sterling and it is easy to fall into the local habit of bargaining. However, 100TL works out to about 3p; then you realise that there is not a lot to gain! All the bustle returned in full as, flowers in hand, we turned our attention once again to the weekly shopping on Marmaris market. This particular Friday was March 10th 1989.

Back at our apartment the flowers were transferred to a vase and more orchids emerged, *Ophrys iricolour, O. lutea* ssp *galilae, O. ferrum-equinum* and the biggest surprise of all, *Ophrys aegaea* ssp *lucis* (Fig. 82, p312).

Ophrys aegaea was described as a new species, together with *O. a.* ssp *lucis,* by Kalteisen and Reinhard as recently as 1987. First recognised on Rhodes, Manfred Kalteisen had been particularly active in trying to define the area of distribution of this particular species and had postulated that it was a narrow endemic confined to those easterly Greek islands, possibly including Lesbos, and to the westernmost part of Turkey. Knowing of our interest in orchids and of our trip to the Antalya region of Turkey in the previous year, Manfred asked us to keep an eye open for and record details of any sightings of *O. aegaea* from there. Happily we were able to provide him with details of three locations. In 1989 we ourselves planned a trip to the Marmaris area of Turkey for a lengthy stay of around six weeks (working on 'Landscapes of Turkey, Bodrum & Marmaris') whilst Manfred was planning a coincident sweeping tour of Aegean Turkey in search of *Ophrys aegaea.* We agreed to meet up to search the Marmaris area together.

On March 10th, *Ophrys aegaea* ssp *lucis* beamed with a quiet radiance from the centre of the dining table. Manfred was not due until March 25th. Would

the two ever meet, we wondered. Our search for footpaths took us into the hills anyway so there was the possibility that we could find locations of this species in readiness for Manfred's arrival. One of our earliest excursions was to the nearby Attaturk Park, easily reached by a short walk from Marmaris. The Turks, great lovers of a picnic, seem also to have a greater awareness of the countryside than their near neighbours to the west, so this beautiful area of natural woodland bordering the sea has been set aside as a park with a section well provided with picnic facilities. The carpet of *Cyclamen trochopteranthum* (Fig. 83, p313) beneath the trees caught our attention the moment we entered. Flowering very early in the year, this species was past its best here at sea level. We also found it in better form on higher ground, but even at higher elevations the hot April sun soon finished the flowers, leaving the marbled leaves as the only clue to its presence. The park was a delightful place to be when the trees were bursting into leaf. Shafts of sunlight through the unfurling light green leaves created images of spring so transient in beauty but so indelible in memory. There was a surprise in store too. It was natural woodland of *Liquidambar orientalis,* a tree very similar to *Platanus orientalis* and often taking its place on serpentines. Orchid leaves were noticed in a swampy region beneath the trees, swampy to the point of standing water. An in-depth deliberation between us came to no firm conclusion as to the identity of the species except to agree that *Orchis laxiflora* was the chief suspect, largely because of the wet location. The leaves didn't look quite right but it had to be an orchis species, it could not possibly be a bee orchid because these just don't grow in swamps and the leaves weren't right for those either. We returned from time to time to check their progress and ultimately to see them in flower. They were, of course, bee orchids, an extensive colony of *Ophrys apifera.* It seemed unbelievable after seeing this species so many times in arid conditions, typically on sand dunes, that here it was with its feet in water.

March 18th and still the only *Ophrys aegaea* to be found was in the centre of the table. It had outlasted the fritillaries and remained in good form. Would it last another week?

Fritillaria sibthorpiana turned up in numbers in some locations on the limestone hills. Some of the yellow fritillaries are not so easy to distinguish without very careful examination of the inner and outer perianth segments and the position and size of the nectaries. None of this is necessary with *F. sibthorpiana.* Its bright cheerful, almost buttercup yellow colour is itself distinctive, but even easier is the fact that it is mostly found with only two leaves, the lower one very large. Other yellow fritillaries around included *F. bithynica* and *F. forbesii. F. bithynica,* which also grows on Samos, needs careful examination, but even more difficult is *F. forbesii,* usually found on serpentine, which can be confused with *F. carica.* The inner perianth segments are narrower than the outer in the first case and the opposite is true in the

other. One other fritillary that we should have mentioned in connection with Attaturk Park is *F. acmopetala* which grew there amongst the cyclamen. More orchids turned up, like *Ophrys holoserica* ssp *heterochila* which looks much like the nominate race but is smaller and flowers earlier and *Dactylorhiza romana* in pale pink and white forms. Still no sign of *Ophrys aegaea.*

March 25th: with typical German regimentation, Manfred and friend Werner arrived at 7.30, just as we were sitting down to breakfast. 'Aegaea' Manfred bellowed as his eye travelled past us to alight on the still smiling orchid on the breakfast table. 'This is the first we have seen since we arrived in Turkey' he exclaimed, 'where did you find it?' At least the answer 'Marmaris market' brought a wry smile. Starting at Fethiye, Manfred and Werner had spent several days combing the countryside as they moved northwards towards Marmaris without success. He reasoned that the Marmaris area with its close proximity to Rhodes offered the best hope for finding more locations. Over a hasty breakfast, plans were laid for the next few days. Manfred argued that there was no point in searching around Turgut, the village where the flower seller lived, because we had seen the evidence that it grows there. So for the three days of our joint search, we agreed to explore other parts and set off, in the first instance, down the scenic peninsula towards Datca. Orchids were found in moderate numbers including some very fine spikes of the slender man orchid, *Aceras anthropophorum,* which turned up regularly over the next few weeks, the sawfly orchid, *Ophrys tenthredinifera,* always a delight to find but never abundant, *Neotinea maculata* and *O. fleischmannii,* but no *O. aegaea.* Other flowers caught our eye during this search, like the yellow *Muscari macrocarpum,* (Fig. 84, p313) and the brilliant red 'anemones' which on closer inspection proved to be *Ranunculus asiaticus.* It is interesting that, whilst the white, yellow and red forms of the turban buttercup grow on Crete and Rhodes, only the red form is found on mainland Turkey, even though this location is almost within hailing distance of Rhodes.

The joint search was over almost before it had started, or so it seemed, and still no signs of *O. aegaea.* More of the same orchids had been found on the searching days plus others such as the pink butterfly orchid, *Orchis papilionacea, O. italica, O. provincialis, Barlia robertiana* and *Ophrys mammosa* bringing the total number of species to twenty for the three days.

Our farewells were tinged with some disappointment. Manfred was convinced that this was the most promising region to find his orchid and we had found none. Next morning they were scheduled to move north in their search, heading for the Bodrum area then northwards again to Izmir.

Next morning, at the usual 7.30 am, they were back on our doorstep. They had made a late decision to spend a few hours searching around the flower seller's village, Turgut, before heading off. A morning's search located

one plant of *Ophrys aegaea* ssp *lucis,* which was lovingly photographed to death before the two orchidophiles sped contentedly on their way. If happiness can be measured in orchid finds, or more particularly in *O. aegaea* locations, then the story has a moderately happy ending. Manfred reported later that they found another location that very same day, this time near Bodrum, with nine plants, and another single plant the following day.

Reference

Kalteisen, M., and Reinhard, W. 1987. Mitt. Bl. Arbeitskr. Heim. Orch. Baden-Württ. 19(4), 895-938.

The book briefly referred to in the text is 'Landscapes of Turkey, Bodrum & Marmaris' published by Sunflower Books, available in May 1991, £6.95. It is described as a countryside guide but the main emphasis is on walking. Most of the species described in the text are mentioned along the routes of the walks where they were found.

El Torcal – A Magical Mountain

ENID BROWN

On May 7th 1989 we flew to Malaga, not for the dubious delights of the Costa del Sol, but to explore some of the hill towns and sierras of inland Andalusia. We were afraid that we might be rather late for an area so far south, but we found a profusion of flowers, and for 1989 at least, the timing was right. All our expeditions were rewarding, but one stands out in memory above the rest.

From the town of Antequera, interesting in itself, we drove a few miles south by a good access road into the Sierra de Chimenea, appropriately meaning the Chimney Mountains, to El Torcal de Antequera (about 1300 metres), where a limestone plateau has been fantastically eroded into a huge area of amphitheatres and towers rising from a vast stretch of limestone pavement. El Torcal gives the impression of an ancient ruined city, built in pale stone. The overall effect was grand, but the details were often amusing; Easter Island heads, a recognisable 'Snoopy', natural arches, precariously balanced capstones. The rocks clearly showed their sedimentary layering, worn into deep horizontal grooves, where *Saxifraga biternata* (Fig. 86, p331) was very much at home. This saxifrage is rather reminiscent of meadow saxifrage, *S. granulata;* it has large white cups, with solid, well-rounded petals, in this instance backed by ferny, velvety leaves.

Some of the most striking flowers were spotted as we drove up towards the parking-place. Scattered across the limestone pavement for as far as we could see were clumps of a lovely large-flowered iris, *I. subbiflora,* deep purple with a violet beard (Fig. 85, p330), along with equally impressive plants of *Paeonia broteroi,* whose carmine cups were just opening to show a boss of golden stamens. Among the grassy tufts growing in the jointing of the rock were orchids; *Orchis laxiflora, Ophrys tenthredinifera,* large and almost gaudy, with its petals and sepals bright pink, and the lip brown with a broad yellow margin; and the finest specimens of the pink butterfly orchid, *Orchis papilionacea* – surely subspecies *grandiflora* – that I have ever seen. The Spanish bluebell, *Endymion hispanicus,* pushed its way through small bushes, its colouring like our own woodland bluebell, but with an erect pyramidal inflorescence and the individual flowers more bell-shaped. *Cerastium boissieri* looked like a more compact version of that garden menace, 'snow in summer'.

El Torcal is a carefully conserved area of natural interest, with three routes through the stony chaos clearly and very necessarily marked with short rustic poles, each with a colour-flash; in the course of the day we walked them all.

The short route into the main amphitheatre is green; the yellow route continues from there among crowding towers and walls. To the right from the car park is a long red route, giving an exhilarating scramble through a more open jumble of slabs and rocks, sometimes forming terraces and flights of steps. This route has flowers all the way, and part of the charm of the place was the variation in size of the plants that grew there; tall ones, like the scented Solomon's seal, *Polygonatum odoratum,* a handsome umbellifer, *Elaeoselinum asclepium,* with much-cut leaves and a yellow flowerhead, and the mullein, *Verbascum nevadense,* with an unbranched inflorescence of large yellow flowers. Some were of medium height, like *Ranunculus rupestris,* with 3-4cm yellow flowers and kidney-shaped leaves, various spurges with their curious yellow-green fruiting heads, and a striking hound's tongue, *Cynoglossum cheirifolium,* with an inflorescence of soft red flowers each framed in a calyx thick with silvery hairs. There were also small plants, of more obvious 'alpine' potential, growing in rocky fissures, like the bright pink *Erodium cicutarium,* the vivid yellow *Viola demetria,* the familiar *Muscari neglectum,* and a saxifrage, perhaps *S. globulifera.* The genus *Linaria* features strongly in Spain, with some thirty six species restricted to the Iberian Peninsula; I read somewhere that every sierra is likely to produce its own variation. On El Torcal, the most frequent was *L. anticaria,* a species with very pale lilac flowers with purple veining, and with the throat-boss either purple or yellow. Another distinctive member of the family was *L. tristis,* a very sad-looking plant with glaucous leaves and brownish-purple flowers.

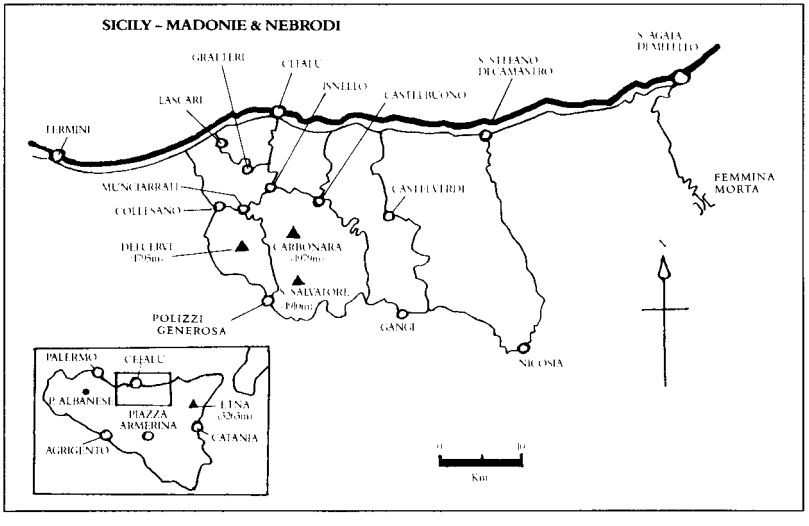
To start the return half of the trip, the trail makes a hairpin bend at a most distinctive feature, a wind-sculpted 'mushroom' almost as tall as a man; in its shadow is a fine impression of a fossil ammonite, big as a dinner plate. Take my advice, and continue a little further along the edge of the plateau before you turn back; you will find yourself in 'hedgehog country', with a superb display of the hummocks of *Erinacea anthyllis* stretching away down the hillside (Fig. 87, p331). I have never found the hedgehog broom very impressive in captivity, often leggy and sparsely flowered, but here in the wild each close-growing bush was covered in flowers of periwinkle blue. In the Sierra Nevada we saw examples of both white and pink flowers, but these blending shades of blue were by far the most attractive. The individual flower repays a closer look, because the inflated calyx is a rosy colour, covered in silver fur.

We sat here to eat our lunch, slabs of limestone providing both seats and backrests, with a splendid view down the flowery slope to the gleaming white houses of Antequera far below. The combination of astonishing scenery and many new and lovely flowers was truly magical.

Sicily Revisited

CHRIS AND MARIE NORTH

Eight years ago we visited Sicily (North & North 1983), and stayed at Giardini, close to Taormina on the east coast and near Mount Etna. It rained hard there in late April and we were hampered in our botanising by having to transverse the city of Catania in order to get to the best sites. However, the flora was sufficiently interesting to make us want to return to the island and to view it from a different and more accessible area. This time we chose Cefalu on the north coast – roughly half way between Palermo and Messina. No package holidays from Britain seemed to be available so we made our own way by flying on the 13th April from Bari in Italy to Palermo, where a hired car was waiting for us. We were accompanied by Marie's sister Mrs Jean Bieri. Having survived the frenetic driving of the Palermo rush hour, we arrived at our hotel in Cefalu to find it was rather like a 'Hi de Hi' holiday camp for French tourists. However, we were well received by everybody, the food was excellent and we were not press-ganged into the competitions and entertainments.



Popular literature on the plants of Sicily is still practically non-existent but since our earlier visit an excellent new three volume, Italian flora (Pignatti 1982) has become available and was a great help in identifying the plants we saw.

Our first botanising was, as usual, around the hotel. On rough ground nearby we found the shrubs *Calicotome villosa, Cistus monspeliensis, C. salvifolius, Daphne gnidium, Erica arborea, Myrtus communis, Rosmarinus officinalis* and *Teucrium fruticans.*

Amongst them were several herbaceous species including *Convolvolus althaeoides, Foeniculum vulgare, Galactites tomentosa, Psoralea bituminosa, Scabiosa atropurpurea, Scorpiurus muricatus, Tetragonolobus purpureus, Urospermum dalechampii* and *Vicia incana.*

Most of these are common, widely distributed, Mediterranean species. The tetragonolobus is the asparagus-pea occasionally grown in our vegetable gardens and the scabious is the wild form of the annual scabious of our flower beds, sometimes with dark, wine-red flowers but more typically mauve. The vicia closely resembles *V. cracca,* the tufted vetch, which is absent from Sicily, but has a rather denser inflorescence of slightly larger flowers.

In an olive orchard near the hotel there were large drifts of the less common corn marigold *Coleostephus myconis* (= *Chrysanthemum myconis*), which we had seen previously on the east coast near Taormina. However, at Cefalu the ray florets were pure white instead of the usual yellow. Another interesting plant near the hotel was a bush of the 2m tall, showy, *Lavatera olbia,* which we later also saw growing by the roadside higher up in the Madonie. It is sometimes cultivated in Britain and has become naturalised around Epping Forest.

Although Sicily can be described as predominantly hilly, and the highest peak is Mount Etna at 3263m, there is a fairly well defined range of mountains stretching behind the north coast from Messina towards Palermo. These comprise the Peloritani in the east, which merge into the Nebrodi, and which in turn give way to the Madonie in the west before Palermo. This range has a number of peaks over 1800m which are frequently snow covered in winter. They also attract precipitation so that the wettest part of Sicily is the north east and the climate becomes sunnier and drier towards the south west of the island.

The Madonie Mountains.

Behind Cefalu one has fairly easy access to the Madonie and the first sortie we made was in this direction. We drove westwards along the main road for some 10km and then turned inland to the village of Collesano. By the roadside there were considerable thickets of the native *Rhus coriaria,* which is a suckering shrub similar to the North American *R. typhina* that is often grown in our gardens for its fine autumn colours. Anther common small tree here was *Robinia pseudoacacia,* an American species which is spontaneous and widespread in many parts of the Mediterranean. On the banks amongst these trees grew *Acanthus mollis* and *Gladiolus italicus.* Passing Collesano and on the road to Polizzi Generosa there were many fields glowing a magnificent

crimson with the flowers of *Hedysarum coronarium,* which is similar to lucerne and is grown as a fodder crop in the region as it is deep-rooted and drought resistant. Along the borders of these fields there were masses of spikes of the yellow *Asphodeline lutea,* which contrasted superbly with the dark crimson fields. This asphodeline is particularly common throughout Sicily. Other plants along the roadside included *Borago officianalis, Cynara cardunculus, Fedia cornucopiae* and *Galactites tomentosus.*

There was also *Allium nigrum,* an interesting stocky species with leaves somewhat like a garden tulip and hemispherical heads of dusky mauve flowers, and *Bellevalia romana,* illustrated in our earlier article, which is especially common in Sicily but has disappointingly dirty white flowers. *Convolvolus tricolor* was also present; it is the showy annual species often offered in seedsmen's catalogues.

On a rocky hillside, further along the road, and in sight of the hill village of Polizzi Generosa, grew the uncommon *Euphorbia dendroides* – a large shrub or small tree related to some of the species found on the Canary Islands. It was accompanied by *Borago officinalis* and *Euphorbia characias.* By the roadside there were more groups of the yellow asphodeline and patches of the blue flowered *Bellevalia dubia* together with the pink-flowered *Convolvolus cantabrica.*

Polizzi Generosa turned out to be a rather messy small town surrounded with hazel orchards, and there were fine views of the mountains. Leaving the town northwards we returned to Collesano along a different road which passed between the mountains. The peaks of Monte San Salvatore (1910m) and Carbonara (1979m) to the east of us were snow covered and impressive. Stopping by a hazel copse we saw *Cyclamen repandum* and an interesting, and uncommon dead nettle, *Lamium flexuosum,* with white, pink-capped flowers. There were also plants of the vetch *Vicia melanops* which has bicolour yellow and brown flowers.

A thunderstorm developed, it began to snow, and soon there seemed to be near Arctic conditions. Through the snow we caught glimpses of interesting mountain plants but decided to continue our journey and to return to this area later under better conditions. We came down from the pass to Piano Zucci where there is a restaurant that caters for winter sports enthusiasts and stopped here for a welcome hot drink. Close by there was very heavy cattle grazing but clumps of *Euphorbia rigida* and *Cynara cardunculus* had escaped being eaten. In mixed deciduous woodland near here we saw plants of *Paeonia mascula,* including one with a pure white flower, and *Anemone appenina.*

At Munciarrati we turned north eastwards along a narrow rough road to the charming, well-kept and unspoiled small town of Isnello. Here there are four churches and a ruined castle, all of which are well worth visiting. After leaving Munciaratti and near Gratteri on our way down to Cefalu, there were

Fig. 85 *Iris subbiflora,* El Torcal, Spain (see p325). Arthur Brown

Fig. 86 *Saxifraga biternata,* El Torcal, Spain (see p325) Arthur Brown

Fig. 87 *Erinacea anthyllis* – 'Hedgehog country'. El Torçal, Spain. (see p326) Arthur Brown

Fig. 88 *Iris pseudopumila*, Sicily (see p334) C. North

Fig. 89 *Linum punctatum*, Sicily (see p334) C. North

Fig. 90 *Orchis quadripunctata var branchifortii*, Sicily (see p338). C. North

groups of *Orchis longicornu* by the roadside. This uncommon species is especially plentiful in Sardinia and can be found occasionally in north Africa, south France, Spain, Portugal and Majorca. It resembles the green-winged orchid but usually grows taller and has a longer spur. Typical flowers have a dark black-purple lip with a white centre marked with a few purple spots. If one were asked to give it a name then we would suggest the 'dinner-jacket orchid' for the flower does remind one of a white shirt front and a short black jacket.

Some days later we returned to the highest part of the pass called Piano di Bataglia where, at 1600m, there had been a covering of snow a few days earlier. This time it was sunny and the stony ground was snow-free and revealed a very interesting alpine flora; including *Arabis alpina, Cerastium tomentosum, Onosma echioides, Ranunculus millefoliatus* and *Romulea bulbocodium*. There were also *Anthemis montana*, a neat, variable species, and the form here seemed to be the subspecies *montana*, and *Bellis margaritae folia*, resembling a stocky, rather robust form of the common daisy with the ray florets tinged pink or red on the underside. It is an endemic of Sicily and the extreme south of mainland Italy and its Italian name is 'Pratolina Calabrese' or Calabrian daisy. *Erysimum bonnanianum* is also endemic to Sicily, and is a small, neat wallflower, with pale yellow flowers. It resembles *E. helveticum* of the Alps. The real treat here was *Iris pseudopumila* (Fig. 88, p332), a small species of the Germanica group which superficially resembles *I. chamaeiris* but is distinguished from it by having a much longer perianth tube. In places it covered the hillsides, mostly with yellow, but some with purple and a few intermediate coloured flowers. It is endemic to Sicily and to Puglia on mainland Italy and we had seen it recently in the Gargano and earlier on the Monti Iblei in south-east Sicily. Yet another endemic here was *Linum punctatum* (Fig. 89, p332). From a central taproot, branches with typical flax leaves radiate like the spokes of a bicycle wheel and lie absolutely flat on the surface. The flowers, borne towards the ends of these branches, are some 25mm diameter and of a beautiful azure blue. It would be a prize alpine house plant. In the wild it is limited to a small area of the Madonie, Nebrodi and Peloritani mountains of northern Sicily.

In places the ground was more or less covered by a prickly astragalus, *Astragalus nebrodensis* – another Sicilian endemic but closely resembling the more common *A. massiliensis*. Also, in a wet area, we saw *Narcissus tazetta* in flower with the white-flowered form of the common primrose, *Primula vulgaris*.

The lower northerly slopes of the Madonie mountains also are very interesting floristically. Another way of reaching Collesano is to drive westwards out of Cefalu and to turn inland to Lascari. Along this road, amongst clumps of a tall stipa grass, there were hundreds of plants of *Serapias*

vomeracea accompanied by the pink *Centaurium erythraea*. By the roadside grew a tall snapdragon with reddish mauve flowers. This is the uncommon *Antirrhinum tortuosum* which we saw later growing on banks in many parts of the island and even in the town of Cefalu. Another roadside plant which caught our eye was *Lathyrus articulatus*, an everlasting pea with medium-sized mauve flowers which have a pale coloured keel. The stems are winged and curiously 'articulated' as indicated by its Latin name.

Not far from Lascari is a village called Gibilmanna – an Arabic derivitive that would probably have been spelt Djebel Manna on a map of North Africa. (Djebel = mountain or hill). Around here there are plantations of manna ash trees *Fraxinus ornus* which are tapped for the gum-like exudate used as a mild laxative. Manna ash is grown as a crop only in Sicily and parts of Calabria. Apart from the exudate, seeds of manna ash are exported to Egypt where they are prized for both culinary and medicinal purposes.

The road leaving Collesano eastwards to the village of Munciarrati passes through deciduous woodland and patches of old cork oak plantations. Similar woodland is to be found between Munciarrati and Gratteri. These were profitable plant hunting areas. On the road verges grew several orchid species including *Orchis longicornu* in quantity and with *O. italica, O. papilionacea, Ophrys tenthredinifera, O. lutea minor, O. fusca* and *O. sphegodes atrata*. There was also an endemic comfrey, *Symphytum gussonei*, with pale yellow flowers and *Melittis albida*, a species of bastard balm endemic to southern Italy. The more common *M. melissophyllum* is not recorded in Sicily. Another but rather insignificant plant was *Biscutella lyrata* – a buckler mustard endemic to southern Italy. Two rather showy composites growing near here puzzled us. One was almost certainly *Centauria napifolia* with reddish flower heads and partly-winged stems. The other was a species of crepis, rather tall and with branched inflorescences of attractive pink flowers which all seemed to be on a level plane. The outer bracts of the capitulae had a central row of short, upright pointing spines. As far as we can ascertain, this is *Crepis praemorsa* ssp. *dinarica*. Pignatti (1982) says that the type species (which has yellow, not pink, flowers) may occur in Italy but does not mention the subspecies. However it is possible that our plant may be assigned to *C. froelichiana*, recorded by Pignatti only for the north-eastern alpine region of Italy. We are sorry we never collected a herbarium specimen for accurate identification. Near here we discovered hundreds of rather small plants of *Orchis provincialis* growing in a cork oak plantation; all the specimens had spotted leaves.

Another sortie took us through Isnello again and on to Castelbuono. Views at Isnello were reminiscent of Switzerland, with snow covered distant mountains and cows carrying large bells, but their collars here were made of wood, not leather. There were few plants we had not already seen except

for large patches of *Allium triquetrum*. Again there were many *Orchis longicornu* and several bushes of the attractive *Lavatera olbia*. At Castelbuono the impressive castle was closed for repairs but we were beckoned in and given a guided tour. It was built by the Ventimiglia family – perhaps the precursors of the Mafia – and there was a well preserved ornate baroque church within the walls, which housed the 'tears of St Margaret', shown to us with great respect. We continued along road 286 to Gangi and then turned south along a road labelled to Castelverde. Near Gangi there were patches of melting snow by the roadside and we saw large groups of the blue-flowered *Bellevalia dubia* and a calendula with large flowers, which may have been *C. suffruticosa*, a very variable species, or *C. officinalis*, the species which has given us our cultivated pot marigold. It is interesting that the origin of the latter is not known with certainty, but cytological examinations indicate that it was first formed as a hybrid between two unidentified species with different chromosome numbers. The road northwards from Gangi rapidly deteriorated to a narrow muddy track. All our concentration was needed to stay on the road and the journey took us about one and a half hours before we came back onto a surfaced road at Castleverde. On our way down from there to the coastal road we passed through woods carpeted with *Anemone hortensis*, *Cyclamen repandum* and *Orchis longicornu*.

The Nebrodi Mountains

The most obvious way to get to this region from Cefalu seemed to be to travel eastwards along the coast road and then to turn inland. Unfortunately the coastal motorway from Palermo to Messina is not yet completed and stops rather abruptly and dangerously at Cefalu. We had to go along the old coast road, winding and narrow in places with much traffic and frequent hold-ups. After 60 kilometres we arrived at Santa Agata di Mitello and turned southwards along road 289 towards Cesaro. Climbing steeply to the small town of Fratello there were oak woods carpeted with *Cyclamen repandum* and the lesser celandine *Ranunculus ficaria*. Still climbing we passed through beautiful beech woods intermixed with some holly and carpeted with *Anemone appenina, Daphne laureola, Doronicum orientale, Orchis lactea, O. morio* and *Primula vulgaris*.

Beech woods continued right to the top of the pass of Femmina Morta (1524m) and here the woodland flora was much the same. In clearings there were other species, especially *Ranunculus millefoliatus*, and a crocus species which had finished flowering – probably *C. albiflorus*. Here and there grew the large-flowered *Romulea bulbocodium* and mauve-flowered forms of the orchid which used to be called *Dactylorhiza romana*, but is now classed by Davis and Davis (1983) as *Dactylorhiza sulphurea* ssp. *pseudosambucina*. Whatever it is called, we had seen the same thing growing on the slopes of

Mount Etna.

At the pass we took a small side road in an easterly direction at a signpost to Monte Soro. Snow had evidently been lying here recently so the stunted beech trees were not yet showing leaf and we came to some alpine pastures still with meltwater. In this charming area the ground was covered with mauve pink stars of *Romulea bulbocodium,* yellow flowers of *Ranunculus millefoliatus, R. ficaria,* mauve violets and thousands of flowers of the tiny, blue *Scilla bifolia.* In one area there were patches of primroses, the form which has white flowers with a yellow centre. Perhaps our most exciting find was *Polygala preslii* which is a very local endemic species with rather large lilac coloured flowers. From here we had hoped to see Etna, but we looked in vain, for the atmosphere was hazy. Whilst we scanned the horizon the snow-clad peak appeared suddenly, hanging in the sky high above our heads like an apparition.

Southwards from Cefalu

We made two day outings southwards from Cefalu, one to visit the Greek temples at Agrigento on the south coast and another through Enna to revisit the extensive Roman mosaics at Piazza Armerina. In both cases we were impressed by the advantage of travelling on the motorways which were not expensive to use and far less frustrating than taking smaller roads through the towns. Most of the time on these outings was taken up by sightseeing rather than botanising but several interesting plants were seen.

Around the town of Agrigento there were large groups of the fine yellow Spanish thistle, *Scolymus hispanicus,* and growing on the walls of one of the temples we saw another member of this genus – *Scolymus grandiflorus.* The second of these is an even more attractive and impressive plant which usually grows no more than 50cm tall but has considerably larger flower heads and leaves with milk-white midribs. It is an uncommon species found also in Spain and the south of France. The taproots of these species, which can be cooked and eaten, taste somewhat like salsify, and hence *S. hispanicus* is sometimes called the Spanish oyster plant. Other plants seen within the walls of the temples included the *Antirrhinum tortuosum* which also grew by Cefalu, and the small Mediterranean palm *Chamaerops humilis.*

To get to Enna we drove along the motorway which took us high above the fields on concrete pillars. When we visited the mosaics at Piazza Armerina in 1980 the site was practically deserted but now it swarmed with tourists and after pushing our way around we were quite glad to return to countryside. Near Enna there were large drifts of *Anemone hortensis* by the roadside accompanied by patches of *Geranium sanguineum* and in places a daisy-like plant. This we identified as *Leucanthemum ceratophylloides* ssp. *tenuifolium* though this plant is said by Pignatti to be endemic to central Italy and not

found in Sicily! It is a rather beautiful marguerite with finely divided leaves. Another interesting plant by the roadside was *Lavatera trimestris*. This is the annual 'lavatera' with shell-pink flowers which has become so popular in our flower beds during the last few years. Here it was growing wild on its home ground and the flowers were nearly as large and beautiful as those on the seedsmen's named varieties. One last find in a deciduous wood near Piazza Armerina was *Tulipa sylvestris* in full flower accompanied by *Anemone hortensis* and *Geranium lucidum*. We have grown this tulip in the garden, and it thrives but does not flower very profusely with us. Here it was truly beautiful with its large, scented, yellow flowers held well above the surrounding ground vegetation. The pointed tepals opened out flat at maturity and in sunshine bent back like the flowers of a cyclamen. It is said to be indigenous in some of the southern counties of England.

Piana degli Albanesi

This area of typical limestone hills lies some 12km south of Palermo and we decided to go there because Davies and Davies (1983) quote it as one of the sites where one may see the uncommon *Ophrys pallida* and *Orchis quadripunctata* var. *branchifortii* (Fig. 90, p333). We made our way there by driving westwards along the motorway, turning southwards on road 121 just past Bagheria and before reaching Palermo. After some 15km we turned westwards to Marineo. In a disused quarry along this road we found a pink with a few flowers, which seemed to be a form of the very variable *Dianthus sylvestris*, With it grew the curious little legume *Coronilla scorpioides*. The roadside verges here were covered with *Lathyrus odoratus* and the scent was superb. This is the wild form of our garden sweet pea and it is endemic to Sicily and the extreme south of Italy. The flowers, which were nearly as large as those in our gardens, were always dark purple with paler wings. In a damp spot there were thousands of serapias and a few fine plants of *Ophrys apifera* and *O. bertolonii*.

We passed the interesting looking lake Bivio Lupollo but could not get to the shore for it is all wired-up and private so we continued along the road and turned northwards towards the Piano degli Albanesi. In hills here there were many plants of the stiff, conical *Echium italicum*, which usually has white flowers, and a strange leguminous vetch-like plant. The last of these turned out to be the uncommon endemic *Vicia sicula*. It has no tendrils, grows upright and can best be described as a miniature broad bean with narrow, grassy leaflets and bunches of elongated, dull mauve flowers. In places there were numerous plants of the *Crepis praemorsa?* we had seen earlier. Examination of a rocky hillside also revealed *Calendula suffruticosa, Nigella arvensis, Pallenis spinosa* and *Tragopogon porrifolius*, with these were *Atractylis gummifera*, a dwarf thistle with large, stemless, purple flower heads, and *Sedum coeruleum*, a small annual stonecrop with pale blue or mauve flowers –

seed of it is sometimes offered in catalogues at home.

Somewhat lower down, in an area with scattered pine trees and large, moss covered boulders, there were hundreds of plants of *Orchis quadripunctata* var. *branchifortii*. This uncommon plant is distinguished from the type species by having a very small lip of characteristic shape. With it there were hundreds of seeding plants of *Iris planifolia* which, though it usually flowers in January or February, we had seen still in flower on a north-facing slope of Mount Etna in March 1980. The boulders here were covered with *Sedum coeruleum* in places. Stopping by some rocks near Santa Cristina, we discovered *Cymbalaria pubescens* which is like a weak-growing hairy form of our ivy leaved toadflax. It is not a great beauty but is a rare plant limited to this area of Sicily alone and was a fitting discovery to end our botanising.

At the end of this second botanising trip to Sicily we feel that yet another visit there would be well worthwhile – probably to the drier western end of the island. Sicily has an interesting flora with many endemics but much work is needed to identify species because of the lack of popular literature on the subject. Another disincentive to botanising in Sicily is the relative lack of choice of package holiday venues. To get to the botanically most interesting areas it is necessary to make one's own travelling arrangements and this can be considerably more expensive than taking a package holiday.

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Line drawings: Flowers of Sicily (p340)

1. *Orchis longicornu*
2. *Orchis quadripunctata var. branchifortii*
3. *Sedum coeruleum*
4. *Leucanthemum ceratophylloides ssp. tenuifolium*
5. *Bellis margaritaefolia*
6. *Iris planifolia*
7. *Anthemis montana ssp. montana*
8. *Linum punctatum*
9. *Erysimum bonnanianum*
10. *Antirrhinum tortuosum*
11. *Cymbalaria pubescens*
12. *Polygala preslii*
13. *Vicia sicula*

hris North

A. F. R. Wollaston: A Brief Conclusion

JACK BAINES

After a lifetime of travel A.F.R. Wollaston finally settled down at King's College, Cambridge. The period until this time is covered by an article in **The Rock Garden,** (Vol XXI Part 4 Number 85), by Peter Burnett and John Mattingley. However, the article ends in a similar fashion to the book by Wollaston's wife Mary, (Letters and Diaries of A.F.R. Wollaston. 1933, Cambridge U.P.) Both state that he died in his rooms on June 3rd 1930. Mary's book ends:

"Towards the end of May 1930 the children and I were able to leave Gloucestershire and join him in Cambridge. He was full of vigour and happiness and we were delighted in being once more together. A fortnight later, on June 3rd, he died in his rooms at King's. Of this tragedy, with its waste and misery, I can neither write nor speak."

1933 Mary Wollaston

As a mountaineer who has followed in Wollaston's footsteps successfully to New Guinea and Colombia and had climbed their highest peaks, this puzzled me. Also, as a specialist second hand bookseller, I had built up an impressive collection of books and ephemera about Wollaston, including some personal copies of his books. This collection was finally sold to a gentleman in America who actually had Wollaston's D.S.C. and the rest of his medal collection. But before this I found a clue to the meaning of Mary's words, *"Of this tragedy with its waste and misery"*, when a chance remark by an elderly mountaineer gave me a trail to follow. Here is the result:

In 1928 Wollaston returned as a tutor to King's College, and went to live in Cambridge. He was an extremely quiet man but had the gift of inspiring friendship; this, combined with a sense of humour, a broad outlook and an amazing acumen, made him an instant success with many students.

In the spring of 1930 he was joined by his family, wife Mary, son Nicholas, daughters Joanna and Georgina. Within a fortnight this idyllic reunion was shattered.

D. N. Potts, reading History at King's, was a flamboyant highly-strung undergraduate aged just 19 years. Unlike many of King's men he had not

been to Eton nor did he belong to any family of note. This may account for his attention-seeking lifestyle, false moustaches, garish clothing, and generally extrovert manner. He ran up a series of debts at Cambridge which his father settled. Potts left home after the Easter break to return to Cambridge but he was not seen for a month. Wollaston then wrote to Potts senior advising him of his son's absence. The police were informed and eventually some friends found Potts in London living in a brothel. On June 3rd he agreed to return to Cambridge with them by car. On his arrival he was observed by a police detective, who had been informed of his imminent arrival as he left his companions. Coincidentally Potts then met Wollaston, the very man he had been hoping to meet, as A.F.R. had the reputation of being a father figure with a sympathetic ear for undergraduates' personal problems. Potts and Wollaston went to A.F.R.'s rooms on the ground floor in Gibbs Building, and after a short while Detective Sergeant Willis entered the rooms and began to officially caution Potts. Willis never finished serving the warrant. Potts drew a pistol and fired it at Willis, severely wounding him. Two fatal shots were fired at Wollaston. Potts fired the pistol again at Willis, then aimed the pistol at his own head and pulled the trigger for the last time. He died in a pool of blood, Willis survived another 16 hours. Wollaston had died instantly.

"Wollaston was a distinguished naturalist, ethnologist, and explorer of tropical mountain regions, a geographer in the widest sense, with a marked understanding of primitive races. His writing was distinguished by a notable sensitiveness, and in accuracy of detail and avoidance of error he exhibited the characteristic merit of the scientist William Hyde Wollaston. He was a man of wide knowledge and noble character. He was master of himself in a rare degree: a great adventurer and a wonderful friend."

T. G. Longstaff

To Absent Friends

BARRY McWILLIAM

My habit, over the years, has been to remove the labels of failed plants and drop them into an old washing-up bowl. Periodically these are picked through and those cut from empty yoghurt cartons are disposed of. However, plants in the aluminium greenhouse which does service as an alpine house were labelled with costly MacPenny's black labels, and a natural greedy streak makes me reluctant to throw them out. As a result, they accumulate as reminders of past failures, though fortunately an incomplete record.

The genus *Androsace* has suffered particularly at my hands. A single seedling of *A. helvetica* from SRGC seed grew to a pad 3 cm across before fading away in its second winter, despite being kept dry and well-ventilated. There appeared to be no reason why it should have rotted off at ground level, when *A. cylindrica x hirtella, A. hirtella* itself, *A. pyrenaica* and *A. vandellii* in the same plunge grew on happily. Last winter *A. hirtella* suffered the same fate after slowly turning an attractive rust shade.

Winter deaths in the alpine house would usually be ascribed to damp, and this may sometimes be the case. Other winter losses included only one of two identically treated *Campanula zoysii,* raised from SRGC seed, all of the *Lupinus lepidus lobbii* from the same source year by year; *X Leucoraoulia loganii* and *Raoulia hectori,* bought at a Cleveland Show plant sale some years ago, went in their first winter.

Observations of *Draba bryoides imbricata* cause me to doubt the winter wet theory. This species was purchased from Alan Huntley of Hartside Nursery in the early years of his business and my interest, planted outside in a trough, and over the years cuttings were tried both in scree and the alpine house. Unprotected, outdoor plants, though martyrs to moss growth in the cushion, remain green all winter and suffer little damage, unless smothered by more vigorous plants. Those in the drier air of the alpine house lose all green colour in autumn and green up only if and when regrowth starts in late winter. My 20 cm specimen failed to re-awake last spring.

Bulbous, or tuberous, species are particularly prone to ascend to the great alpine house in the sky during winter. *Anemone tschernjaewii,* purchased from Potterton & Martin in spring, duly died down in summer, and failed to reappear in the following spring, an example of what a friend refers to as "monocarpy without going to the bother of flowering". *Iris histrioides* 'Major' bulbs, bought from a local garden centre in the autumn of 1988, turned to pulp in their pot before the next spring, in spite of a

precautionary benomyl soak. Two species of *Narcissus* have failed my test also. Both *N. asturiensis* and several *N. watieri* were raised from SRGC seed to flowering size in four years and promptly rotted in the following winter.

But back to *Androsace*. *A. villosa jacquemontii* was obtained from Potterton & Martin and planted directly into a 30cm shallow pan in an attempt to produce a large mat. This it did quickly and looked very promising until the summer heat of 1989 when it died even more rapidly, as even frequent watering failed to meet its needs. In the heat of 1990 *Plantago nivalis* in a small pot and *Raoulia hookeri* in the same 30 cm pan died in the same way. The problem, paradoxically, appears to be that the very frequent watering made necessary by wilting in high temperatures, with a restricted root run, induces root and neck rots.

Very similar fates befell some species of *Lewisia*. One *L. brachycalyx* and two large specimens of the reputedly indestructible *L. rediviva alba* rotted as a result of watering too late into hot summer weather. Another *L. brachycalyx* responded to the neck rot by sprouting side-shoots, becoming a multi-rosetted plant. Conventional wisdom decrees that *L. cotylèdon* is at risk from winter wet in the crown of the plant, hence the advice to plant vertically. However, a hundred or so *L. cotyledon* plants in 7 cm plastic pots look none the worse for their full exposure to a very wet autumn, winter and early spring here. Several were lost last summer. Could it be that the rot starts in summer and that is when dry conditions are essential?

The genus *Saxifraga* has by far the longest list of these summer heat failures. Despite heavy shading, wide ventilators and door, and the removal of the glass from one end of the alpine house, the list of failures is impressive. Large plants of *S. brunoniana, S. cebennensis, S. exarata, S. x haagii* and *S. retusa*, and smaller specimens of *S. pubescens iratiana, S. poluniniana, S. sprueri* and *S. 'Valerie Finnis'* have died or been severely damaged during hot weather.

There are two ways of preventing this slaughter of the innocents. My remaining pan plants could be given to a more skilled cultivator and I could retire to growing geraniums, or tomatoes. Alternatively, frames could be constructed to allow plunged plants to be grown outside, with facilities for covering only in winter, or summer, as required. But what would that cost, and would it really solve my problems?

Plant Portraits

Narcissus bulbocodium var *conspicuus*

Lyn Bezzant

This hoop petticoat daffodil is about 15 cm tall and has deep yellow flowers. The corona is up to 3.5 cm long and 2 cm wide at the mouth (Fig. 91, p350). The bulbs grow wild in mountain meadows in west France and in Spain. *Narcissus bulbocodium* var *conspicuus* is an excellent early bulb for the rock garden. Here it flowers in late March and well into April. It can sometimes be naturalised in short turf. Plenty of water must be available during the growing period. Congested clumps of bulbs can be lifted and gently divided up and replanted while in early growth, if the weather is mild and damp. Otherwise the bulbs can be dug up and replanted during the dormant period, June and July. A little bone meal sprinkled around the plants in autumn is beneficial. This daffodil also makes a good subject for pan culture in the alpine house or bulb frame. In cool conditions the flowers can last for several weeks. Bulbs are readily obtainable from the specialist nurseries, and are best planted by the end of August. The plant shown was grown from S.R.G.C. seed. From sowing to flowering, narcissi can take as little as three to four years.

Corydalis solida

Lyn Bezzant

This member of the Papaveraceae, found widespread throughout Europe, Russia and Turkey, is a charming early flowering tuberous rooted plant for the rock garden, the peat garden or the woodland. The flowers, which resemble those of fumitory, have a colour range from white to pink and purple (Fig. 92, p350). The grey-green leaves are finely lobed and have a delicate appearance, but flowers and foliage stand up very well to rough weather. The plant reaches a height of about 12-15 cm and flowers here in late March to early April. The whole thing disappears again underground in early summer. A top dressing of coarse chippings or bark helps to save disturbing or stabbing the tubers while dormant and protects the tender new growth somewhat from voles, hungry after hibernation, and regarding our garden as a gourmet vegetarian restaurant. When necessary the clumps of tubers can easily be divided up and replanted during the dormant period. It is hardly worth growing these ordinary forms of *C. solida* as alpine house plants. The flower colour is much more attractive in the open garden, especially if the plants can be viewed with the sun shining through the flowers. *Corydalis solida* is readily available from the specialist nurseries and sometimes appears on club sales stands.

Viola cenisia beneath the Eigergletscher

JOEL B. SMITH

Happy memories transport me back to beneath the Eiger Glacier, in the heart of the Bernese Oberland. Quite typically I had arrived in thick fog and the Jungfrau and Eiger were swathed behind a seemingly impenetrable barrier of cloud. Suddenly however the clouds unfurled and sailed away, as the sun pierced the gloom. The contrast was incredible, and in the brilliant sunshine on this limestone scree, I saw a splash of purple at my feet. Nestling amongst the boulders were the joyful peeping faces of a pansy.

The violet-purple faces were relatively large, with a warm yellow eye and little markings on the petals. The spurs were short and slender, unlike the elongated spurs of *Viola calcarata*. Forming a shiny green mat, the oval leaves are long-stalked and arranged in loose rosettes. It was *Viola cenisia*, the limestone scree-lover (Fig. 93, p351).

Soon my eyes became attuned to the colour and I saw that the scree was covered in mats of purple. Here at 2300m, by the beginning of July, the snow had receded from the scree entirely, leaving the viola to carpet the ground, far more plentifully than anywhere else seen in the area. This species is able to tolerate the shifting stones of the scree by dying down overwinter and then reshooting around any obstacles.

Also in the scree were the translucent white faces of the Broad-leaved Mouse Ear, *Cerastium latifolium*, another plant seeming to revel in lime-rich rocks (Fig. 94, p351). Nearby *Draba aizoides* was blooming and just below the scree were the beautiful lemon-yellow umbels of the protected *Primula auricula*. On the side of the terminal moraine ridge, *Ranunculus alpestris* carpeted the loose stones, while in the flatter area of the scree were the low, close hummocks of *Galium helveticum* studded white. Just above the scree were a few specimens of the pink-tinged *Ranunculus glacialis*, an unusual visitor normally only content on siliceous subsoils.

However, *Viola cenisia* took the pride of place by far and it was a thrill to discover the plant that had eluded me last year on Mont Cenis.

Svalbard 1990

HEATHER DALE

Suddenly, after months of preparation, I was setting off. The train pulled slowly out of Newcastle station, away from family and friends, everything familiar – taking me to a foreign, hostile environment with people I hardly knew. I was setting off on the British Schools Exploring Society's expedition to Svalbard, partly thanks to the assistance of the Scottish Rock Garden Club Exploration Fund.

In London I was met by a friend of the family who I stayed with for a night then the next day it was time to go to Heathrow, Terminal 8, to meet most of the expedition. The rest we would meet in Tromso airport. The flights were ruled by "what have I let myself in for?" questions and ear ache (the ear ache was not caused by people asking "what have I let myself in for?").

We spent a day in Longyearbyen, the capital of Svalbard, before leaving (several hours late) on a boat to the area which would become base camp. Base camp was sited on the strandflat which is the richest in terms of plant life; nowhere is rich in animal life. It is very important in environments like this to be careful, as any damage would take a long time to disappear. The Exploring Society has very strong views on our effect on the environment; we must be beyond reproach. A sentence much quoted on this topic was "Take nothing but photographs and leave nothing but footprints".

Base camp, much to my regret, was on top of a field of *Cassiope tetragona*, flowering much more prolifically and on bigger plants than I have ever seen in cultivation.

When I arrived I could hardly believe I was actually there, but after about a week it changed, all problems, strains and worries had disappeared. Life was to keep going, today was all that mattered – the next meal, when you'd eat your day's ration of chocolate. If I stopped to think about home I could remember specific details but I couldn't really capture the flavour of what life was really like back home. It wasn't something you could put your finger on. When I came back there were the same feelings but reversed.

The expedition was split into 'fires'. These are the groups of approximately twelve young expeditioners who worked on the same science project. The science projects included ornithology, geomorphology, survey, radiation and last in more than one sense (ie late

for everything) terrestrial ecology. Although none were specifically involved with plants, the terrestial ecology project, on which I worked, needed data on mite and springtail identification and counting, as well as detailed records of vegetation at each site studied. So I was able to spend most of my time looking at the plants.

This science work took place over the first three weeks of the expedition. The aim of the project was to see if the numbers and species of insects varied as you move away from the glacier. Obviously, they didn't live in the snow but on the mountains which showed above the ice. The terrain varied, some very stony with only the occasional plant. In this situation the plant was nearly always the Svalbard poppy *Papaver dahlianum* (Fig. 95, p352). The Svalbard poppy is a coloniser and was often found in the moraines and on recently exposed land. New land is constantly and slowly being uncovered as the glaciers retreat.

As you moved further away from the glacier, the poppy was intermingled with *Saxifraga oppositifolia* and *Draba corymbosa*. The *Saxifraga oppositifolia* was present in two distinct forms; one which tended to sprawl and have either very dark flowers or very pale flowers and the other which grew as a cushion and had mostly medium coloured flowers. Neither form seemed to have any particular habitat association.

Salix polaris could be seen a little further from the glacier. As the tallest tree on the island it was dwarfed by plants such as *Saxifraga caespitosa*. This saxifraga, although it produced almost perfect cushions, did not flower prolifically.

Svalbard did not escape the buttercup: ranunculus turned up in most areas but was never in great numbers. The most common species was the pygmy buttercup *Ranunculus pygmaeus*; at a maximum of 5cm high it provided a very delicate looking flower. This was found in all the places of study up the glacier where the soil was relatively good, whereas its larger brother, *Ranunculus sulphureus*, could only be found on the strandflats near sea level. The most lush growth was provided by *Dryas octopetala* and mountain sorrel *Oxyria digyna* (which is edible and was the only fresh vegetable we had for six weeks).

The science work involved moving around a lot, travelling from one mountain to the next. This meant we never slept in one place more than two nights. It didn't bother me because once inside the tent every night it was the same.

The weather in Svalbard is mostly the kind that just sits there and does nothing. No wind, no sun, no rain, no snow. When the weather was good it was brilliant; clear blue skies. There was a patch of really bad weather; whilst we were on the glacier it snowed and was misty and windy. The temperature was only about minus one but the wind chill factor was a lot

colder. Despite the near desert rainfall levels wet socks were a fact of life. This was because the water never ran away and was stored above the permafrost on the strandflat and as snow on the glacier. Every morning when "nature called", (the only reason why anyone ever got up) it was on with the wet socks which had been hanging along the ridge of the tent all night pretending to dry.

We returned to base after the science phase to replenish food supplies and wash bodies and underwear. Then it was back up onto the glaciers for the adventure phase. The adventure phase is the part of the expedition that was our own. We decided, within reason, where to go and what we did when we got there. The plan was to go back up onto the glacier and spend the first couple of days learning to ski, cross country style, then to move further up and set up an advanced base camp and do at least one three or four day trek with the whole fire and to climb a couple of mountains. Finally the fire was to split up and either do another four day trek or a couple of two day trips. The weather was good for the most part and we had some spectacular views of Svalbard.

On the second four-day trip there were only five of us and the silence was more noticeable, but it didn't grind like it does, for me, at home because it was silence, real silence, no cars, planes, people, trees, birds . . . it was pure silence. I suppose it gave a sense of security beause you knew you would hear people coming when they were still miles away.

One thing I definitely hadn't expected was the relaxed contentment that rested on me for the majority of the time. Even when I was working hard and particularly while I was ski-ing, I was happy. If there is one thing I would like to go back for it is that underlying feeling. This affected everything, especially if something went wrong, like the tent fell down, you just got up and put it back up, you didn't get worked up. I think that is something that has changed me a bit, I still now say "does it really matter?" When I first got back I was amazed at how wound up everyone was, and am now not at all surprised by the high number of stress related diseases and illnesses that affect our society.

All too quickly it was time to come down from the glacier and back to base camp for a couple of days then back to civilisation. The boat trip back to Longyearbyen was terrible, out of thirty people only two were not seasick. Then finally the flights back to London and the train to Newcastle.

Heather Dale was a recipient of a Scottish Rock Garden Club Exploration Fund award in 1990. Full details of this fund are available from the Club Secretary.

Eds.

Fig. 91 *Narcissus bulbocodium conspicuus* (see p345) R. Bezzant

Fig. 92 *Corydalis solida* (see p345) R. Bezzant

Fig. 93 *Viola cenisia* on the Eiger Glacier, Switzerland (see p346) Joel Smith

Fig. 94 *Cerastium latifolium* on the Eiger Glacier, Switzerland (see p346) Joel Smith

Fig. 95 *Papaver dahlianum*, Svalbard (see p348) Heather Dale

Fig. 96 *Fritillaria sewerzowii* (see p357) Sandy Leven

Fig. 97 *Fritillaria alburyana* (see p356) Sandy Leven

Fig. 98 *Fritillaria michailovskyi* (see p355) Sandy Leven

Fritillarias – A Race of Thoroughly Bad Characters?

SANDY LEVEN

Mr Reginald Farrer was apparently not a lover of the fritillarias. He described these aristocratic plants as 'very miffy or mimpish or both and the family has a bad character'. He went on to say that 'an enormous number of fritillarias have more or less stinking bells of dingy chocolate or greenish tones, which often appear transfigured by the enthusiasm of those who desire to get rid of them as "rich purple or amaranthine violet"'.

While everyone must agree that many fritillarias have an unpleasant smell this is only apparent in confined spaces. You don't have to crawl round your garden sniffing every plant. It is much better to remember to smell the nicely perfumed ones twice as often. Many of them do have their bells coloured various shades of green and brown, the relative proportions varying between species, and indeed between members of the same species. However there are also many 'frits' available in shades of yellow, red and pink. There is even the bright orange *F. recurva,* whose colour is as bright as any *Lilium bulbiferum.* Their charm and attraction lies in a large part in their subtle colours and tones, and how they are combined on the chequered bells.

Fritillarias make good plants for the garden, frame and alpine house. Once you start growing them, it is a bit like stamp collecting – you start to look for other species and then for variety within the species. One of the main dangers of buying frits from commercial sources is that we risk becoming blinded to the variety within a species. We become used to seeing one clone and we then expect every member of the species to look like the first one we saw. If you buy bulbs try to buy three of the species and hope they have been seed raised, try to cross-pollinate them when they flower and raise your own from seed.

A collection of fritillarias will give you plants in flower over many months, from late February until early June. Plants which flower early are very precious, as there are fewer of them than there are summer flowers. We have more time to admire them when our attention is not distracted by beds of pansies or roses. Can you imagine giving your true love a fritillaria on St Valentine's Day instead of a red rose? There is little likelihood of a political party taking so pungent a bloom as its emblem. Nevertheless I would encourage you to grow them if you possibly can. Given proper

growing conditions I find most of the European and Asian species straightforward to grow. For me the Californian species are more difficult but I am learning. Of the American ones *F. liliacea* and *F. biflora* may be two of the easier ones, or perhaps they just like Perthshire. *F. pudica* is not too bad if you can resist repotting it every year.

Fritillaria bulbs are generally expensive to buy, the exception being *F. meleagris* whose value in the garden cannot be rated too highly. It is a British plant, native to water meadows and open woodlands. In the garden it clumps up well and spreads gently by self sown seedlings. It is also most effective planted in semi-wild woodland. At Belhaven House in Dunbar, Sir George Taylor has a wood underplanted with narcissus, erythroniums and *F. meleagris*. In this woodland the snakeshead fritillaries seem to grow singly and tend not to clump up as they do in the rock garden. This might be due to competition from the grasses in the wood. This tendency to grow singly and not to clump up is also seen with trilliums in the wild.

F. meleagris has square-shouldered lantern shaped flowers, usually purple or pink with marked chequering. There are graceful white forms whose cool fresh flowers, often tinged with green, are more beautiful than words can describe. Other whites are suffused with pink. These are equally beautiful. 'Aphrodite' is a selected white form.

F. pyrenaica is another good garden plant. The 'garden form' is 40cm tall with flowers of deep chocolate brown. The lower edge of the petals reflexes to display the rich golden yellow inside. This is a graceful, regal plant. I have admired another form with longer bells which are less reflexed and which have more yellow on the outside. In the wild there is more variation. It would be good to raise more of *F. pyrenaica* from seed to see this in the garden. The 'garden form' regularly increases each year, producing two new bulbs from each old one.

About ten years ago I bought three bulbs of *F. michailovskyi* for £5.75 each. The original bulbs multiplied slowly. More importantly, I sowed seed from them every year. After four years some of the seedling bulbs flowered. Now I have more bulbs raised from seed than from vegetative increase. Unfortunately, I am not going to make my fortune this way because the price of *F. michailovskyi* has fallen dramatically. It is however, still one of my favourites. It is up to 20cm tall, has lanceolate leaves and flowers almost unique in their colouring. The bells are dark reddish purple edged with yellow. The yellow can occupy one third of the petals. The flowers are covered, like grapes, with a grey bloom (Fig. 98, p353). There can be up to five flowers per stem but usually they are single or paired. Recently we have been encouraged to grow *F. michailovskyi* outside. Now that I have enough I will follow that advice. Certainly if it will grow outside in Fort Augustus for Mike and Polly, it should grow in Dunblane.

Other frits which should be fine outside in central Scotland are *FF. acmopetala, camschatcensis, pallidiflora, persica, imperialis* and *raddeana.* The last three are tall plants with large bulbs, best planted leaning to one side, on 2cm of coarse sand in a well drained bed. They appreciate warmth while they are resting, and shelter from strong winds when they are growing – a near human quality!

As I have already advised, try to increase your bulbs from seed. Continual vegetative increase can leave you with a large pan which contains only one clone. I am guilty of growing my frits in clones because I like to see uniformity in a show pan. To compensate I keep pans of different clones of the same species close together and deliberately cross-pollinate them to get good seed set. Until this year I had been unable to get seed set on *F. minuta (= carduchorum).* This year I have one seed capsule. I had thought this was due only to my growing only one clone because this is one fritillary which increases dramatically by small bulbils, a kind of plant version of a chain letter. *F. minuta* flowers on quite immature bulbs hardly more than 1cm in diameter. These flowers are single, held on stems 10–12 cm high. At this age it lives down to its name; it is a small gem. As the bulbs become more mature, they increase in size till they are four times bigger. These large bulbs produce six or seven flowers closely packed together at the top of stems 25cm tall. These plants are robust and it is one of these which has produced my first seed of this species.

Another frit which has not yet set viable seed for me is *F. hermonis amana.* I have three clones of this but so far, no luck. It does however produce huge numbers of bulbils. By deliberately cross pollinating my *F. alburyana* with pollen from another clone, I have for the first time got two fat seed heads. I can already imagine these germinating in their seed pan of John Innes mixed with Perlite (equal volumes of each) before they develop into flowering plants in four or five years time. The more recent introductions of *F. alburyana* seem to be darker pink in colour than the original shell pink. The flowers face outwards rather than upwards and are slightly chequered (Fig. 97, p353).

If you grow fritillarias from Club seed then you will start with seed from several sources, so that you can expect some variation. One of the best species in which to see this is *F. crassifolia kurdica.* This first sowing I made in 1983 resulted in four quite different flower shapes and colours. Many clones of *F. c. kurdica* don't increase vegetatively, or if they do then it must be very slow. One of mine has happily split each year giving an annual doubling. The colour of the bells varies from greenish yellow to deep chocolate.

Another way to increase your bulbs, I am told, is to break them into two after the leaves die back. I would advise that you adopt this method with some caution. Perhaps it would be best to practice on species of which you

have a good number rather than pounce on your rarity. If it does work, it must be a good way of bulking up good forms of *F. c. kurdica.*

Anyone who doubts the powerful aroma emitted by some frits only needs to share a car with a few potfuls on the way to a Club show. Indeed on one trip to Newcastle with *F. hermonis amana* one of my friends suffered the combined effects of travel sickness and "frit niff". Unfortunately for exhibitors, some frits, when grown in pots, are just too tall to fit into the car boot, so that they have to travel to the show inside the car. Here, when the pots are packed into boxes and placed on the car seats they are subjected to less shaking than they would be if they were in the boot. Care is needed in transport, especially with those long stemmed species. I try to leave enough pot depth below the rim and above the compost so that any stems which do move can be supported with extra gravel. It is good to wrap sheets of newspaper round the flowering stems, to support them while travelling as well as packing newspaper between the pots. Take care not to allow the blooms to rub on the paper or they will become marked.

In the shows frits are very handy plants, especially in multi-pan classes. They always complement one another's colour, never clashing like brightly coloured flowers do. Sometimes they merge together too well and the greens and browns of different species tend to blend into one mass. While three pans may be specifically distinct, as per the show rules, they may look very similar. Try wherever possible to choose pans which look distinct; e.g. white *F. bucharica,* brick-red *F. minuta* and jade *F. hermonis amana;* or lime green *F. sewerzowii,* (Fig. 96, p352), pink *F. stenanthera* and yellow *F. aurea.* There are many colours of frit: the trick is to get them flowering at the same time.

On the bench put the tallest plants at the back and the smallest at the front. If the three pans are of similar height, raise two of them on blocks of different heights. In the six pan classes the frits soften the bright pinks and yellows of primulas and saxifrages.

Grow your own plants from seed and you can enter more classes. By carefully perusing the schedule you will find that there is scope for taking several pans of this one genus to the shows. You can enter the Fritillaria classes themselves, seed classes, new, rare and difficult, multi-pan classes, Liliaceae, native to the Americas, to the Himalaya and native to one country. A passion for one genus does not force you to enter only one or two classes at the shows. Come to the shows. Let us see what you grow. You will soon be swapping bulbs and seed with other exhibitors; people you have never met will talk to you or write offering this or that to exchange. Come to the Discussion Weekend and participate in the Dwarf Bulb Exchange. I want you to follow me and spend your leisure time with these 'Bad Characters'.

Letters to the Editors

Dear Editors,
Most people will share David Simpson's concern about the use of Paraquat in the garden (letter Jan. 1991.) As with most "medicines" it is not so much the material as the dose that matters and there is no particular difficulty about being careful. You would need to swallow 8 ozs of Grammoxone concentrate to kill or 2-8 gallons of the diluted material – which would be difficult. I know personally one unfortunate who ate a packet of Weedol in a suicide bid. It didn't work and after a few days observation in hospital he was returned home. With hindsight, the manufacturers of Grammoxone were exceedingly foolish to colour their product dark brown initially, to look exactly like Coca Cola. That it took 20 years and some 20 deaths in Britain alone before they changed it did nothing for their reputation.

A reaction to some of the stronger assertions of pressure groups and the media seems to have set in; let us hope that in future they will try to maintain some sort of balance in these things. Our main problem is lack of information, which only manufacturers can give, and which they are understandably very nervous about supplying.

As a user of Paraquat for some thirty years, commercially and as a gardener, on a variety of soils and in rather wet climate, I can say that it has no substitute for some situations. But for a few genera of plants it has dangers, especially on acid and peaty soils, and should not be used within root range. Monocots generally (but not universally) are susceptible, especially *Iris, Crocus, Agapanthus, Camassia* and *Luzula*: also *Peltiphyllum peltatum* and *Rodgersia tabularis,* and in the vegetable garden, peas. It is probably best kept out of the vegetable area altogether; the slightest speck of spray drift will give dead spots on any leaf vegetables. Against perennial weeds it is only a defoliant but some annuals, notably bittercress and the annual willowherbs are rather resistant. It is also more effective used in the evening or in dull weather than in bright sunshine, and with a temperature about 10°C. My own particular method of use is as spot treatment with a rather strong solution, going round the garden 3-4 times a year. A 4 litre bottle lasts me about 4 years on an acre or more – you can't get more economical than that!

Yours sincerely,
Peter Hainsworth
Station House, Achnashellach
Strathcarron, Ross-shire IV54 8YR.

Dear Editors,

Dryas octopetala

I read with interest the article on *Dryas* by Brian Halliwell in the latest issue of the SRGC Journal. There is no reference there, nor have I seen any elsewhere, to a double-flowered form which I have encountered in the Alps as related below. I should be pleased to have independent confirmation of such a form from other of your readers.

Holidaying in the Alps in mid-July 1988, I spent a few days at Montgenèvre; in particular a day botanising along the Rio Secco which, I might add, was neither much of a Rio nor very Secco at the time. Soon after starting on the Italian side I came across a single plant with white double flowers which I did not at first recognise. Only slowly did it dawn on me that it was our familiar Club emblem – *Dryas octopetala* in a 'multipetala' variation. I then spent some while photographing it much to the quizzical and embarrassing delight of a brat (I think that is the right collective!) of Italian schoolboys who, as bad luck would have it, were passing by at the time. I helped myself to one or two of the seedheads but as one might have expected nothing came of them.

To my way of thinking this plant was much superior to the single form, which is more than can usually be said of double-flowered varieties.

Yours sincerely,
Darrell Desbrow
3 Brunstane Gardens,
Edinburgh EH15 2QW.

Dear Editors,

Some time ago, in the course of venting my spleen against that ubiquitous pernicious weed *Cardamine hirsuta*, I mentioned that it was included by all nurserymen as a bonus with their deliveries. This observation must have struck a chord with a correspondent who, after dealing with other matters, wrote: "I have often thought of making up a pan for our local show of *Cardamine hirsuta* Drake's var., *Cardamine hirsuta* Ingwersen's var. and *Cardamine hirsuta* Elliott's var."

I must say on behalf of my correspondent that I am sure he had nothing personal in selecting those particular nurserymen's names. It was probably an unconscious acknowledgement of the debt we owe them in supplying much more worthy plants.

Not that my fellow sufferer would have won a prize or even a Cultural Commendation. Judges may have individual senses of humour but these seem to be rigorously suppressed when acting in concert. Leg pulling is definitely **not allowed.**

There once appeared in the S.R.G.C. Seedlist the item *Gentiana kochiana*,

red, white, blue". Who could resist that? Not I, certainly. I was fortunate enough to get the seed and when the plants first flowered there was indeed a mixture of a purplish red, a greenish white and a good blue. A mix was entered in the "Grown from seed" class. It happened to be Jubilee Year so I had high hopes of success. And what did I get? N.A.S. of course!

Your sincerely,
Don Stead
Esk Hause, Bishop's Park,
Thorntonhall, Glasgow G74 5AF.

The Easy Ten: A New Concept in Seed Distribution

MORRIS WILSON

Having completed two years Seed Distribution with some success, it appears obvious to me that quite a number of our members find it a daunting task to take part in the existing seed exchange, first in applying for a seed list, and then find it even more daunting having received one, in not knowing exactly what to request from about 4,000 species.

In an effort to stimulate a greater interest in seed sowing, and bearing in mind that there is no greater pleasure in any form of gardening than successfully producing a plant from seed sown by oneself and being able to give surplus plants to friends, I am this year offering a package of 10 packets of reasonably easily grown species of my choice, which will include, as available, probably a Lewisia, Cyclamen, a Meconopsis and a bulb or two, and will include basic cultivation instructions.

To partake of this scheme, which is completely separate from the main seed exchange, all that is required is to send a remittance of £1.00 and your name and address to:

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You can apply anytime before the closing date for requests, 14th February, and seed will be despatched mid-February.

I trust this fills a gap which I think exists and wish you good luck with your seed sowing in future.

Discussion Weekend

September, 1991

Pollock Halls of Residence, Holyrood Park Road, Edinburgh
Friday 6 September to Sunday 8 September 1991

Scotland's capital city can perhaps lay claim to be the cradle of rock gardening in the country, and certainly the Royal Botanic Garden hosts the best collection of rock garden and alpine plants in the country today. A visit to Edinburgh would not be complete without a visit to 'The Botanics' and this year's programme allows time to do this, guided by RBG staff if you wish.

The lecture programme will cover many fields by both new and well known speakers. Bulbs are a popular group of plants and we shall hear how they are cultivated to perfection at Gothenburg Botanic Garden. "Patterns of Change" will delve into the variation found in plants and in particular gentians; and hardy orchids are a group of plants that fascinate most people, both in the wild and in the garden. Travel will take us to the Himalaya in search of primulas, across both hemispheres in search of the unusual, and everyone can learn something in a D.I.Y. talk by an expert. There will be the popular bulb exchange along with a talk on an aspect of their cultivation by Duncan Lowe.

The Pollock Halls of Residence (Edinburgh University's Halls) are to the south west of Holyrood Park, almost in the shadow of Arthur's Seat. They are situated next to the Commonwealth Pool, with access from Holyrood Park Road, the entrance road to the Park. Car parking is available on site. There are numerous bus services from Edinburgh town centre, which is about a mile away.

Accommodation is available from Friday evening to Monday morning 9th September, in single study bedrooms. **Members requiring vegetarian meals, or with any other special requirements, should make these requests at the time of booking.** All the lectures and the autumn show will be held on the campus site. A list of local hotels and attractions is also available on receipt of an s.a.e. **The Saturday evening dinner was to have taken place at the Old Students Union Debating Chamber; however, this has been extensively damaged by fire and the dinner will now take place in Holland Hall. Wheatsheaf from Houston House will be providing the dinner. As our lectures are in Holland Hall, we must therefore vacate by 5 pm to allow the dinner to be set up. As a result, the programme has been rescheduled. The guided tour of the Botanics will now commence at 9.30 am with lunch at 12.30 pm. The first afternoon lecture will commence at 2.00 pm.**

There will be a number of trade stalls, and a club plant stall and plant auction, for which plants would be greatly appreciated. In addition, books and paintings will be on display and sale. We hope there will be large entries

for the autumn plant show and for the holiday photographic competition (details in the Show Schedules). Please support both of these and add to your and everyone's enjoyment of the weekend.

Programme

Friday	
8 pm	**Alpines from Both Hemispheres** Mrs Brenda Anderson
9.30 pm	Dwarf Bulb Meeting and Dwarf Bulb Exchange
Saturday	
9.30 am	Guided tours of the Royal Botanic Garden, Edinburgh Meet at the West Gate
2.00 pm	*The William Buchanan Memorial Lecture* **Bulbs in Gothenburg Botanic Garden** Mr Henrik Zetterlund
3.45 pm	**Patterns of Change** Dr Noel Prichard
7.30 pm	Dinner in Holland Hall
10 pm	Plant Auction
Sunday	
9.45 am	**Alpines – DIY** Mr John Main.
11.30 am	*The Harold Esslemont Lecture* **Alpines in the Langtang Valley, Nepal** Mr Peter Burnett
2.30 pm	**Hardy Orchids** Dr Philip Cribb

Prices

Residents

Friday evening dinner-Sunday afternoon tea £93.00
Saturday lunch-Sunday afternoon tea £65.00

The above prices include the cost of the Saturday evening dinner.

Members wishing to stay for Sunday evening meal, bed and breakfast should add £25 to the above prices.

Non-Residents

Saturday or Sunday: morning coffee, lunch, afternoon tea and all lectures on that day £15.00
Saturday evening Reception and Banquet £15.00

Bookings should be made preferably on the form enclosed with the January issue of 'The Rock Garden'. Together with the appropriate remittance, these should be sent to the Registration Secretary, Mrs Jane Thomson, 88 Liberton Drive, Edinburgh EH16 6NR. Telephone 031 664 1512.

Please send s.a.e. for acknowledgement of booking. Members wishing further information should contact Jane at the above address (s.a.e. please).

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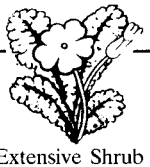

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Early numbers of the Journal are now urgently required for the evergrowing Waiting List. I would gratefully receive these as gifts to the Club, or buy them at half the above prices. Those most required are up to No. 56 and also No. 82. Postage for either arrangement will be refunded.

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