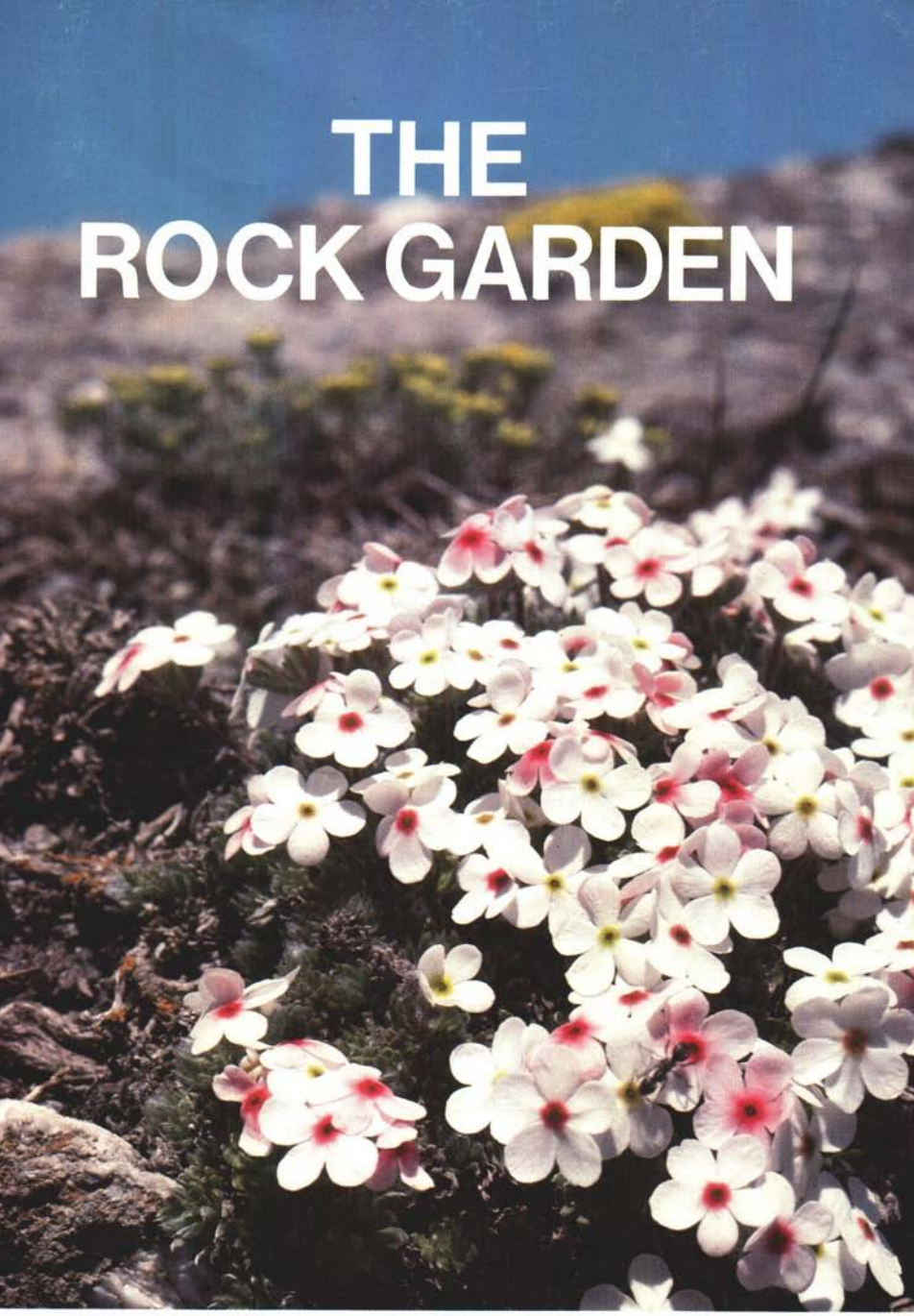
THE ROCK GARDEN



THE JOURNAL OF THE SCOTTISH ROCK GARDEN CLUB

Volume XX Part 3 Number 80

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The Rock Garden

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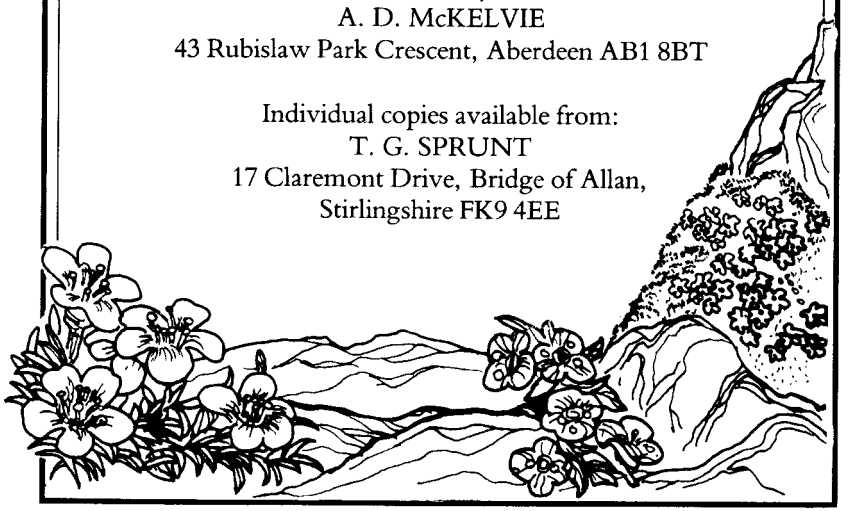

Front cover:
Androsace villosa Photograph by M. & H. Taylor

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Editorial

IT IS good to see a trend at SRGC shows for common plants to be judged on their intrinsic merit and not to be dismissed as too ordinary and unworthy of the highest prizes. Judges are bound to have their individual likes and dislikes, but, if they are good judges, they do not let their prejudices outweigh common sense. We know of one judge who does not think that pleiones of any kind should be seen at rock garden shows, and another who does not like any flower which has four petals. Let me hasten to add that they are amongst our finest judges and judge all plants on merit.

These thoughts were inspired by a magnificent primrose (*Primula vulgaris*) at the Perth show. It is not to detract from its quality to say that it looked as if it was made of wax; it was just so perfect. It was nice to see it awarded a first prize. To my mind it almost merited a Forrest Medal.

A club such as ours can not stand still; whether in pursuit of the cultivation of rare plants or in the improved culture of plants we already know, the search goes on. A single span of life does not seem enough to solve all the problems we face; there is the saying that gardeners need two lives – the first to learn how to grow plants, and the second to actually grow them.

Newcomers to the Club regularly ask how to get hold of the plants they see at the shows or read about in the Journal. Just the other day I was asked where one could get a plan of *Erythronium revolutum* 'Johnsonii' (Fig. 57, p.285), and I had to admit I didn't know.

In our Club, once you are known as a keen member you will be invited to visit other members' gardens and be offered plants, many of which will be rare and not available from nurseries. Even the more expert of our members often have problems getting hold of particular plants they wish to grow and which are known to be in cultivation – but where to look? The thought struck me the other day when I realised that, although I am not an expert in corydalis, I had eight different species of this genus growing in my garden – several of which would be difficult to track down in commerce.

Perhaps we should think of setting up a confidential register of plants which members grow. The list would not say where a plant was growing, but would enable a member, through the keeper of the list, to find out if a plant was in cultivation and whether a plant might be available.

On the other hand, the present system where members slip each other pieces of plants at shows or at the monthly meetings works reasonably well, although I am still concerned about enabling beginners to get hold of the good plants and showing them in Section 2.

ALASTAIR McKELVIE

THE STONE COLUMN

An alpine spring?

According to the calendar it was spring, but the weather showed scant regard for the equinox, the temperature falling to −11°C overnight on March 20. Actually we consider an agricultural definition more appropriate; spring has arrived when the soil temperature has risen sufficiently for grass to start growing. Up here this is usually about a month later than the official calendar date. For once we had quite good snow cover, and this particular frost did very little harm. The early rhododendrons like *R.* x *cilpinense* had already been damaged in bud, no flowers again this year. In a largish garden, like our one and a half acres, one can ignore such happenings and concentrate on the good things. Well, that's the theory; we try to, but each loss of flower is a sad occurrence.

Sunny days and clear, cold nights in the range −5 to −9°C followed. The snow steadily sublimed away, exposing kabschia saxifrages in full flower on our troughs, quite unconcerned by the overnight frosts. One had to find time to wander, to enjoy the comparison of the many species and cultivars, with their endless subtle variations. A real alpine spring for once, and to add to the effect, *Soldanella alpina* defied the suggestions we read recently that their buds are frost tender as they expand. Some other factor must be causing them to abort in some more southern gardens. Its close relative, *S. carpatica*, even self-sows freely in one of our peaty, leafy beds. Would that the two miniature gems, *S. pusilla* and *S. minima*, were so accommodating. They grow freely enough; the former has almost filled one of our troughs, but only the odd flower here and there . We feel that they should be pulled to pieces regularly and replanted in a fresh position. Recently repotted small offsets nearly always flower freely the following year for us.

We make no apology for returning once again to the subject of European primulas; they are one of our favourite plants; they ask for little and give so much. Some species, particularly the Arthritica group, can be left alone to

expand their tufts slowly for very many years. Others such as *P. marginata* extend upwards rather than outwards and eventually have to be taken up and replanted lower down. *P. marginata* is placed in subsection brevibracteata along with *P. latifolia* and *P. carniolica*. The last has a quite different growth habit; it is the most herbaceous of the auricula primulas, almost disappearing completely during the dormant period. *P. latifolia* is in between the two habits; it rises slowly as it ages.

P. minima, and the many hybrids in which it is dominant, also tend to grow up out of the ground, their mats becoming very loose after several years. Top-dressing with chippings is at best a temporary solution; eventually one has to pull them apart and replant the pieces.

In this second cold spring in a row, our European primulas are excelling themselves in the quality and quantity of their blossom. We must disagree with the AGS book; we do feel that flowering, or not, is more a question of climate than clone. Virtually every form and hybrid of *P. minima* is superb this year, as is *P. tyrolensis* in pot and trough. A plant of *P. glutinosa*, raised from seed originating in an area where it is not contaminated with *P. minima*, has four scapes, each with several of the characteristic blue-violet flowers, contrasting beautifully with the mica-schist outcrop.

We haven't had quite everything our own way, however; for the first time ever we have frost-damaged flowers on an auricula primula. The plant concerned is Murray-Lyon's large-flowered *P. clusiana*, which we grow in one of our troughs fitted with a temporary winter cover. These covers, which consist of plastic sheeting lights suspended at a slight angle to shed water, are intended to help in the outdoor cultivation of such cushions as *Androsace helvetica*. The sides are left open to provide maximum ventilation. However, we had a warning from Jack Drake that although such covers may help prevent winter rotting through excessive wet, there may be a penalty to pay during very cold weather. The cover catches any snowfall and suspends it about 30cm above the trough, thus negating any insulating effect.

P. clusiana 'Murray-Lyon' is always the first primula to flower here, even ahead of *P. allionii* and *P. marginata*. It was caught by the night of the −11°C and lost the flowers on the south-east side from too rapid a thaw in the sun. Another, more typical *P. clusiana*, is always amongst the earliest; our attempts to cross-pollinate 'Murray-Lyon' with the "type" have always failed. This lends credence to the suggestion that Murray-Lyon's form is a hybrid, probably with *P. minima*. It does have the minima feel in the large flowers with more divided segments, but the leaves are quite normal clusiana.

In the evolution of the garden at Askival, the last year or so has been a time of consolidation and refinement rather than dramatic change. The winter

winds have tried hard, but the only tree to succumb was over 50m from our north-east boundary and it fell away from the garden.

In Journal 74 (page 7) we described how the top nine metres was blown out of a venerable larch tree during the "Winter of Storms". The decapitated tree was subsequently felled into what was then (Feb. '84) simply a field, now part of our upper garden. A track had been constructed pre-war, to give access to this field. It runs from what is now our front gate, up our left-hand boundary, diagonally across the centre of the garden to the right-hand side where it enters the upper garden. The diagonal part is cut into a moraine slope, with a stone-built retaining wall along the rear side. Two sections of this wall have collapsed, one many years ago, and another smaller part was demolished by the falling 9m of larch top. The tree itself had stood just above the wall, and its stump was finally removed, with the help of friends, last August. The last few weeks of my summer holiday were then devoted to the repair of the retaining wall below here. A section about 7m long had to be taken down, and rebuilt to a height of over 1.5m. The original builders had used (weak) cement; it was repaired dry, but with a more pronounced rearward slope or "batter". It was not the stonework which took the time, but clearing the inevitable collapses of the bank behind, in order to excavate secure foundations.

We levelled out the soil above the wall, here about 25cm deep over glacial drift, and Poll forked it over to remove the worst of the stones. The paths were marked out, and we were almost ready to move the bulk of our "dwarf" conifer collection here, when an almost continuously wet October brought operations to a close for the year.

We feel that these conifers do not mix very well with the general run of alpines. Although slow growing, they are potentially quite large, and can rob the soil over a considerable area. Even in our climate it is very dry under a dwarf conifer bush. Thus we have decided to concentrate them in a ghetto of their own where they can compete with one another.

In tandem with this development, we have been trying to extend Poll's propagation area by adding a further frame each year. In 1986 we built another raised concrete block frame, after the style of our seed-frame, but one bay longer at 6m by 1.75m. Double-sided, the enhanced through ventilation more than compensated for the slightly more complex woodwork involved in its construction. The plants benefit from their raised position with easier access and better visibility.

Visitors have, on occasion, commented on the fact that many of our frames have two sets of "lights", the plastic sheeting covered set to keep out the rain (winter only), and, below them, a "permanent" netting set to keep out cats and birds. These netting lights are much more convenient in use than simply draping a net over the top of the ordinary lights. We have

tried that, and found daily light removal and replacement in spring and autumn very laborious. At present we are using an extruded 20mm square mesh, black polypropylene net, sold originally for fruit cages. We find it much stronger and easier to use than the woven diamond-patterned bird nettings. We have mentioned once before that we would rather not risk using galvanised chicken-wire, because of the possibility of the leached zinc damaging plants. Acid rain can greatly increase the rate at which the zinc is removed, and so is bad for fences as well as forests.

For convenience in use, our frames are built on the flat area immediately around the house. Naturally, this area turned out to have the deepest and least stony topsoil in the whole garden, so we could not afford to waste it. Before building a frame, the area is excavated down to the subsoil, the topsoil re-used elsewhere, and replaced with some of the masses of stones we have to fork out wherever we break in a new area of bed. Sometimes gardening at Askival consists primarily of barrowing things around, always to the opposite corner of the garden!

Plants on TV, postscript; and vinegar

When writing this sort of column, it is always too easy to fall into the trap of being too critical too often. We hope, and certainly intend, that criticism be constructive. However, we are only too pleased when such criticism is later proved to be unfounded. It appears that the policy of the BBC programme, "Gardener's World", in avoiding rare plants, has changed since we wrote our piece for the January 1986 column (No.77, p.342). We thoroughly enjoyed their recent visit to Eric Watson's garden and alpine house; full marks for showing his wonderful collection.

Jim Jermyn later told us that there was some prior discussion on the subject of "unobtainable" rarities, hence his inclusion in the programme, with commercial stock. It all helps to spread the message, and can only be of benefit to the SRGC.

We were particularly interested in the patch of *Iris winogradowii* in the open garden. With us, the leaves are barely visible at flowering time, whereas they clearly over-topped the flowers in the shots of Eric's group. We were told that they had been covered to protect the flowers for the programme, which must have forced the foliage a little. Incidentally, we find that this rare and beautiful yellow iris responds very well to being split up when in flower. Like snowdrops it is scarcely ever really dormant and grows away strongly, the leaves extending as the flower dies.

While on the subject of "Gardener's World", an earlier episode in February caused us much hilarity. A lady was sowing seed of the flowering dogwod, *Cornus florida*, which she mixed with parrot droppings (sic). We imagine she was trying to simulate the passage of the seed through a bird,

but we doubt that the technique would actually have the desired effect. It cannot have done any harm, and may be beneficial from the nutrition point of view.

However, there is a procedure which we have found effective on berries which incorporate germination inhibitors. Nature intends such berries to germinate more freely when scattered far afield through the agency of a wandering bird. In the garden we often find seedlings of *Rosa glauca* under favourite perches. Berries which simply fall off the tree or bush and try to grow underneath would suffer competition from their parent. Before we sow such berries we soak them for several days in vinegar, a convenient mild acid. They are rubbed several times to remove as much as possible of the fleshy part of the fruit. Finally they are rinsed and sown in the normal way in autumn, and left outside to germinate naturally. This method works well with sorbus, and thereby hangs a tale.

A friend, living locally up Glen Garry, is a member of the International Dendrologists, and went with them on an autumn visit to Nepal. In due course some sorbus seed came our way, and in return we described our method for germinating it. Next spring the Dendrologists organised a tour of large Scottish gardens, and our friend joined them for a day. One of the party, who had also been with her in Nepal, is an expert on sorbus, and she asked him if his seed had germinated. Replying in the negative, he suggested that it very rarely did the first year. She was able to report that hers were indeed up, and went on to describe our vinegar technique. The consequence was that the tour bus paused outside our wall. Have you ever tried to potter unconcernedly in the frames when looked down upon by over forty people?

An Alfa and some marble

During the Easter holiday, our daughter and son-in-law drove up from England in their brand-new Alfa-Romeo. Marco enjoys driving, and naturally he wanted to take us out for the day. Driving for its own sake has never appealed much to either of us; our Land-Rover, Grendel, is a work-horse. So we demurred, thinking of all the gardening we could be doing. Eventually a compromise was suggested; he had never been to the "Misty Isle" and we could collect some Skye marble. The reponse was hardly enthusiastic, but having taught them both physics, I could apply pressure in the form of logical argument. "The car should be stressed to carry four large people of, say, thirteen stone each; our combined weight is less than forty stones, which leaves twelve stones (76kg) over for rocks, not including the weight normally allowed for in the boot". Naturally, I won, and we went, armed with two large cardboard boxes, well padded with newspaper. Our son-in-law's face was a picture when we loaded up these

boxes, but he coped very well. Normally we just dump rocks into the back of Grendel, but then she hasn't had any paint on her floor for years, and we can hose her out!

The marble rock we found is most beautifully veined with green over a creamy ground. It will make a nice outcrop on one of our troughs, quite distinct from any of our other geological collections. Well worth the trip to find, and, of course, there's the association. Somehow we don't think Marco will forget that day either; most people have normal in-laws!

Exotic weeds

An old saying, and a valid one, is that a weed is any plant in the wrong place, the implication being that the diligent gardener removes the offender forthwith. There should be no place for the likes of *Cardamine hirsuta*; removal on sight is the ideal to aim for. Incidentally, we have found the size of their rosettes, produced before flowering and seeding commence, to be a good indicator of soil fertility and moisture. It is much easier to control in good soil; tiny fertile specimens are difficult to spot in gravel or scree. There is no doubt this species is a weed of cultivation par excellence; even if you gardened on a desert island, sooner or later it would find you, as indeed would the ubiquitous dandelion. However, it is with species deliberately introduced into the garden at Askival, and which have subsequently proliferated excessively, that this item is concerned. These include a few surprises which may be of interest. They can be divided into two groups: the seeders and the runners.

Amongst the latter, one of the most vigorous is *Pyrola asarifolia*. We originally obtained this from the late General Murray-Lyon back in 1974, as a single tuft which we planted in a dry position under a beech tree. After a slow start for a few years, it suddenly took off and now covers an area of about 4 × 3m. Perhaps its mycorrhizal association helps it make the most efficient use of this difficult habitat. As it is, we must try to curb its spread across a line of stepping-stones into the front half of the bed. This spring we have finally had to rescue *Hacquetia epipactis*, *Heloniopsis orientalis* and *Hylomecon japonicum* from the clutches of this pyrola. Their clumps had to be completely pulled apart to extract every last vestige of the pyrola, whose runners can even force their way up, like couch grass, through the centre of the densest mass of rhizome. If it were not such a good evergreen ground cover, we would be tempted to try to remove the pyrola altogether, if indeed this is a feasible undertaking. We find it thrives better under the beech trees than the well-known and oft-recommended *Hypericum calycinum*.

Another unexpectedly vigorous spreader was a plant we obtained from a commercial source as *Erythronium americanum*. Given what we considered

generous treatment in a slightly raised bed of good soil, it had failed to reward us with a single flower in the eight years since planting. During that time the original trio had become hundreds, spreading over a metre in all directions. Each corm produced a single small mottled leaf, and several further runners. Action was finally taken, declaring a free-fire zone against this particular erythronium.

In the way of things, when digging them out, I found one very deep, with a flower stem. It was moved to a less choice position at the base of a cherry tree; time will tell if this rougher treatment will pay off.

In marked contrast, a single specimen from North Carolina we obtained in 1984 is now flowering for the third year running. It has twin leaves, on either side of the flower, and, so far, no runners.

Naturally, one takes care only to plant troughs with material one considers likely to remain in scale, but inevitably mistakes can be made, especially when the species is relatively unknown. We had such an experience with *Valeriana supina*, a beautiful miniature from the Dolomites. We first placed this in a trough where it became overly vigorous, and was subsequently consigned to a raised scree bed. However, it proved unable to compete in the rough and tumble of this environment and started to fade away. Recently rescued and repotted, it looks as if we shall have to tolerate its running ways in a trough, just as we do with *Phlox nana*. Planted in one corner of a winter-covered trough, this pops up all over the place. I can still see the look on a visitor's face when I absent-mindedly plucked a tuft from the centre of a 15cm cushion of *Androsace pyrenaica*. Yes, a trowel was produced, and they did get another bit, with a root.

Turning to those ornamental plants which self-sow, it is always a matter of where, and to what extent, they spread. With relatively short-lived alpines, we always aim to establish a self-perpetuating colony such as with *Androsace mathildae* or *Primula scotica* on our troughs. Would that townsendias were as accommodating, they have to be helped along. A primula which has definitely overstepped the mark is *Primula denticulata*. We started many years ago with three lots of seed from the exchange, "type", "alba" and "cashmirica". The white plants gradually faded away, but we now have dozens of self-sowns in all colours from typical lilac to rich purple. Many can be left in situ, and, as with monocarpic rosette meconopsis, usually become more vigorous specimens than if transplanted from the nursery. Others, however, perhaps too close to a more delicate plant, have had to be removed. This operation requires care and a fork as *P. denticulata*, like docks and dandelions, grows from root cuttings.

Another plant whose seedlings are equally difficult to remove is *Bulbinella hookeri*, so much so that we now carefully collect all the seed before it sheds. In this case, it is quite easy to remove all the seed from the upright

spikes. Across the garden, it is quite a different matter in another bed where two trilliums, *T. erectum* and *T. grandiflorum*, have become weeds. Their clumps produce seedpods at various heights, those of the shorter stems within the clump being difficult to spot and intercept before they scatter their seed. It is hard to imagine a trillium being a weed, but we do not want an entire bed of these two vigorous species only. Yet another monocot which can become too much of a good thing is *Scilla siberica*. We started this with the traditional dozen bulbs of "Spring Beauty" from a bulb merchant, and now have a continuous carpet of brilliant blue about 2 × 1m. Although they are seeding freely, there is almost no variation in colour. Within this area they are welcome to proliferate, but when seedlings appear on the opposite side of the drive amongst the *Crocus chrysanthus*, we remove them lest they eventually overpower the latter. The crocus also have their own bounds, where they give us many beautiful variations, including some pure white ones, from the original three cultivars we bought.

Bulbs can, of course, also become a nuisance by excessive vegetative spread; certain alliums and muscari are notorious in this respect. We touched on a similar self-inflicted problem we have with notholirions in our last column, having unwittingly spread their bulblets when re-using old potting compost as a top-dressing. Beautiful they may be, but there are places where their four-foot flower spikes are not welcome, and we do indeed try to weed them out. Perhaps readers may have similar tales to tell of surprising exotic weeds; if so we would like very much to hear from you!
P.S. – Poll has just discovered a similar potential problem from the same part of the world in a pot of *Arisaema jaquemontii*. Its old compost has been consigned to a bare area under a *Chamaecyparis lawsoniana* "Columnaris" by our boundary fence. It'll probably love it!

Two from Alaska – thank you, Mrs Strutz!
Although both plants we wish to describe, *Arnica frigida* and *Veronica grandiflora*, are members of very widespread genera, we feel they both have that certain something, common to many species of higher latitudes. Often of small stature with relatively larger flowers than their counterparts of softer climes, they also frequently possess a clarity of colour all their own.

Like *Gentiana glauca* we described in our column for January 1984 (No.73, p.318), these two species were on our wanted list after we saw their photographs in the Alaska-Yukon Wildflower Guide. Seed of both was contributed by Mrs Strutz of Anchorage to the 1982 ARGS exchange. Naturally we jumped at the chance, especially as the photograph of the veronica was attributed to the lady herself. We had not expected this species to be so easy to come by, as it is found only in the Western Aleutian

Islands and southern Kamchatka, but must be established in her garden. *Arnica frigida*, on the other hand, is found throughout Alaska and extends both into north-west Canada and across the Bering Strait.

We treated both as scree plants, sowing on a mixture containing 50% chippings, and they germinated around the same time in April 1982. Potted up singly later that summer, they were planted out in our troughs the following spring, but neither flowered until the next season, i.e. 1984. They have repeated the performance each year subsequently and, although spreading very gently, have remained in context with their surroundings.

Veronica grandiflora is closely related to one of the common European alpine species, *V. aphylla*, for which Farrer has scant regard, but is very much the superior plant. From a gently running rhizome arise tufts of noticeably hairy ovate leaves up to 2.5cm long. From the larger tufts arise short stems of about 5cm each carrying several of the typical flowers of the genus, but of a size and colour we have not seen on any other dwarf veronica. They were almost 1.5cm across, and of a very rich, deep blue. We were reminded of an omphalogramma in miniature, but without the latter's texture and light reflection qualities.

Arnica frigida is a smaller and quieter relation of the well-known golden *Arnica montana* of the European Alps. This latter is one of our "old friends" (see Journal 79, p.145) which we originally raised from the SRGC exchange many years ago, and met again behind our campsite on Mt. Cenis. Farrer seems to have had trouble growing it, but we find it asks for little other than the protection of its emerging young growths from slugs; and it indicates its appreciation of the Highlands by self-sowing mildly. If *Arnica montana* has a fault, in common with several of the other yellow alpine composites, it lies in being a little too gross, up to 45cm here in fairly poor, stoney soil. No such accusation could be levelled at *Arnica frigida* which carries its deep lemon-yellow daisies singly on stems of only 10cm. The leaves are in proportion and have a noticeable red, hairy edge when young.

Arnica frigida is stated by Hulten's "Flora of Alaska" to be a variable plant, so when Mrs Strutz again sent seed to the 1985 ARGS exchange, this time wild collected, we requested it once again. The resulting plants were very slightly larger, the flowers are less nodding and of a more medium yellow, but of the same quality.

There is no doubting the almost universal appeal of the ray-floreted composites; there can be few people who did not draw daisies as a child. We feel that the Alpine Asteraceae, as they are now properly called, could be the next fashion. Many are native to the Rocky Mountains and were given a boost by the splendidly illustrated report of the 1986 Conference held in Boulder, Colorado. Virtually all the world's mountains are home to beautiful daisies; in our experience, *Arnica frigida* can well stand comparison with most of them.

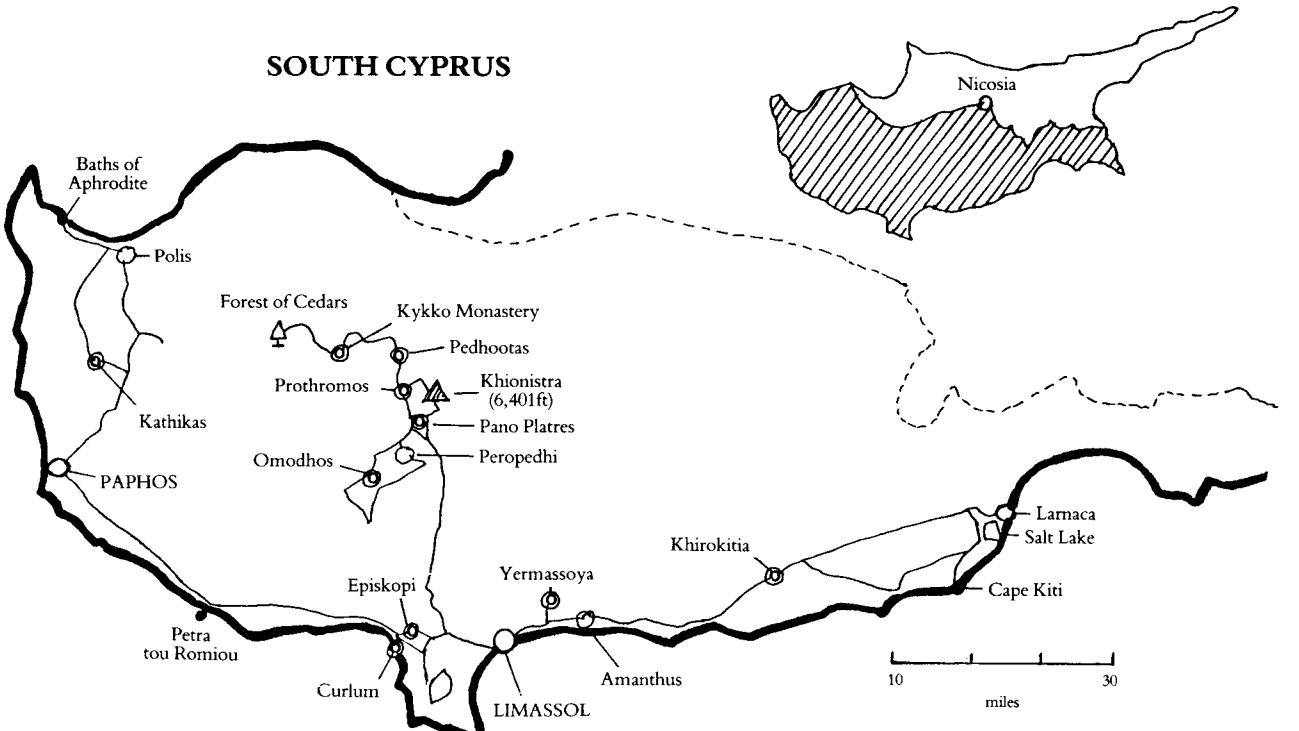
Spring in Cyprus – Part I: The South

CHRIS AND MARIE NORTH

CYPRUS is the third largest and most easterly of the Mediterranean islands. Thanks to its size and position it is host to a large number of endemic species, and is especially interesting to the plant hunter since the flora includes not only European elements but also several species which are common to the Middle East – especially Turkey, Syria and Lebanon. Indeed, the "Flora of Syria, Palestine and Sinai" by Post (1932) was, until recently, the most useful source of reference to identify many of the wild plants of Cyprus. It is now superseded for that purpose by the newly completed "Flora of Cyprus" by Meikle (1977) and this work has been used as a reference to standardise the nomenclature of the species quoted here. Another publication which is well worth consulting before making a visit to the island is that by Holmboe (1914), a Norwegian, who gives a full account in English of the vegetation of the island, though his plant nomenclature and some of his place names are now rather confusingly out of date.

Like most of the other Mediterranean islands, Cyprus has had a very chequered political history. It is large enough to have been of interest as a strategic base since classical times, but was never sufficiently populated to be able to defend itself effectively against covetous neighbours. Consequently it has been occupied by many different peoples in the past, including the ancient Egyptians, who left behind the fruit bat and the locust, both of which can be seen there today. At present Cyprus is politically divided more or less equally into two sections; the south is governed by the Greek Cypriots and the north by the Turks. In both areas the people are friendly and well disposed to the British, but it is not easy to cross the border between the two divisions. We made two visits, one to the south in 1983 and one to the north in 1986.

The principal physical features of the island are the Troödos mountains in the south and the Kyrenia range in the north. The Troödos mountains are high, rounded peaks rising to over 1800m, lightly covered with trees and having substantial winter snowfalls so that drifts last well into April. The Kyrenia mountains form a narrow ridge mainly of hard limestone rocks some 80k long parallel to and near the north coast; although they rise to only 900m they are jagged and spectacular. Most of the area between these ranges is relatively flat, cultivated and botanically of less interest since herbicides have been used extensively; it is called Mesaoria. However,


SOUTH CYPRUS
Nicosia
Baths of Aphrodite
Polis
Forest of Cedars
Kykko Monastery
Pedhootas
Prothromos
Khionistra (6,401ft)
Pano Platres
Kathikas
Omodhos
Peropedhi
PAPHOS
Khirokitia
Larnaca
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Amanthus
10
30
miles

g 49 *Corydalis rutifolia* (see p. 271) C. North

g 50 *Phlox mesoleuca* (see p. 299) H. Esslemont

Fig 51 *Glaucidium palmatum 'Album'* (see p. 297) H. Esslem

Fig 52 *Verbascum 'Letitia'* (see p. 298) H. Esslem

there are exciting coastal areas with substantial rugged cliffs in the west and the south-west.

On April 15, 1983, we started our first visit to Cyprus, based initially on the south coast near the ruins of the ancient city of Amanthus, just east of Limassol. Amongst the ruins grew many plants that are typical of the island flora and we list them here in some detail. The main shrubs were:

Crataegus azarolus
Helichrysum conglobatum
Lycium sp.
Olea europaea
Phagnalon rupestre
Pistacia lentiscus
Sarcopoterium spinosum

Amongst them grew the following herbs and bulbous plants:

Anacamptis pyramidalis
Ajuga chamaepitys palaestrina
Allium neapolitanum
Asphodelus aestivus
Arisarum vulgare
Bellardia trixago
Chrysanthemum coronarium
Convolvulus althaeoides
Carlina involucrata cypria
Crupina crupinastrum
Clematis cirrhosa
Cyclamen persicum
Calendula arvensis
Lagoecia cuminoides
Mercurialis annua
Notobasis syriaca
Orlaya daucoidea
Ornithogalum narbonense
Orobanche ramosa
Poterium verrucosum
Pallenis spinosa
Plantago cretica
Papaver rhoeas
Reseda alba
Ranunculus asiaticus
Silene vulgaris
Silybum marianum
Trifolium stellatum
Tragopogon sinuatus
Tamus communis
Urginea maritima
Vicia hybrida
Oxalis pes-caprae

The lycium may be *L. schweinfurthii* – a small, spiny bush with tubular flowers which were creamy white in the specimens we saw but may be mauve in other forms. *Crataegus azarolus*, the azarole, is the common hawthorn of the island. It has rather large, showy, white flowers with a strong scent that is 'fishy' at a distance, and its fruits are large and yellow. It is a decorative species that is reasonably hardy in the British Isles but rarely cultivated here, though it has been grown as a crop plant for its fruits in the Mediterranean area. *Crupina crupinastrum* is a delicate centaurea-like plant with mauve flower-heads and much-divided leaves. Of course, *Cyclamen persicum* seemed to be a 'find', though in mid-April the flowers were nearly over. It grew mainly amongst piles of stones and in dry stone walls – presumably because it was relatively protected there from animals foraging for the corms.

Limassol itself did not seem very attractive, but a visit to the bus station is well worthwhile. The buses are 'Bedfords' with bodywork made, we were told, in Cyprus, The design is distinctly outmoded and they are well furnished with carefully-polished chrome plating. They have a jaunty, antique appearance so that any one of them would look in place leading a vintage car rally.

The South-West

Hiring a car, we drove some ten miles west out of Limassol to Episkopi. This is a residential area for British service personnel and their families and has homely touches such as notices to 'Acacia Avenue' and the Church of Scotland, so it seemed a little incongruous to see six griffon vultures circling overhead. As one might expect, Episkopi has well-kept gardens, but there were roadside weeds and amongst them grew the attractive *Convolvulus oleifolius*. This is a sub-shrub with narrow, silvery leaves and pink flowers. It is a somewhat variable species and the 'leggy' form here was probably the variety *deserti* which is confined to Cyprus and Libya.

A road south from Episkopi takes one to the peninsula of Akrotiri, where there are salt marshes. Here one can sometimes see flamingoes through the tall reeds and impenetrable local blackberry *Rubus sanctus*. Even more exciting, from our point of view, was a group of 16 vigorous spikes of orchids growing in a eucalyptus plantation nearby. They were the unusual form of the bee orchid *Ophrys apifera* var *bicolor*. We had hoped to see also *Orchis laxiflora*, recorded from marshes near here by Holmboe (1914), but were unable to find it – there has been extensive drainage of the area since his time..

Returning to Episkopi, we then drove farther westwards along the coast road to the site of Curium where classical ruins can be seen. Around the site grew the small *Allium subhirsutum* which normally has white flowers, but here they were a deep and attractive pink colour. *Ranunculus asiaticus* gave a fine show, mostly with white flowers. In addition, there were *Fagonia cretica*, *Muscari comosum*, *Limonium sinuatum*, *Linaria chalepensis*, *Thymelaea hirsuta*, *Parentucellia latifolia* and the endemic rock rose *Helianthemum obtusifolium* which is a rather tall-growing species with creamy yellow flowers. In the sand, on the beach nearby, grew the attractive *Centaurea aegiolophila* (syn *C. cretica*), a distinctive plant with a rosette of greyish leaves and stemless heads of mauve flowers. It may be the same as *C. raphanina* described by Polunin (1980).

A few miles west of Curium we came across a patch of typical, unspoiled local garrigue with several endemic and unusual plants. The shrubs there included:

Calicotome villosa *Juniperus phoenicea*

Cistus salvifolius
C. parviflorus
C. villosus creticus
Helianthemum obtusifolium
Fumana arabica
Lithodora hispidulum
Onosma fruticosum
Pistacia lentiscus
Sarcopoterium spinosum

Cistus parviflorus, one of the less common of the genus, is found only in the eastern Mediterranean region. It has grey foliage and small, bright-pink flowers. *Lithodora hispidula* ssp. *versicolor* (sometimes called *Lithospermum hispidulum*) is an unusual, but not very attractive, gromwell with long-tubed pinkish or mauve flowers. It is common all over the island, but otherwise found only in Turkey and Syria. *Onosma frutescens* is an endemic, shrubby, golden drop with small, bright-yellow flowers and a generally untidy appearance.

The best find amongst these shrubs was *Gladiolus triphyllus* – another distinct endemic. It is short-growing (usually 10-12cm) with large, pink flowers which look like, and smell like a freesia – a real beauty. The pyramidal orchid *Anacamptis pyramidalis* grew with it and was just coming into flower. Here we found the endemic *Allium cupanii* ssp. *cyprium* with purplish heads of small flowers which do not open into the usual star shape of most of the members of this genus.

Farther westwards along the coast, the road runs by impressive sea cliffs through a dry and eroded area and, near to a rock out to sea called Petra tou Romiou, is where Venus is reputed to have arrived in Cyprus from the sea. We looked in vain for Botticelli's vision, but saw nothing – it was cold and uninviting. Passing then through a cultivated area where there are orchards of almonds and some bananas, one arrives after 15 miles at Paphos. This is one of the island's main tourist areas and has some interesting classical ruins, for it was once the centre for the Venus cult. We saw no particularly unusual plants around here, but noted *Nigella damascena* and *Lupinus luteus*. The latter is not included in the flora by Meikle (1977) – it is probably an escape from agriculture.

Striking north-eastwards from Paphos towards Stroumbi, there was much common fennel, *Ferula communis*, by the roadside and patches of the distinct *Scabiosa prolifera*, a stocky annual with flat heads of pale yellow, typical scabious flowers – it is rather common in Cyprus and grows in a variety of habitats, but is found, otherwise, only in Turkey, Syria and Palestine. This area has a reputation for its orchids, and up a side road we saw *Anacamptis pyramidalis*, *Orchis italica* and one plant of the normal form of *Ophrys apifera*. There were several cistus and the yellow-flowered, endemic *Phlomis cypria* which resembles *P. fruticosa*.

Continuing along the road to Polis one can turn west to the coast of

Latsi where there was typical shore vegetation in the sand including:

Anthemis rigida
Centaurea aegiolophila
Medicago marina
Paronychia argentea

To the west of here is a well-watered cave called the Baths of Aphrodite, but it was still too cold and we saw nothing except for the fern *Adiantum capillaris-veneris* – Venus's tresses! Around here grew a particularly beautiful pale yellow form of *Ranunculus asiaticus*, *Salvia fruticosa* and *Cyclamen persicum*. The whole of this area is said to be especially good for orchids, including the rare *Orchis punctulata*, but we did not find much; perhaps we were too late in the year. We returned through the hills via Kathikas.

Back at Limassol, there is a chance to visit the reservoir of Yermassoyia. One takes a turning to the north, just east of the town. This is a cool, quiet spot which is well worth a visit. Around the reservoir the garrigue is so tall in places as to be near 'maquis', and amongst the bushes grew several orchids, especially *Orchis coriophora* and one specimen that looked like the closely-related *O. sancta*. Other interesting plants included *Allium cupanii*, *Arum dioscoridis*, *Ornithogalum narbonense* and the weedy little horseshoe vetch, *Hippocrepis unisiliquosa* which has such extraordinary pods.

The South-East

Driving eastwards from Limassol, through roads lined with giant fennel, and about halfway to Larnaca, there is a turning off to the left for the 7,000-year-old Stone Age village of Khirokita. This is certainly worth a visit from an archaeological point of view, but the only interesting plants we saw there were large rosettes of the mandrake *Mandragora officinarum* and the delicate *Legousia speculum-veneris*. Continuing to near Larnaca one comes to the Hala Sultan Tekke – a Mohammedan monastery. This is situated near a salt lake that is a well-known site for bird enthusiasts. The pine and eucalyptus plantations here are noted for their orchids, but many had finished flowering in April so that it was not possible to identify all the species we saw. However, *Orchis coriophora* ssp. *fragrans* grew in quantity with a variety of colour forms and *Ophrys scolopax* was still in bloom: Accompanying species included:

Bellardia trixago
Centaurium pulchellum
Crataegus azarolus
Ferula communis
Helianthemum obtusifolium
Helichrysum conglobatum
Lagoecia cuminoides
Phagnalon rupestre
Pallenis spinosa

We were somewhat taken aback to find the woods being used as a rubbish dump. There were scattered large piles of specialised discards and,

though old clothes were off-putting in such a setting, they were in no way so objectionable as the stinking piles of rotting sheep's heads.

Towards the salt marshes *Orchis coriophora* grew in thousands and we saw *Asparagus stipularis* in flower – a rare sight. *Astericus aquaticus* also grew here together with *Ornithogalum narbonense* and more *Scabiosa prolifera*. On the way back to Limassol we followed the coast road and stopped at Cape Kiti. In short turf round the lighthouse grew *Atriplex halimus*, *Centaurea aegalophila*, *Limonium sinuatum*, *Notobasis syriaca*, *Plantago cretica*, *Trifolium tomentosum* and *Thymelaea hirsuta*. The Syrian thistle, *Notobasis*, seems to be the most common thistle on the island.

The Troödos Mountains

The second part of our visit to southern Cyprus was based at Pano Platres in the Troödos Mountains. We made our way there along the main road from Limassol. Stopping at the limestone area near Trimiklini, we saw many white *Ranunculus asiaticus*, *Orchis italica*, *Ophrys scolopax* and *Ophrys fusca*. There were a few locusts – just isolated individuals, for they did not form swarms here as in Africa. Approaching Pano Platres, amongst pinewoods and on the banks by the roadside grew hummocks of the attractive, thyme-like *Acinos troodii* (syn. *Saturea troodii* in Holmboe (1914)) and *Astragalus lusitanicus*. The latter has a curious distribution, being found in Portugal and then not seen until one comes to the Peloponnese and some Aegean islands, but it extends to Turkey, Syria and Lebanon. It is quite unlike most of the members of the genus, being tall with white flowers and inflated pods – at a distance it resembles a broad-bean plant. The form in the east, including Cyprus, is the sub-species *orientalis*. The pinewoods themselves contained *Platanthera chlorantha*, not yet in flower, and on the edges grew the tall bugle *Ajuga orientalis* with attractive hairy, purple upper leaves. A few days later in this area we saw large groups of *Paeonia mascula* growing in a thick carpet of needles under the pines accompanied by scattered plants of the prickly *Berberis cretica*. They were not in bloom, but covered with flower buds and would make a magnificent show later.

As soon as possible after reaching Platres, we drove to the top of Khionistra (Olympus) which rises to 1,900m. We soon came to appreciable snow drifts and under the pines grew some of the most charming and distinctive plants of the island:

Arabis purpurea
Corydalis rutifolia (Fig. 49, p.265)
Crocus cyprius
Ranunculus cadmicus var. *cyprius*
Telephium imperati ssp. *orientale*

These are endemics except for the corydalis and telephium, which are confined to Cyprus, Turkey and the Middle East. *Arabis purpurea* is just what it sounds like. The corydalis is a dwarf gem with pink flowers and bluish-green leaves. *Crocus cyprius* is a small, mauve-flowered species and the ranunculus a low-growing buttercup with glossy yellow flowers and purple-backed green leaves. At the highest point of this rounded granite mountain there is a radio listening post, and the trees here are mainly *Pinus nigra* ssp. *pallasiana* and the cupressus-like *Juniperus foetidissima* which forms substantial gnarled trunks. Somewhat lower down, below the main snow line, they are replaced by *Pinus brutia* with an undergrowth of *Arbutus andrachne* and the charming golden oak *Quercus alnifolia* – a small evergreen tree or large shrub which is special to Cyprus and has leaves with a golden brown, felted surface. We collected acorns that were lying on the surface, but none of them germinated – they lose their viability soon after shedding. The shorter shrubs in this association included *Cistus salvifolius* and *Cistus villosus creticus*. Amongst them we found the green-flowered form of the butterfly orchid, *Platanthera chlorantha* ssp. *holmboei*, which was once though to be confined to Cyprus but has now been recorded from Turkey and northern Syria. In these woods one could hear, and sometimes see, the cuckoo, hoopoe, scops owl, chuckar and alpine swift.

Not far from Pano Platres are the Caledonian Falls – a cool, much-sought-after picnic site in the heat of summer. Holmboe highlights this place as a centre for interesting plants, and we looked in vain for *Pinguicula crystallina*, *Laurentia minuta* and the giant helleborine *Epipactis veratrifolia*. However, there was a lot of *Arabis purpurea* on the rocks, and lower down the large-flowered celandine *Ranunculus ficaria* ssp. *ficariiformis* and the local dog violet *Viola sieheana*.

The forest of cedars is obviously one of the botanical highlights of the island. To get there we drove in a north-westerly direction out of Platres through Prodhromos, Pedhoulas and to the Kykko monastery. The road is not well signposted and the route is difficult to follow. In pinewoods near Prodhromos, with an undergrowth of *Quercus alnifolia*, there were hundreds of seedling colchicum plants and *Platanthera chlorantha* not quite in flower. Near Pedhoutas there are extensive cherry orchards, but in places the landscape is dry and desert-like. Here grew the striking blue and yellow bicolour vetch *Vicia lunata*, confined to Cyprus, Turkey and Syria, and the umbellifer *Smyrnium olusatrum*. The thrush nightingale sang in bushes nearby.

Kykko monastery offers welcome overnight accommodation and food for a 'donation'. From here there is an unsurfaced road to the cedar forest; it is rough and the journey of about eight miles can take up to an hour by

car. It passes through woodland which is mainly on acid rock and contains *Arbutus andrachne* amongst the pines. Here we were delighted to find the endemic *Orchis anatolica* var *troodii* which was near the end of its flowering season. It is more robust than the type form, which also occurs on the island, has green markings on the sepals and an upturned spur.

The cedars are *Cedrus brevifolia*, an endemic which is similar to, but less vigorous growing and with shorter needles than, the more impressive cedar of Lebanon, *Cedrus libani*. It was once widespread on the island but has been decimated for its timber, though serious attempts are now being made to replant it in reafforestation. The quiet remoteness of such a cedar forest is impressive. The trees are accompanied by *Pinus brutia*, which is similar to the widespread *P. halepensis* of the western Mediterranean and may be simply a sub-species. The ground under the trees was carpeted in places with the yellow stars of gagea – the species of this genus are very difficult to determine with any degree of certitude.

Another area we were able to visit before returning home was the high chalky and limestone hills to the south and south-west of Platres centred more or less around Omodhos. Coming south from Platres there is a green valley near Suittas where we saw:

Arabis purpurea
A. verna
Geranium purpureum
Lathyrus aphaca
Lithodora hispidula
Ruscus aculeatus
Vicia hybrida

Geranium purpureum is similar to our herb robert *G. robertianum*, but with smaller, and darker purple, flowers. Amongst these grew a number of interesting bulbous and tuberous-rooted species including:

Colchicum cupanii
Muscari comosum
Neotinea maculata
Ophrys sphegodes ssp. *sintenisii*

The last of these is closely allied to the ssp. *mammosa*, and experts do not seem to agree on the dividing lines between these two. We intend to call it *sintenisii* as it differed from the *mammosa* we had seen in Greece. Near Perapedhi there are typical chalk downs, and here we came across our first group of the giant orchid *Barlia robertiana* in Cyprus, though we saw it again several times later. Other interesting plants here included *Geranium tuberosum*, which is sometimes offered in dutch bulb catalogues, and *Tuberaria guttata*. By Trimiklini, in old vineyards, we came across the endemic *Onobrychis venosa*. This is a distinctive, sainfoin-like plant with interestingly marbled leaves and heads of straw-coloured, dark-veined flowers. Nearby grew the striking variegated-leaved form of *Lamium moschatum* that we saw later in quantity in north Cyprus. The Omodhos and

Mallia areas were good for orchids, and there were hundreds of *Ophrys sphegodes* ssp. *sintenisii* some 60cm tall and with 12 flowers to a spike. There were also *Ophrys carmeli*, *Ophrys lutea murbeckii*, *Orchis italica* and *Serapias vomeracea*. In a damp area grew *Orchis laxiflora* and round about *Anagyris foetida*, *Ferulago cypria* (endemic) and the uncommon *Ajuga chamaepitys* ssp. *palaestrina*.

By now we had come to the end of our stay and were reluctant to have to return, for there was still much to see in Cyprus. One difficulty facing anybody planning to go there to see the plants is at what time of the year to make the visit. Early February or March is the best time for the lowlands of the south, and April for the high Troödos Mountains where spring is later and the snow just melting. It is easy to get around in southern Cyprus. Nearly everybody speaks some English, driving is on the left-hand side of the road and feet, miles and gallons are still used for measurement.

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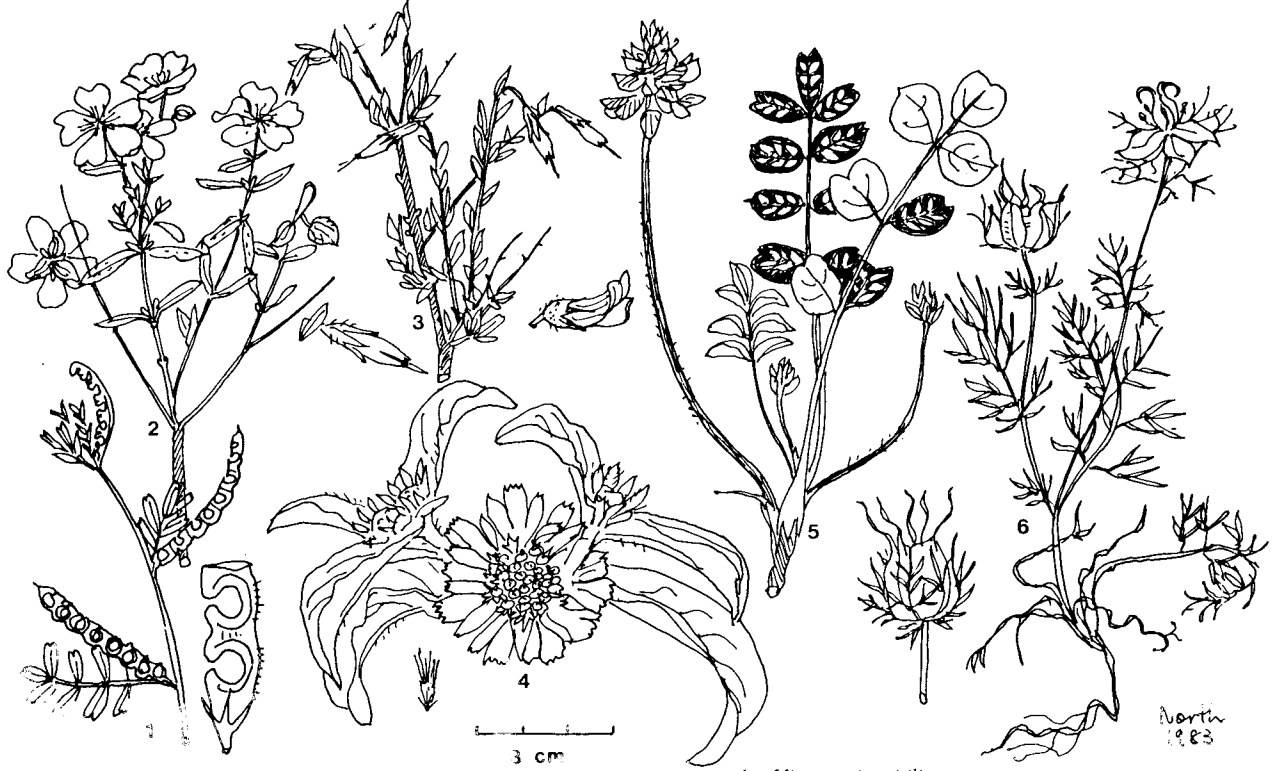
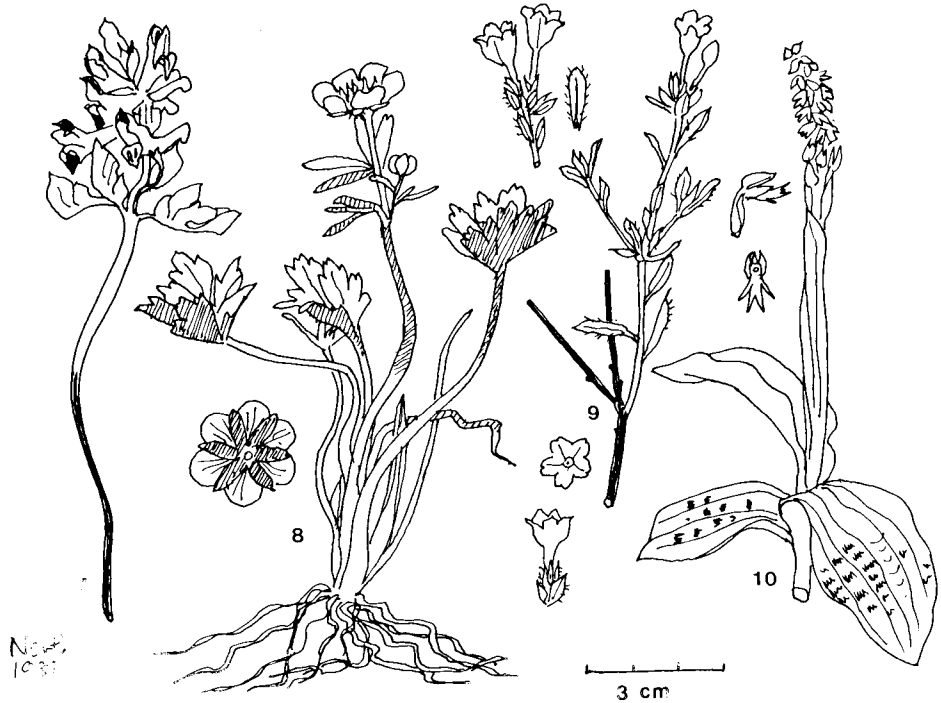


1 *Hippocrepis unisiliqua*
2 *Helianthemum obtusifolium*
3 *Onosma fruticosum*
4 *Scabiosa prolifera*
5 *Onobrychis venosa*
6 *Nigella damascena*



7 *Corydalis rutifolia*
8 *Ranunculus cadmicus* var. *cyprius*
9 *Lithodora hispidulum* ssp. *versicolor*
10 *Neotinea maculata*

Soils, composts and growing alpines Part I: Soil – Composition, structure and plant nutrients

EVELYN STEVENS

COMMON questions after lectures at Group meetings are of the type "What sort of compost did you use?" People are frequently confused about what plants require of the soil and composts in which they grow. I was very much in that position a few years ago when I was introduced to alpine gardening; the aim of this article is to shed light on a topic that is so important in the successful cultivation of alpines – and all other plants for that matter.

We grow alpines in various situations in our gardens – the open rock garden, raised beds, sinks and troughs and in pots kept in frames and alpine houses. In all these situations, important requirements for the majority of alpines are that the medium in which they are grown must be well drained with good aeration; it must also be water retentive, and it must be nutritious.

In the open rock garden, it is usually not feasible to completely alter the garden soil to meet these requirements if they are not naturally present, but various additives and procedures can be used to improve the soil for growing alpines. By growing them in smaller containers like pots, sinks and troughs, it becomes possible to prepare special composts to meet the individual requirements of plants.

The raw materials for making *soil-based composts are such materials as soil or loam, sand, grit and gravel, peat, garden compost, leaf-mould, leaf-litter, humus and manure. Again, people are often confused about exactly what these various materials are, so by describing the composition and structure of soils, I hope to clarify these problems. I also intend to outline what plants need from the soil or compost in which they grow and then consider how plants obtain these requirements from the soil. Applying the information outlined, I will then, in Part 2 of this article, attempt to describe how to improve soils for the open rock garden and to prepare composts suitable for growing alpines in smaller containers using the raw materials listed above.

*I shall confine mysef to considering soil and soil-based composts. Many people these days are using soil-less composts (based on peat) for growing alpines in pots, but the principles for successful cultivation are the same as for soil and soil-based composts.

Plants comprise two main systems, the shoot system and the root system. The shoot system typically encompasses the stems, leaves, flowers, and fruits – the parts that we gardeners admire and enjoy. But at our peril, or rather at the peril of our plants, do we ignore the roots. The root system is the part which mainly concerns me in this article. Typically it is the part which is hidden from view within the soil in which it grows.

Anchorage of plants by soil

Soil or compost has two main functions for plants. First, there is a physical function. Plants are firmly anchored to the soil by means of their widely spreading network of roots – it is worth taking a moment to reflect that plants do not move about as animals do, but remain stationary for the whole of their lives. Not only does soil provide anchorage for a plant, but there is also a very intimate contact between soil particles and the very delicate thin walls of the root-hairs or root tip regions (Diagrams 1a and b). This aspect is closely related to the next function.

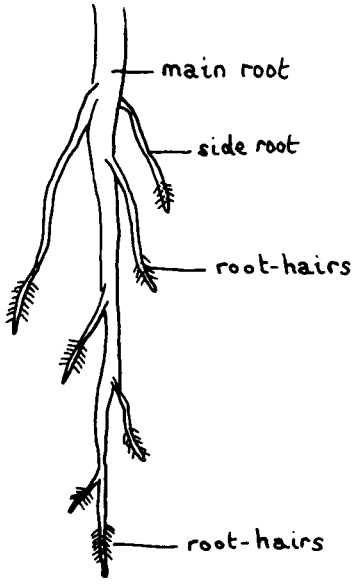


Diagram 1a *The location of root-hairs on roots.*

Nutritive function of soil

The second main function of the soil is a nutritive one. To maintain life, plants need chemical nutrients. These are the inorganic chemicals from the outside world which must be incorporated into the bodies of plants to provide the raw materials forming the building blocks for plant tissues and for the complex chains and networks of interrelated chemical reactions which are the essence of life processes and permit growth and development. Many of these nutrients are provided by the soil, and they gain access via the root-hairs.

N.B Only 50% of plants possess root-hairs. In the remaining 50%, the role of the root-hairs is performed by the newly-formed tip regions of the main or side roots as they grow out into the soil.

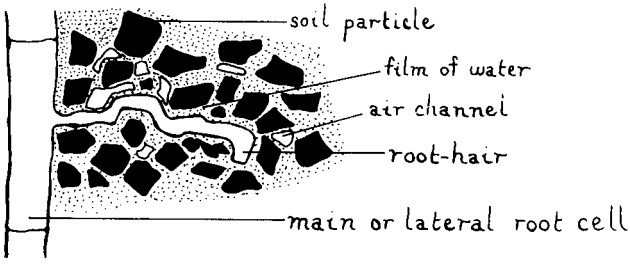


Diagram 1b *The intimate contact between a root-hair and soil particles.*

Groups of nutrients

The chemical elements which comprise the nutrients of plants may be divided into three groups on the basis of their abundance in plant tissues.

Group 1 – The four elements present in largest amounts in plant tissues are carbon (C), oxygen (O), hydrogen (H) and nitrogen (N). These elements form the major components of the organic compounds of living matter. Examples are proteins (including enzymes); carbohydrates (like starch and sugars and the cellulose of cell-walls of non-woody tissues), and lipids (an important component of cell membranes). Carbon, oxygen and hydrogen are also the elements which in combination are involved in the processes of photosynthesis and respiration.

Group 2 – (macro-nutrients) – This comprises elements occurring in plant tissues in significantly large amounts, but not in such large quantities as those in Group I. These macro-nutrients are potassium (K), phosphorus (P), sulphur (S), magnesium (Mg) and calcium (Ca). In general, there is a direct correlation between amounts of growth and the quantity of these macro-nutrients available to the plant.

Group 3 – (micro-nutrients or trace elements) – Certain other elements are also essential for full and successful plant growth, but they are only required in extremely small amounts. They include iron, manganese, boron, molybdenum, zinc and copper.

The soil is the provider of a large part of the nutrients required by plants. But before considering this, I will briefly describe the other source of nutrients. This is the air. From the air certain nutrients are taken into plants via the leaves in the important processes of photosynthesis and respiration.

Photosynthesis

During the process of photosynthesis, two compounds, carbon dioxide and water, are converted into carbohydrates (mainly sugars). The formation of carbohydrates requires energy in the form of sunlight which is absorbed by aid of chlorophyll in the leaves.

$$\text{carbon dioxide} + \text{water} \xrightarrow[\text{energy of sunlight}]{\text{chlorophyll}} \text{carbohydrate} + \text{oxygen}$$

Respiration

Respiration can be regarded as the reverse of photosynthesis. During respiration, the energy stored in the carbohydrates produced during photosynthesis is released in the form of chemical energy for use in other complex chemical reactions needed for growth and development. For this energy release, another nutrient, oxygen, is required. Part of this oxygen is also taken into plants via the stomata.

Apart from the acquisition of nutrients in gaseous form as just outlined, the source of all other nutrients is from the soil.

COMPOSITION OF SOIL

As the provider of all other nutrients the soil therefore has a very important role to play in the life and healthy growth of plants. How does it perform this function? I propose first to outline the composition of soil, and then to consider how plants derive their nutrients from it.

Both the physical character and chemical composition of soils are important from the point of view of plant growth. Most soils are predominantly mineral in character, being derived from the solid rocks of the earth's crust (parent rocks), with a relatively small, yet important, component of organic material (10 to 15% of the total volume). Some soils, in contrast, are predominantly organic in nature. Peat bogs are an example of an organic soil, being largely comprised of partly-decomposed plant remains, e.g., mosses, sedges.

Weathering of "parent rocks" to form soil

The mineral constituents of soils are formed by highly complex and lengthy processes of both physical and chemical weathering of parent rocks. An example of physical weathering is the scouring of solid rocks by glaciers to break off boulders which are then subsequently further broken down in rushing mountain streams by rubbing against other boulders to produce smaller boulders, pebbles and sand grains. Chemical weathering is brought about largely by chemical interactions of parent rock with water, in the absence, or in the presence of, carbon dioxide, and oxygen. As an example, chemical weathering is involved in the formation of clay.

By such physical and chemical means, the parent rocks are gradually converted into soils which overlay the solid rock to a depth ranging from the very limited cover of a few centimetres, as in many montane situations, to, at most, two or three metres elsewhere on the earth's surface. The nature of the soil in a given place very often bears little resemblance to the solid rock below. One reason for this is that, in the process of weathering, the parent material has been transported large distances by water, wind, ice, etc., from its site of origin, and another reason is the chemical transformation of parent rock to produce materials of a very different nature.

Soil texture

Soil is particulate in nature, and the basic particles vary greatly in size, shape, state of aggregation and chemical composition, and these variations have an important bearing on plant life. Soils are most often classified by soil scientists on the basis of particle size. The main particles comprising soil are categorised as gravel, coarse and fine sand, silt and clay:

Particle	*Size limit (diameter)*
Gravel and stones	more than 2.00mm
Coarse sand	2.00mm – 0.2mm
Fine sand	0.20mm – 0.02mm
Silt	0.02mm – 0.002mm
Clay	less than 0.002mm

N.B. – 2mm = about $\frac{1}{12}$ inch

On the basis of these particle sizes, soils are given textural designations. At one extreme is sand, which is soil containing at least 85% sand particles. At the other extreme is clay, which is defined as material that contains more than 40% clay, together with less than 45% sand and less than 40% silt.

A term frequently referred to in horticultural literature is loam. Often the term is either not defined, or variously defined. According to the soil scientist, loam is a soil intermediate between the extremes of sand and clay containing between 7 and 27% clay, 28 to 50% silt, and with less than 52% clay. It exhibits the properties of each fraction about equally.

In a horticultural context, loam is often regarded as the material that is produced when turves of grass are cut and stacked one on top of another and left until the leaves and roots of the grass have decomposed. Sometimes loam is taken to be a good soil, and such a soil approximates to the soil scientist's definition given above.

Air and water in soil

Two other inorganic constituents of mineral soils are air and water. The mineral components of a loam soil represent about 50% of its volume, organic substances contribute around 10-15%, and the remaining not inconsiderable volume is occupied by air and water.

Normally, both air and water occupy spaces in the soil, although in a saturated or water-logged soil air is excluded. The spaces form a complex system of channels radiating in all directions and of varying cross-sectional areas. The spaces or channels exist because the soil particles vary in size and shape, and thus, in packing together, leave spaces between them. The particles are of two types: (i) the basic particles already referred to, e.g. sand and clay particles, and (ii) aggregations of basic particles to form larger

units (called peds), which result from the tendency of finer soil particles, especially clay and humus (see later), to stick together (see Diagram 2). The formation of peds is said to give a soil structure. In a soil with good structure, peds are well developed. Peds may be composed of predominantly one type of basic particle, or, more usually, of a mix of the various sorts of particles. The channels between the basic particles are narrower in clay soils, made predominantly of small particles, than in sandy soils with a predominance of larger ones. The development of peds in a soil gives rise to wider channels (see Diagram 2).

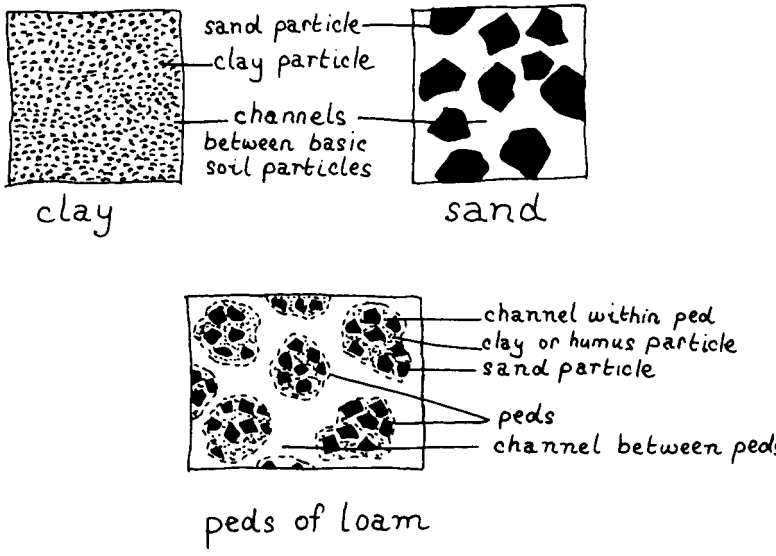


Diagram 2 *The relationship between basic soil particles (e.g. sand, clay, humus), peds (aggregations and basic particles) and channels (between and within the peds).*

Living organisms in soil

Two remaining groups of soil constituents remain to be described. One category is the living organisms which live within the soil, although they are not, strictly speaking, a part of the soil. These range from macro-organisms like the roots of living plants (which constitute most of the bulk of living organisms in soil), to animals such as earthworms, to a huge population of a variety of different species of microscopic micro-organisms (mainly the soil bacteria and fungi). Although very numerous in terms of numbers of individuals, because of their small size the micro-organisms do not constitute a large proportion of the bulk of soil volume (less than 1%).

Fig 53 *Primula gracilipes* (see p. 300) A. Jenkins

Fig 54 *Ranunculus seguieri* (see p. 334) A. Evans

Fig 55 *Ranunculus nivalis* (see p. 329) RBG, Edinburgh

ig 56 *Ranunculus pyrenaeus* (see p. 332) H. Taylor

ig 57 *Erythronium revolutum 'Johnsonii'* (see p. 253) H. Esslemont

Fig 58 *Ranunculus rupestris* (see p. 333) RBG, Edinburgh

Organic material in soil – humus, leaf-litter, leaf-mould, garden compost, manure, etc.

The last type of soil-constituent to be considered is the organic material. This is composed of the dead remains of plants, animals and micro-organisms. It varies widely from (i) undecomposed dead plants and animals, through (ii) partially decomposed material in which there is still visible evidence of the original sources, to (iii) humus which is the eventual end-product of the process of decomposition.

Humus is a very finely particulate material in which there is no macroscopic indication of the material from which it was derived. It is a complex of chemically very stable amorphous, dark-coloured substances. The particles of humus are so fine that they tend to coat the mineral particles of the soil (especially clay particles) like a coat of paint and so impart a dark colour to the soil. As little as 4–5% humus, on a weight basis, is all that is required to give a black colour to soil. Even though it is very stable chemically, it is eventually broken down still further, though this may take very many years.

Plant remains make by far the largest contribution to the "pool" of dead organic material. A term often used by gardeners is leaf-mould. There seems to be some confusion about its nature. Some people regard as leaf-mould partly decomposed leaves in which the structure of the leaves of origin is still apparent (category ii above). Other people would call this material leaf-litter, and restrict the term leaf-mould to the material lying beneath the leaf-litter on the floor of woodland in which no leaf structure remains apparent and which looks like very dark soil. With the latter definition, leaf-mould must be the same as humus or, at least, contain much of this material. In an average fertile loam such as a good agricultural soil, organic matter accounts for 10–15% of the volume of the soil.

For completeness it is worth pointing out that garden compost, as made by gardeners on a compost heap (and to be distinguished from compost prepared by mixing together a number of soil components for growing plants in pots, sinks and troughs, etc.) from kitchen vegetable waste and from garden refuse, consists very largely of decomposing organic material of plant origin. Similarly, manure consists of decomposing organic material of animal origin (i.e. the faeces and urine), together with straw and/or hay. The latter are a valuable component of manure in that they absorb the liquid parts of manure and reduce the amounts of these leached out.

HOW PLANTS OBTAIN NUTRIENTS FROM THE SOIL

Transpiration and water

All soil nutrients are taken up into plants via the very thin walls of the root-hairs or root-tip regions (Diagram 1) in dilute watery solutions. From the

root-hairs or root tips they are transported to where they are required in the larger roots and the aerial parts of the plant by a process called transpiration. In this process large amounts of water are continually passing through from the root-hairs or root tips via the conducting channels to the stomata on the leaves from which water is lost to the atmosphere in gaseous form.

Water is not merely a transporter of nutrients; it is also a nutrient itself. Already mentioned has been its role in photosynthesis. Water is involved chemically in many other life processes. It also comprises a very high percentage (around 90%) of the bulk of plant tissues, a fact that is emphasised by the wilting that occurs when water is withheld. This is due to loss of turgidity of individual plant cells.

Seeds form an interesting exception to this generalisation about the high water content of living matter. During their ripening, water is gradually withdrawn and the water content of ripe seeds is very low at around 5-15%. This very low water content results in a considerably reduced rate of metabolism, thereby making seeds an efficient means of tiding plants over adverse seasons of the year, until the advent of conditions suitable for germination and development.

Soil texture and structure, "drainage", water-retentiveness and aeration

The texture, structure and chemical composition of soils is determined by the proportions of sand, silt, clay and organic matter of which they are made. The texture and structure of soils are important for plants in their requirements for (i) water and (ii) the oxygen needed in the respiration of their roots. Chemical composition is important in their requirement for other nutrients.

Adequate water in the soil is vital for plant growth, and it is necessary that the soil is able to store water between periods of rain or between waterings by the gardener. The reason that soils can store water is that water adheres to the surface of soil particles (Diagram 3a). Sand particles, being larger, retain less water for a given volume of soil than do clay par-

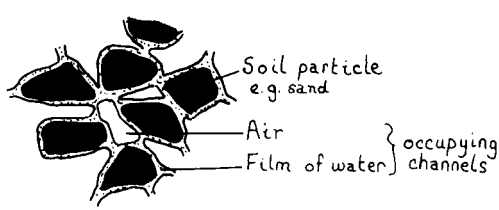


Diagram 3a *Unsaturated (non-water-logged) soil in which a film of water surrounds the basic soil particles, while air fills the remaining space.*

ticles, and they confer an open texture to a soil. Therefore after rain, water passes downwards rapidly. Such a soil is termed very well-drained, and is prone to drought.

Clay, on the other hand, consists of minute particles with abundant small channels between them; large amounts of water adhere tenaciously to the large surface area thus provided. Therefore clay soils have poor water permeability, and a clayey soil is prone to waterlogging (i.e. it is poorly drained).

For healthy plant growth, the channels in soil must provide not only water, but also oxygen, and this is another important aspect of the drainage properties of a soil. After heavy rain the spaces in a well-drained soil will be filled for a while with water; that is, the soil will be saturated (Diagram 3b). As water drains away, air will enter the soil from the atmosphere and air-spaces will develop within the channels, leaving a thin film of water adhering to the surface of the soil particles (Diagram 3a).

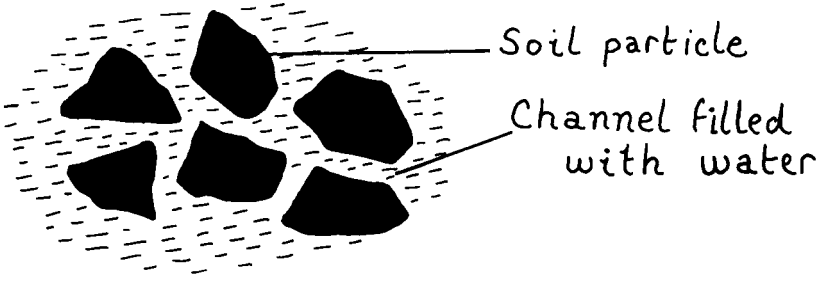


Diagram 3b *Saturated (water-logged) soil in which water completely fills the channels, so that air is excluded.*

This soil air must supply the oxygen required for the respiration of the roots. The oxygen from the air spaces becomes dissolved in the thin film of water that surrounds the root-hairs or root tips and from this film diffuses into the root-hairs or root tips (Diagram 1b). The oxygen taken up by the root-hairs or root tips is replaced from atmospheric air, with which it is in contact, through the system of channels which extend to the soil surface. This, incidentally, explains the need to prevent a caked surface forming on garden soil. Oxygen *can* diffuse through water, but does so 10,000 times more slowly than through air, so in water-logged soils or compost with poor drainage the health of plant roots is in danger of being impaired. Conversely, a well-drained compost or soil is well aerated with adequate oxygen for healthy root-systems. As a general rule it is desirable that the spaces or channels between soil particles should contain about two-thirds water and one-third air.

Organic material in a soil improves its water-retentiveness, drainage properties and structure. Water binds readily to organic material, so the addition of this to a soil enhances water retentiveness. Organic matter also improves the structure of sandy soils by inducing clumpiness to form peds. In clayey soils, the addition of bulky organic material tends to open them up, thereby improving drainage and aeration. Loam soils with their intermediate complements of clay and sand and the presence of some organic material are both reasonably water retentive and well-drained.

Organic material in the soil is not only beneficial to plant growth by improving the aeration and water-retentiveness of soils; it is also an important source of plant nutrients. The ease of access to plants of nutrient elements locked up in dead organic remains varies widely. As already explained, humus, the end-product of decomposition, is only very slowly further decomposed to release yet more nutrients. But, at earlier stages of decomposition, before dead remains are reduced to humus, more-available nutrients are released into the soil. Thus certain nutrients are available for plants from such materials as leaf-litter. Organic material also traps other soil nutrients (see later).

Nitrogen (N)

Organic material is vital for plant growth as it is the major source of nitrogen. This is the one nutrient that is most likely to be limiting.

Nitrogen is an important constituent of the proteins of living matter, and is largely obtained by plants from the protein constituents of dead animal, plant and microbial remains in the soil by means of a recycling process. These remains are for the most part composed of complex substances which do not simply gradually dissolve in soil water to become available for re-use by plants. Soil fauna, for example, earthworms, have an important role in the breakdown of organic material. They feed on it and, in the process, draw plant remains lying on the surface down into the soil, and break it down into smaller fragments. These are then available to the extensive micro-organism population of soil bacteria and fungi as the source of their food. One by-product of the feeding of micro-organisms is the release of nitrogen in soluble forms, most importantly as nitrates (NO_3) that can then be absorbed by the root-hairs or root tips of plants. Micro-organisms can also use dead material lying on the surface of the ground and are not necessarily dependent on earthworms and other animals for fragmenting dead remains.

There is one other relatively minor further source of nitrogen for plants. This is atmospheric nitrogen. Nitrogen is a large component of air (four-fifths), but in this gaseous form it is generally unavailable to plants. However, one family of plants, the Leguminosae (pea family), is able to use

atmospheric nitrogen in the following way. These plants possess swellings on their roots called root nodules. In these nodules lives a certain species of bacterium which is able to take up nitrogen from the atmosphere and this nitrogen is then available to the host plants.

A small amount of atmospheric nitrogen is also made available to plants as a result of electrical discharge during thunderstorms, which results in the production of soluble nitrates in the soil. This may be of greater significance in high montane habitats than in those of lower altitudes. In mountain habitats there are low densities of plants and animals and therefore little organic remains for recycling, but thunderstorms are a frequent occurrence.

Primary source of nutrient elements

Although plants obtain most of their nitrogen in a process of recycling dead organic remains in the soil as just explained, the primary source of nitrogen is the atmosphere, as is also the case with carbon, oxygen and hydrogen. In the case of all the other nutrients to be considered below, the primary source of these nutrients are the minerals of the earth's crust, i.e. the parent rocks which give rise to soils.

These nutrients are the Group 2 elements (the macro-nutrients) and the Group 3 elements (micro-nutrients or trace elements) listed earlier. But before discussing each of these nutrients individually, I will discuss in general the mechanisms by which nutrients are acquired by plants from the soil in which they grow.

Nutrients in simple solution, and involved in ion-exchange systems

The proportions of sand, clay and organic material in a soil affect its nutrient status for plants. Sand is chemically inert, and therefore predominantly sandy soils are deficient in plant nutrients. Clay and organic material, on the other hand, raise the nutrient status of soil. They do this in two main ways. Firstly, many nutrient elements form an integral part of the chemical composition of clay or organic material. An example of this has already been cited in the case of nitrogen in organic material.

A second way by which clay and organic material is involved with providing plant nutrients is by trapping the nutrient elements. Plant nutrients usually occur in soil in an electrically charged form, i.e. as ions. The ions may be positively or negatively charged (e.g. $K+$ CO_3-). These ions occur in one of three states, of decreasing availability to plants. These states are: (i) ions in simple solution, (ii) exchangeable ions and (iii) non-exchangeable ions. Some nutrients occur in soil predominantly in simple solution, others predominantly as exchangeable ions. Often the acidity or alkalinity (pH) of the soil, or the presence of certain other chemicals in a

particular soil, or yet other factors, influence whether a given nutrient ion occurs mainly in states (i), (ii) or (iii).

Most readily available for uptake into root-hairs or root tips are ions which occur in simple solution in water. These ions move through the soil-water by the process of diffusion. In this process, the ions move down a concentration gradient from areas of higher concentration of the ions to areas of lower concentration. The area of lower concentration may be the surfaces of root-hairs, the low concentrations of ions here being due to their removal from solution by their uptake into the root-hairs by absorption.

Less available to root-hairs or root tips are the exchangeable ions; these are involved in ion-exchange systems. The ions are bound by electrical forces to ions of opposite charge which occur on the surfaces of particles of both clay or organic material. The bound ions are said to be adsorbed onto the ion-exchange sites of the clay or organic particle. The ions of the exchange-sites are more or less fixed, i.e they are part of the structure of the particles. By thus attracting nutrient ions, and holding onto them by relatively weak forces, both clay and organic particles confer nutrient benefit to soils. This is because the trapping of nutrients prevents them from being leached (that is, removed in solution to lower levels of the soil as rainwater drains downwards to the lower levels) from the soil. The electrical forces between a given nutrient ion (e.g. K+) and that on a clay or organic particle are fairly readily broken by exchanging the ion in question for an ion of similar charge, but of a different element, thus releasing the nutrient ion into free solution. This ion thus replaces one that has been taken up by a plant root-hair or has been leached out of the soil. By this process of ion exchange, a balance is maintained between a given type of ion (e.g. K+) in free solution relative to that which is bound.

The least available nutrient ions are the non-exchangeable ions. These are ions that are firmly bound into the molecular structure of clay or organic particles, and they are only released very slowly as a result of such agencies as gradual weathering to replace exchangeable ions as the soil is depleted of the latter. Thus an equilibrium exists in soils between ions in simple solution, exchangeable ions and non-exchangeable ions.

It will be recalled that the macro-nutrients are the elements required in significantly large amounts, such that on the whole there is a direct relationship between the amount of plant growth and the quantity of macro-nutrient available. The first two macro-nutrients I will discuss are phosphorus (P) and potassium (K). These two nutrients, together with nitrogen (N), are the main constituents of the general purpose, "complete" fertilisers used by farmers, horticulturists and gardeners. Deficiencies in these three elements are the ones most commonly responsible for the failure to produce maximum or optimum growth of plants and crops.

Phosphorus (P)

Phosphorus is an important plant nutrient, being distributed in every part of plant tissue. It is vital for essential biochemical processes for maintaining life and for growth and development, and becomes most concentrated in the plant's reproductive parts. A seed must contain enough phosphorus and other vital nutrients to suffice until roots are formed to obtain a supply from the soil.

Most soils contain large amounts of phosphorus, both within organic material and associated with clay. In the latter, phosphorus occurs both as a constituent of clay itself and also, derived from other sources, adsorbed onto the surface of clay particles. Nevertheless, phosphorus is commonly a limiting nutrient because most of it is bound strongly both within the organic material and to clay particles (i.e. state (iii) in the previous section) with the result that it is very insoluble and thus largely unavailable to plants. On the other hand, plants can make satisfactory growth with a very small concentration of phosphorus in solution in the soil as long as that concentration is maintained.

The ways in which phosphorus is steadily solubilised and thus made available to plants is both complex and poorly understood. Factors involved include (i) the acidity or alkalinity (pH) of the soil (a pH of near neutral or slightly acid is most favourable for phosphorus availability) and (ii) the digestive activity of micro-organisms which use both organic and mineral sources of phosphorus thereby releasing soluble phosphorus in excess of their own requirements.

The application to soils of soluble phosphorus in fertilisers is fraught with problems, one reason being that much of it is wasted as phosphorus is readily fixed, both by adsorption onto clay particles and by competition from micro-organisms which also require phosphorus.

Potassium (K)

Potassium is the third of the plant nutrients that is likely to limit plant growth and which is therefore a component of general purpose fertilisers.

Potassium is widely distributed in plant tissues. It helps in the uptake of other nutrients and their movement within the plant. It is also involved in maintaining the turgidity of plant cells and it is used in various metabolic processes. Unlike phosphorus, it is not tightly bound within plant tissues, but occurs in solution. Therefore it is readily leached out of dead organic material and is thus immediately available from this source for recycling.

Potassium occurs in soil in the three forms mentioned above, i.e. in simple solution, as exchangeable ions and as non-exchangeable ions. Potassium in solution is the form most readily available to plants – by the mechanism of diffusion already referred to. But much of the potassium in

soil is lost from solution by becoming adsorbed onto the surfaces of clay particles and organic matter. Unlike phosphorus, however, the adsorption or binding is not very strong, and this exchangeable potassium is therefore fairly readily removable. In this case the potassium is obtained by the root-hairs or root tips growing and extending their length until they reach as far as the particles to which it is bound (Diagram 4). Non-exchangeable potassium occurs widely in a number of soil minerals, and it is gradually released from these as a result of weathering processes to become exchangeable potassium.

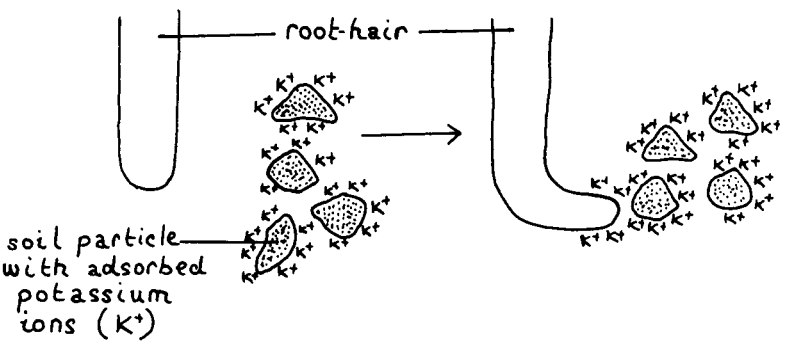


Diagram 4 *Growth of root-hairs towards potassium ions (K+) adsorbed on clay and humus particles.*

Calcium (Ca), magnesium (Mg) and sulphur (S)

The remaining three macro-nutrients to consider are calcium, magnesium and sulphur. These are abundant elements and are usually present in large enough amounts to meet the needs of plants. Also, they are usually present in nitrogen, phosphorus and potassium fertilisers, and as a result it is not usually necessary to worry about deficiencies of these nutrients when applying fertilisers.

Calcium is abundant in calcium minerals like calcite (calcium carbonate), and it is widely distributed in clay minerals. Some calcium occurs in soils in simple solution and is thus readily available for uptake by root-hairs, while large amounts are adsorbed on exchangeable ion-exchange sites of both clays and humus. Some calcium also occurs firmly bound within humus. Calcium is a structural component of the cell walls of plants, and a shortage of calcium results in restricted growth of stems, roots and leaves.

Magnesium is abundant in clay and silt, and most of the magnesium available to plants is exchangeable magnesium ions, bound to ion-exchange sites, rather than in free solution. Magnesium is vital to the production of

chlorophyll, which in turn is vital for photosynthesis. Magnesium also occurs in seeds in higher concentrations than elsewhere in plant tissues.

The primary source of sulphur, as with the other nutrients I have just been considering, is the soil parent materials, but most of the sulphur is soils occurs firmly bound within organic material of plant and animal origin, in a way similar to nitrogen. Some sulphur, in the form of sulphate ions, occurs in simple solution in soil water or is bound to ion exchange sites on clay or humus. These sulphate ions are available to plants, but the supply is usually small. It is replenished as a result of decomposition by micro-organisms of dead plant, animal and microbial remains.

Sulphur is needed by plants as it is a vital part of all plant proteins and of some plant hormones. Plants use approximately as much sulphur as they do phosphorus, while nitrogen requirements are four to ten times larger.

Micro-nutrients

The micro-nutrient elements have already been listed earlier in this article (Group 3 nutrients). A micro-nutrient is an element that is essential for plants to complete their life-cycles but is only needed in tiny amounts.

As the micro-nutrients are only required in such small amounts, the likelihood of deficiencies occurring in soils and soil-based composts is less than for the macro-nutrients. The micro-nutrients occur widely in soils, some being more concentrated in the organic component and some more abundant in the mineral component.

The micro-nutrient elements are often present in fertilisers as minor impurities. This situation occurs to a lesser extent now than previously. This is because manufacturers market fertilisers with higher analyses of the principal fertiliser elements and less of contaminants, and thus there has been created the greater need to be aware of micro-nutrients. Certain fertilisers, e.g. Vitax Q4, have intentionally-added micro-nutrients in carefully balanced amounts. Care must be taken with the use of micro-nutrient fertilisers as some micro-nutrient elements, e.g. boron and manganese, are toxic to plants if present in too large quantities in the soil or compost.

Micro-nutrients are not one of the building-block nutrients like, for example, nitrogen, oxygen and phosphorus. Most of the micro-nutrients either form an integral part of the structure of certain proteins called enzymes, or are concerned with the activation of enzymes. Enzymes are proteins which catalyse the essential chemical reactions of living processes. Their function is to accelerate chemical reactions in living organisms, but they themselves remain unchanged at the end of the reactions. They are thus available for further catalytic action, and are therefore not needed in large amounts. Several of the micro-nutrients, i.e. copper, iron, manganese and zinc, are required in the production of chlorophyll. Molyb-

denum and zinc are involved in protein metabolism.

I have attempted to outline the theory behind the art and practice of improving ordinary garden soil for growing alpines in the open garden and also the preparation of soil-based composts for growing alpines in the confines of such containers as pots, troughs and sinks. In Part 2 of this article, I will endeavour to outline the application of this theory to the situations just mentioned.

Twice-yearly competition 1987 – Drawings, paintings & photographs

Prize-winners at Stirling 28 March (subject: Gentiana) were:

Colour photographs
1st Prize – Mr Peter Mackie – G. *sino-ornata*; Highly Commended – Mr Peter Mackie – G. *sino-ornata*; Mr Sandy MacLeod – G. *acaulis*; Mr Anthony Kemp – G. *brachyphylla*; Dr V. Davies – G. *bavarica imbricata*.

Paintings
1st Prize – Mr Duncan Lowe – G. *depressa*; Highly Commended – Mrs M. Gillison Todd – G. *verna*.

Pen and Ink
1st Prize – Mrs Heather Salzen – G. *depressa*.

Plant Portraits

Glaucidium palmatum 'Album'

John Good

This plant is, quite simply, one of the most stunningly beautiful available for shady and moist places in the garden. When its large, waxy, poppy-like flowers (Fig. 51, p.266) unfold above the bright-green, net-veined foliage, revealing a boss of lemon stamens, even hardened plantsmen gasp in admiration. It is one of those plants, like its relative jeffersonia and the equally memorable double bloodroot, which one seeks out regularly each season as their flowering time approaches, eager to re-experience their brief season of splendour and anxious lest anything untoward should have happened to them in the dormant season to rob one of the pleasure.

Like sanguinaria, this is a firmly perennial rhizomatous plant which dies down completely in winter. The structure of its rhizome is much more dense and "rooty" than that of the bloodroot, however, being more like that of a hosta. Each of the buds on the rhizome gives rise to a single unbranched shoot bearing two or occasionally three leaves and in most cases a single flower. I have had shoots with two flowers, but this is unusual and generally only occurs following division and replanting in enriched soil. As the flowers are already formed in the autumn and lie but a few centimetres below the soil surface, it might be thought that they would be vulnerable to severe frost, but I have not found them so. They are, however, vulnerable to damage by underground invertebrates, particularly slugs, which do not so much destroy them as damage them to such an extent that the beauty of the full-blown flower is marred. Slug pellets scattered around the crown in autumn and spring may lessen the damage to some extent, but a liquid molluscicide is more likely to be effective since it will penetrate below ground to kill the slugs lurking in the heart of the plant.

Glaucidium is a monotypic genus which has been placed in various plant families at different times and by different taxonomists. It is now often referred to the rag-bag family Podophyllaceae, which was formed out of aberrant genera of the Berberidaceae and Ranunculaceae, but Ohwi in the "Flora of Japan" retains it in the Ranunculaceae. The type plant, which has pale lilac flowers and is itself very beautiful both in the normal form and the reduced form known as 'Compactum', is of restricted distribution in Japan, having apparently been reported only from the islands of

Honshu, Hokkaido, Hondo and Yezo. It frequents open woodland on high mountain slopes. This habitat gives good guidance to its requirements in cultivation – cool shade and a humus-rich soil which never dries out. It looks very well among dwarf rhododendrons and the like towards the back of a peat bed. It is particularly suited to the climate of the north and west of Britain, generally being considered hard to please in the south-east.

Propagation by division of the rhizome as growth starts in spring is easy and for the amateur who is fortunate to possess a plant will probably provide sufficient means of increase. Unfortunately, however, growth of the rhizome is very slow, so that for the commercial propagator there is never enough material to build up a good stock. This would not matter much if the seed, which is freely set on white as on violet-flowered plants, came true. Unfortunately it does not, and Jack Drake reported (Journal RHS 1961, vol. 86, p. 304) that 300+ seeds obtained from white plants yielded only two white seedlings. It is not surprising, therefore, that this lovely plant, wanted by all who see it, remains rare and is hardly ever offered in trade catalogues. That does not necessarily mean, however, that it is unobtainable, but rather that it is only ever likely to be available in small numbers and that you should ask for it specifically when placing orders for more easily available plants.

Verbascum x 'Letitia'

Will Ingwersen

There can be no doubt that many potentially valuable plants have been lost when tidy-minded gardeners destroy what they think to be weed seedlings. We have good reason to be grateful for the watchful eyes of the late Ken Aslet when he was in charge of the rock garden department at Wisley.

He observed growing in the shingle between pans of *V. spinosum* and *V. dumulosum* in the alpine house, a seedling which he carefully lifted and grew on. It turned out to be a hybrid between these two species and has now become a deservedly popular plant (Fig.52, p.266).

The upright, woody stems branch from ground level and attain a height of 30cm or more. They carry attractive, lobed, velvety grey leaves. The tip of each stem and branchlet carries a short, dense raceme of 2-3cm wide flowers. The petals are clear yellow and the base of each one carries a brown blotch at the base.

It blossoms for a prolonged period throughout the summer and is a splendid sight when grown as a specimen in the alpine house, and can also be grown in a sunny position in the open as long as it is assured of good drainage and a gritty but humus-rich soil.

Phlox mesoleuca (syn. **P. nana var. ensifolia)**

John Good

What's in a name? Unfortunately quite a lot where the phloxes of the Nanae subsection of subgenus Protophlox are concerned. The plant illustrated (Fig. 50, p.265) has been grown and shown as *Phlox mesoleuca* (which is almost certainly the correct epithet), *P. triovulata*, *P. nana* and, most frequently, *P. nana* var. *ensifolia* (or simply *P. nana ensifolia*).

Why and how has the confusion arisen? In an excellent article in the AGS Bulletin for June 1978 (vol. 46, pp. 163-167), the late Professor Paul Maslin provides a considerable part of the answer.

The problem arose chiefly because two extremely similar, but nevertheless apparently distinct species occur in the same area around Santa Fe, New Mexico, the type locality of *P. nana*. These are *P. nana* itself and *P. mesoleuca*. *P. nana* characteristically has a woody tap root topped by a short, perennial, woody stem which annually bears deciduous leaf and flower shoots. *P. mesoleuca*, on the other hand, has a more divided and less woody root system and, most importantly, woody rhizomes instead of a central woody stem. This rhizomatous character results in *P. mesoleuca* being a much more prostrate, rambling plant and also renders it easier to propagate since rooted pieces of rhizome can be detached from the plant. The flowers of the two species are very similar, which probably accounts as much as anything for the confusion, but when the two plants are held side by side the differences between them are very apparent.

Whatever the nomenclatural problems, *P. mesoleuca*, as we should now call it, is an excellent and much sought after plant. One of its greatest virtues is its extremely long flowering season; from April to October in a normal season, and the fact that there are usually sufficient blooms open at any one time to give a good show. The colour of the flowers is a good clear pink set off perfectly by the chocolate eye with its radiating white corona.

Phlox mesoleuca is one of that relatively small band of alpine plants which seem to grow better in a pot under cover than in the open ground, at least in Britain. Perhaps this is not surprising when we realise that in nature it grows in poor gravelly soils in barren or rocky areas where summer rainfall is very meagre. Certainly in my experience it grows best if watered sparingly at all times of the year, even when in active growth. As the habitat suggests, really good drainage is essential for success whether in the open garden or a pot. I have a specimen of *P. nana* (an upright form grown from ARGS seed) which has been in the same 20cm pot for five years now. It receives no special treatment except the removal of the previous season's dead stems in February and an occasional weak liquid feed of a balanced fertiliser during the growing season. I lift the pot from the

plunge occasionally to prevent the roots spreading as far and wide as they would otherwise do, and this appears to have no adverse effect whatsoever.

If you wish to try *P. mesoleuca* in the open ground, I would recommend either a lean scree in full sun or a trough containing a well-drained compost. You are unlikely to lose the plant through frost, but a pane of glass or some other cover in winter will protect it from excess wet and perhaps improve flowering performance the following year. If it rambles too far from its allotted home it can be pruned hard back in spring just as growth starts.

As I have already hinted, division of rooted rhizomes is the usual method of propagation. If the rhizomes are not seen to be producing roots *in situ*, cut some off, chop them into short pieces each with a couple of "eyes" and treat them as root cuttings, inserting them apex uppermost in a shallow tray of very sandy compost with the apex at soil level. Stem cuttings are usually considered to be difficult to root, but some growers have reported good strikes of young shoots taken early in the season, so it is worth experimenting. I have never had seed set on my single plants, but neither did Paul Maslin until he grew several seedlings of wild origin together when they all set seed. Clearly cross-pollination is essential. If you do manage to obtain seed, either from your own plants or from the exchanges, sow it as soon as possible and place it in a warm place. Maslin found that at 20°C seed of *P. nana* gave 100% germination in seven days, so clearly chilling is unnecessary for that species and probably also for *P. mesoleuca*. From seed sown in October he produced plants of a size for planting out by May the following year. One of these produced a few flowers the same July and most flowered the following spring, so you will not have long to wait before the first of many seasons graced by this beautiful plant is upon you.

Primula gracilipes

Joel B. Smith

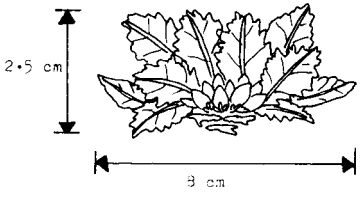
After my last article, on the general cultivation of Asiatic Primulas, this article deals with *Primula gracilipes*, in greater detail (Fig. 53, p.283).

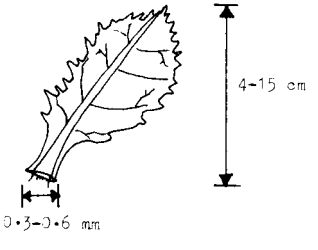
P. gracilipes belongs to a section of Asiatic Primulas called petiolarids, subsection *Petiolaris sonchifolia* and specifically Group Vera.

In the wild, the plant is found from Nepal and Sikkim to Bhutan and Southern Tibet, from 13,000-16,500 feet (4,000-5,000m) above sea-level, growing in the temperate climate. The species was first discovered in 1834.

The tight winter-rosettes unfold to reveal the pointed buds, as early as November. The foliage is arranged in whorls, around the blooms and sprouts from a dwarf rhizome. The lamina is oblanceolate/obovate in


Joel Smith 3/3/87


2·5 cm
8 cm


4-15 cm
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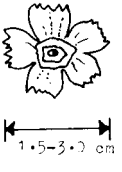
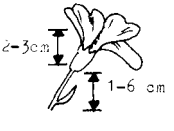

1·5-3·0 cm


2-3cm
1-6 cm

shape, rounded at the end, with irregular toothing and is borne on a winged petiole. The central ring of leaves and buds are dusted lightly, with a covering of farina. After flowering and fruiting, the leaves elongate and the rosette becomes looser. The small buds enlarge and unfold in April, to reveal rich, rosy-pink blooms, with yellow eyes, surrounded by a narrow, white zone. The flowers are highly variable and may be rose coloured with rounded petals, or lilac and deeply toothed.

There are several hybrids and varieties of *P. gracilipes*, including 'Major', with pink flowers and mustard-yellow eyes; 'Minor', a compact, floriferous hybrid between *P. gracilipes* and *P. petiolaris*, and 'Sheriff's', a deep-pink form.

The species seems amenable to cultivation in a mixture of brown peat and gravel, in a peat garden, topped with a layer of forest bark, to act as an insulation from frost, minimise weed germination and provide an attractive setting. *P. gracilipes* requires plenty of moisture in the summer, but very little in the winter months. The plant is protected by a glass/aluminium cold frame from September to May, to protect the plant and foliar farina from rain, cold winds. A cool, shady site in a north or east-facing direction is ideal.

Problems include: rot from overwatering; withered, browned foliage from frost; irregular holes in the leaves from vine weevils; holes in the blooms from birds or slugs, and yellow patches (chlorosis) may be caused by mineral deficiency, often the compost is lacking in iron or magnesium.

Plants can also be potted up and placed in a greenhouse for the winter, if ventilation is good and the plant is topped with grit, so blooms may be viewed with greater ease.

Propagation can be achieved by division of the mature plant, after flowering every few years, as crowns multiply rapidly in good growing conditions. Root cuttings can be attempted or leaf cuttings, which are more successful. A leaf cutting can be taken, by holding the petiole and pulling the leaf downwards and inserting it into a sandy compost, in a propagator for 3–6 weeks, after which a leaf bud develops from the base of the petiole.

Seed is another rewarding method, provided the seed is sown whilst green, which means removing the seed capsule, before ripening. The seed should then be sown in a pan of seed compost, with a light covering of granite chippings. There is some dispute whether the seeds need a period of cold to germinate, but it is advisable to sow the seed in summer as a precaution.

This species is widely available from alpine shows in the spring and Primula specialists and is not expensive, compared with other Petiolarids, from £1.50 to £2.00, depending on the size of crown or quality of bloom.

Fig 59 *Tulipa cypria* (see p. 343) C. North

Fig 60 *Ophrys kotschyi* (see p. 344)

C. No

Saxifraga x luteo-purpurea

Brian Arundel

(This note was written following the note in The Stone Column in June 1986)

Until quite recently, the *Saxifraga* x *luteo-purpurea* nothomorphs, discussed in the June issue of the Journal, were the only known examples of natural interbreeding between species of the Porophyllum (Kabschia and Englaria) section in the wild*.

Of the fact that a representative range of these plants existed in cultivation there can be no doubt. The evidence of many respected authors, including the distinguished German botanists, Engler and Irmscher, stands in testimony; in addition, almost all the named plants were listed in UK and Continental nursery catalogues during the 1930s, and a few even survived to appear again after the War. As reported in "The Stone Column", only *S.* x *luteo-purpurea* nm. *aurantiaca* is known to survive today. However, after many years' absence, the true plant has now returned to grace our gardens, where it will hopefully remain for a long time to come.

Nor can there be any doubt concerning the existence of a wild population in the Pyrenees – at least in the past. Hybrids of *S. aretioides* Lap. and *S. media* Gouan. were known (and published) long before Franz Sündermann named and began to distribute his collected forms. The first was *S.* x *luteo-purpurea* Lap. 1801; this was followed by *S.* x *ambigua* DC. 1815, and *S.* x *lapeyrousii* Don. 1821. The range of plants introduced by Sündermann merely filled the gaps in what he described as a string of continuously variable intermediate forms between the original parents.

Whether Sündermann found his plants in the wild or, as inferred by Farrer, in a seed frame, should not cause any problems. Apart from Farrer's remark, there is nothing to suggest that the plants in question originated anywhere other than in the wild. Indeed, given his reputation as a hybridist, Sündermann would have attracted more attention had he been able to say he "created" these plants himself, a claim he never failed to make for a new Lindau hybrid. Perhaps the question was unwittingly answered by Farrer when he suggested that plants similar to Sündermann's could ". . . equally well be raised by anyone who can induce the two parents or any of their hybrids to seed side by side in the garden . . ." The parents and at least some of their hybrids have lived together in dozens of gardens, *including Farrer's*, without producing a single new *S. aretioides*

*A marvellously comprehensive Czech review of the whole Porophyllum Section, by Radvan Horny and Karl Weber, published last year (and shortly due out in English) describes two recently-discovered nothomorphs of *S. juniperifolia* and *S. dinnikii* found in the Caucasus Mts – *S.* x *akinfievii* nm. *akinfievii* and nm. *oettingenii*. Also a hybrid of *S. sempervivum* and *S. scardica* which rejoices in the name of *S.* x *gyoerffiana* is reported from Mt Olympus.

x *S. media* hybrid. Farrer's only hybrid was *S.* 'Myra' from *S. lilacina* x [*S.* x *luteo-purpurea* nm. *lapeyrousii*]. The Russell Pritchard hybrids, *Ss.* 'Beatrix Stanley', 'Christine', 'Cranbourne', etc., are offsprings of *S. lilacina* x [*S.* x *luteo–purpurea* nm. *godroniana*], one of Sündermann's collected nothomorphs.

In light of what appears to be a revival of interest in Porophyllum Saxifrages, members may be interested in a more detailed account of these fascinating plants at a later date. Farrer's explanation of their origin and evolution certainly leaves much to be desired, although his description of their promiscuity which, he said, led them to ". . . breed with each other backwards and forwards in and out interminably . . ." is not far from the mark. Who would dare substitute a dry scientific explanation of the term "nothomorph" for this gem? It certainly should be left for later!

Let it be hoped that somewhere in their Pyrenean hideaway the nothomorphs are still doing whatever it is they did in the past to maintain their existence – for since they were discovered all those long years ago, nothing has been reported of their whereabouts. Perhaps what Papa Sündermann found was a weak colony created by entirely local and obviously very favourable ecological conditions. Perhaps also the last remaining survivor of this remarkable bounty has lingered to taunt us for squandering the rest – and to remind us of what we might reclaim and retain by greater diligence in the future.

A Sad Postscript

Shortly before reading "The Stone Column" in June last year a French friend and fellow Saxifrage enthusiast – Christian Lavaysse – and I decided to spend two weeks in the locations cited by Sündermann and the various botanists with the express purpose of rediscovering the lost nothomorphs. In the event we were both taken ill and the expedition had to be cancelled. I am happily recovered, but poor Christian died in October at the tragically young age of 47. What a story he would have been able to tell had our efforts borne fruit. Perhaps others with a similar inquisitive mind and Christian's detailed knowledge of the area will take up the search. I will be happy to provide them with such information as I have at my disposal.

Androsace villosa

Margaret and Henry Taylor

The cover photo was taken at the roadside in late June. This was actually on our third attempt to motor along a road in north-west Italy marked "Pericoloso". (A rare phenomenon, a true roadsign.) To find the spot, travel along the dirt track on the crest of the ridge until (a) you are halted by a

deep snowbank, or (b) you reach the point where the "road" has fallen away. Leave the car and continue on foot.

From 2,300 to 2,500m the whole of one rounded summit hump is studded with *A. villosa*. The brilliant, silver woolly cushions sparkle with flowers, the genuine 100% alpine that sucks expensive Kodachrome through the camera. In general, this androsace grows in bare lime-rich soil in patches between rocks, often being the first coloniser. It is usually a ground-dweller, but not always. Last June on Durmitor in southern Yugoslavia we saw plants growing on their sides on vertical loose, shaly limestone cliffs. Here they were facing south-east. Others we have seen have either been on summits or on southerly aspects, so we assume this androsace thrives in full sun.

When garden cultivation is considered, we are usually advised to "study conditions in the wild". Well, we studied this at Kalt Quelle on the Hoch Obir in Austria (Quelle meaning a spring or well). Certainly the plant was facing south with few competitors; no wonder, it was growing in soggy limestone silt with water running through its roots. Would you try growing it in similar gunge?

The plant forms a loose cushion about 8cm across made up of small rosettes which root where they touch the soil, giving "Irishman's cuttings" for the gardener. The leaves vary from dark to soft green and to grey covered with varying amounts of silky hairs. The most attractive we have seen were growing at 2,800m in the east Pyrenees. These plants were very silvery with stemless solitary flowers.

The primula-like flowers are white 8-10mm diameter with a greeny yellow eye which can turn orange with age, or change to a deep rose with a rose flush suffusing the petals. In any one colony this mixture of colours can be found. Stem height varies too, not necessarily with altitude. Some plants have stemless solitary flowers and others have clusters of two or three flowers on 4cm stalks. Different varieties? Difficult to say without collecting seed of each type and growing the seedlings side by side.

Like all androsaces, *A. villosa* sets seed readily and it regularly appears in the seed exchanges. We have a seed-raised plant of *A. villosa arachnoidea* from Rumania which seems easier to grow than its more western cousins. In appearance it looks identical to the better Pyrenean forms, so the varietal name is rather doubtful.

How often does it find its way to the show bench? Why should a plant so accommodating in the wild be so rare in cultivation?

Natural and unnatural rock gardening

D. B. LOWE

REGINALD KAYE has been a builder of rock gardens for more years than I have lived. On a beautiful autumn morning I stood with him, admiring a newly renovated area of his own garden, a structure of rock awaiting its inhabitants. The weathered limestone boulders had been persuaded to sit in easy natural harmony, looking as though they had rested there since the last Ice Age. The whole thing looked right and I said so. Reg took a pull on his pipe, grinned and replied, 'Yes, it almost seems a shame to clutter it up with plants, doesn't it?'

And that is the real test; if your finished rockwork is a pleasing and complete thing in itself, you have succeeded, but how many of us do? The other Reginald (Farrer) felt real pain when he saw the worst of the attempts and gave them descriptive titles in his own incisive style – 'Devil's Lapful', 'Dog's Grave' and 'Almond Pudding'. These are still with us and still being built, by amateurs and professionals.

The outcrop

Not many are blessed with the ability to blend rocks and earth into something that looks as though it had never been built at all, but was there as a natural feature of the ground before the garden was made. Nevertheless, some of us have the urge to create such things and it will save some frustration and despair if we recognise our handicaps as amateur garden makers. We don't have the tackle employed by the master builders; the jacks, winches and tractors that are the means for manoeuvring massive blocks of stone. Our limit is probably a rock of a hundred pounds or so in weight, and it is much more difficult to create something convincing out of such cobbles than it is with boulders of a ton or so. It also helps to cast a keen eye over constructions that are obvious failures, identifying at least what to avoid and then work out how to avoid it.

Take, for instance, the all-too-common commercial approach, the contract rock garden. 'Landscape gardeners' arrive in a lorry laden with a few tons of soil and reclaimed stone. The rock is rarely the natural stuff of the area, if such exists, and the soil is probably whatever has been scraped off the nearest development site, complete with a million hidden fragments of marestail and couch grass. this is tipped and shovelled into an irregular

mound, the base of which is then surrounded by a waggontrain of stone chunks, the leftovers from which are stuck in the mound here and there to complete the 'rock garden'.

Municipal versions are, in general, no more successful and often because they have a dual purpose. You will find them, here and there, particularly in seaside resorts, disguising the presence of a public toilet, which has been built bunker fashion, partly below ground and covered with a mounded 'rockery', incorporating two small gorges for access and exit. More common is the rocky island type used to form anti-vehicle barricades at precinct entrances and in new traffic flow systems.

Perseverance cannot be overvalued in the building of rockwork. It is not at all unusual to alter the placing and relation of rocks ten or a dozen times in the endeavour to produce a pleasing arrangement – another good reason for limiting the rock weight to within human shifting capability.

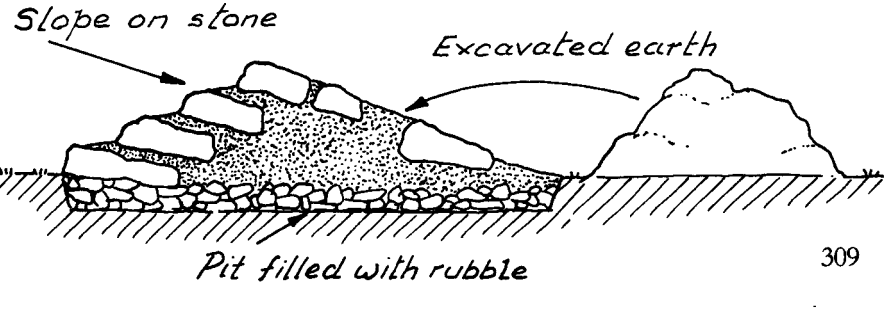
Ambition for size can overwhelm the builder's art (and energy). Better to achieve something satisfying with four or five attractive, well-placed stones than something resembling a rock fall, using fifty or a hundred (see Figs. 61 and 62, p.321).

Seeking guidance and instruction from general gardening literature and programmes can be dangerous. Bad as well as good advice is passed down from generation to generation of gardening journalists. Take, for example, the recommendation for pit digging, which appears time and time again in articles, books, journals and TV series, as the first step in the construction of a rock garden. The wording is suspiciously similar wherever this procedure is described and runs something like this:

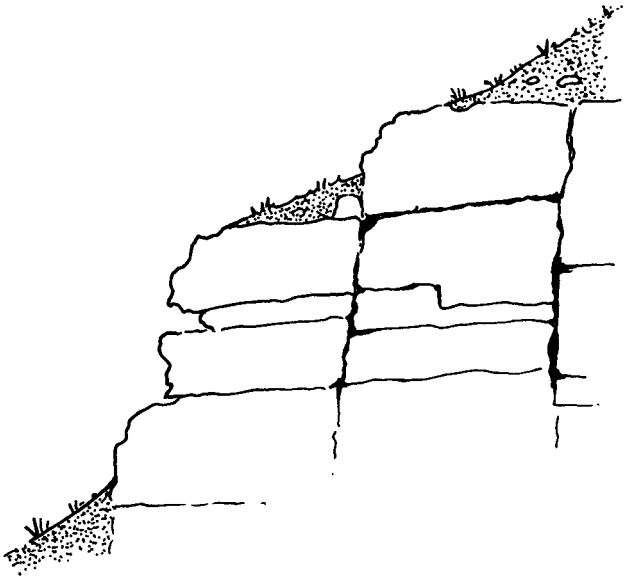
'Dig out the selected area of ground to a depth of ten to twelve inches to form a shallow pit and fill this with rubble to provide the extra drainage necessary'.

But, in reality, the pit acts as a collecting and holding place for water – a reservoir, not a drain, unless your ground is gravelly or sandy and doesn't hold water, in which case you don't need to improve the drainage anyway. So, whatever your conditions are, the pit either makes matters worse or is superfluous.

A diagram often accompanies the building instructions to illustrate the ideal structure, like this:



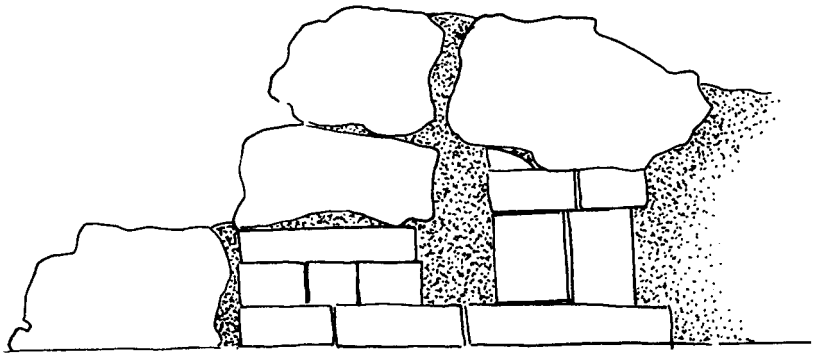
which is supposed to simulate this (the real thing):



You will be told to incline the stones, as in Figure 1, to imitate the slope of natural strata, the inference being that all natural strata slopes, which it doesn't. The other purpose of the slope is explained as ensuring that rain water runs back into the pockets created between the rocks. Why is this regarded as necessary; do the plants lack water after rain if the stones are flat? No, of course they don't, because in the next issue of the magazine or TV instalment you will be shown how to build a 'pavement garden' planted with alpines, 'ideal for the patio or floral path'.

Why bury so much of each stone? If you have gone to the trouble, or expense, of obtaining handsome rocks, you want to see them and, if they are properly placed and seated, they will be no less stable than if they are two thirds sunk in the earth.

If you strive for effect and want height in the rock work, stability is a problem, and burying comes to your aid, but don't bury good stone, bury the support. Foundations can be built from old bricks, broken paving, and other builders' waste provided that it is reasonably regular in form and won't deteriorate underground.



Building the same feature by resting the rock on mounded soil will be regretted later, when the soil moves and subsidence sets in.

Considered as something specially built to provide homes for alpine plants, the outcrop doesn't score highly. The more realistic it looks, the less it caters for planting; the bigger the rocks, the less room there is for rooting places. The masterpieces produced by the great landscapers, such as Symons-Jeune, are not gardens for alpines but garden features, with an alpine theme, made to look as natural as possible. (Fig. 63, p.322.)

Let's look at the outcrop-styled rock garden (of modest proportions) as a functional thing. What you have built is an arrangement of stones in a bed of specially prepared earth. Structurally it is nothing like a real outcrop and it doesn't behave like one. It is not a knuckle of exposed bedrock, but a group of rock fragments, free to move – and they do! They rest upon and are packed in between with newly disturbed earth, soft and vulnerable to settlement and erosion, however much you may have tramped and pounded it during the building work. In the summer months, drying will cause it to shrink away from the retaining stones; in winter it will expand when it freezes, pushing the stones apart. When the thaw comes it will return to its former state, but the stones don't come back; as a result the carefully-contrived crevices are no longer packed, the filling is loose and gets worse when it dries. Eventually it trickles or falls or is washed away, carrying with it, or leaving bare, whatever was planted in it.

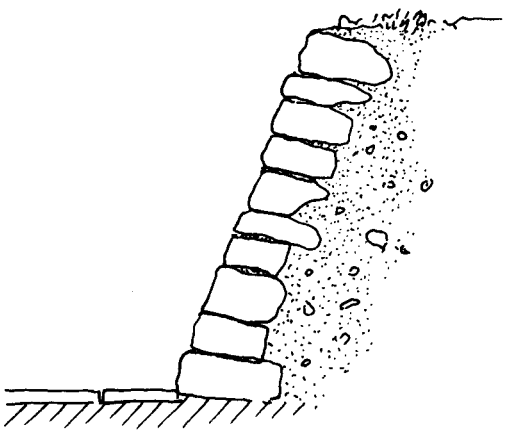
Most dedicated gardeners become plantsmen, or plantswomen, in time and, whilst most of them like to produce pleasing scenes in their plots, their priority is to create the best conditions for the plants they wish to cultivate. With such aims, 'natural features' are often difficult to incorporate, but what is natural about a garden? We create ponds where water would never normally collect, we shave the turf whenever it tries to grow as it should, we tear out or induce terminal hormone disorders in native flora that would like to grow where we wish otherwise. Plants from the

Himalayas, the Greek Islands, the American prairies and the Swiss meadows are expected to co-habit in the same patch. We regularly disturb the soil by digging, hoeing and re-arrangements and (most of us) cause grave ecological imbalances through the use of chemicals. The only 'natural' things in a garden are the plants; the rest is a tussle with Nature. Creating a garden is an act of defiance.

All this discouraging comment begs the question – why are we so determined (or persuaded) to build these synthetic geological features? Not many wild alpines choose to live in such places; the majority are to be found in the high pastures, stony slopes and screes. Yes, there are crevice-dwelling plants, and they seek the fissures and pockets in outcrops, cliffs and boulders, but there are easier and more effective garden constructions which will please them just as well, and these will be discussed, but not yet, we have not finished with the difficult categories, eminent amongst which is the 'planted wall'.

The Wall

This is a quite different approach, producing a substitute cliff, using a wall as the rock face. Not the free-standing dry-stone type, because this presents all sorts of problems in both holding any soil filling in place and keeping it adequately moist. The favoured structure is the retainer wall, usually holding back a bank or terrace, forming a more or less vertical stone skin over a face of earth, like this:



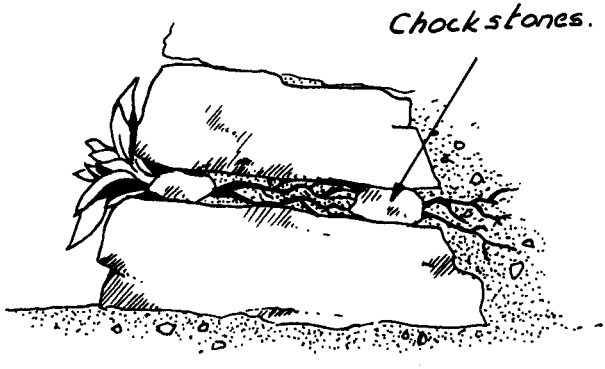
You can achieve very limited results by directly planting up an existing wall of this type; *Erinus alpinus*, toadflax, some sedums and semperviuums may be persuaded to take up residence. Be prepared for a lot of discouragement, however, and be persistent in pushing the plants back in their niches when you find them on the path or dangling from a few roots. Wedging the plants in with peat fibres, clay or dead moss will help to retain them until they are well rooted back into the earth behind the stone. Some devotees cement plants in place, which illustrates just what a problem it is to keep them where you want them.

Seedling-sized plants are far easier to handle and insert between the stones than those of nursery sale size, and are more likely to become established. Try squeezing the root ball from a three-inch pot into a one-inch gap that you have scraped or gouged out. You can break up the ball, but then you have a fat tassel of roots with an infuriating reluctance to be poked into the slot and which is drying out rapidly as you fight for control.

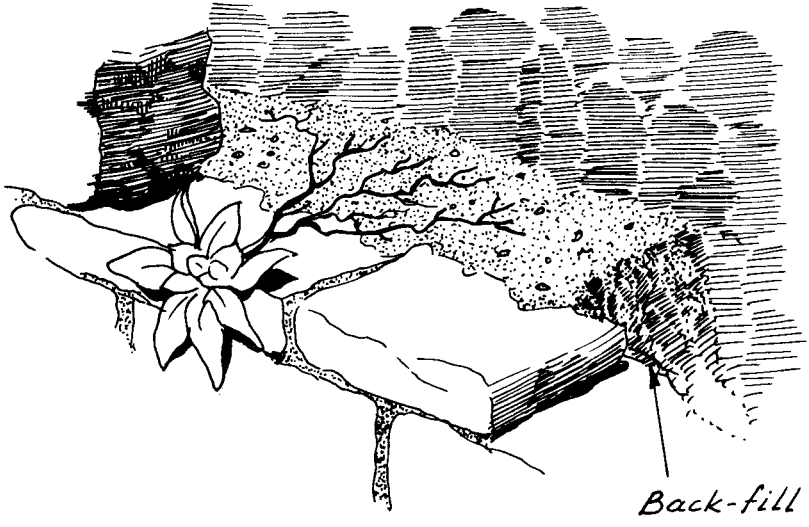
If you do succeed, you then have the next major problem – how to get soil round the roots you have pushed in. It is likely that you will have to do it single-handed; your other is needed to stop the plant from springing out on those compressed roots, like some herbal jack-in-a-box.

The textbook method is designed to avoid such frustrations; the plants are 'built in', which means that you have to build the wall from scratch or dismantle and rebuild it if it is already there.

In this system, plants are incorporated as building progresses, making special preparation for each plant, like this:



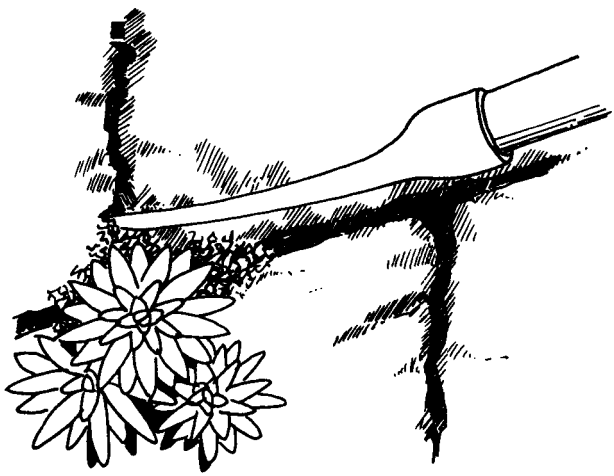
and if the back-filling of earth keeps pace with the rise of masonry, roots can be spread out over it each time a plant is incorporated.



There is little doubt that plants given this careful attention have a far better chance of becoming established and the size of plant used is much less constrained. Nevertheless, for the first year or so you will still have to keep regular watch for the effects of settling and erosion, pushing back and packing the loosened plants. Overdoing the planting up, by inserting rather too many, will probably pay dividends in the long term, because some will sulk and refuse to accept a cliff-hanging life and others will fall to the slug and the snail (who appreciate the cosy homes you have provided), and, yes, there will still be 'drop-outs' in spite of all your care.

Not very encouraging, is it, all this building, poking, plugging and packing? It's a lot of hard work and a lot of maintenance, and there's another major problem unmentioned as yet – watering! How do you keep the new plant sufficiently moist in a vertical wall? The best solution is to plant up in late autumn and rely on the winter to keep everything moist. Unfortunately this is the start of dormancy for most plants, so they are unlikely to make any significant root growth in their clammy crevice until spring comes along. The plant does little before then to improve its anchorage and is prey to all the adversaries already mentioned. If planted in spring it will do its best to live and root growth will start – but it will need moisture to succeed, and in dry periods you may well have to supply the water; but how do you water a plant in a vertical wall?

Ingenuity and perseverance is the answer. The ingenuity is needed to fashion a device for delivering the water and creating access for it. Try leaving a small entry hole in the wadding round the neck of the plant, *above* the plant, then bodge together or buy an extension spout for the watering-can to give it a proboscis. With the perseverance mentioned earlier, you can trickle water to where it is needed, like this:



If you still feel the urge to create an alpine wall after all these cautions and discouragements, then you'll probably produce a masterpiece.

The Bed

Quite different and far more effective, reliable and practical, as a place prepared for growing alpine plants, is the raised bed. It is not a recent development. In general gardening it has been around for centuries, but more as an ornamental element than a means of producing specialised growing conditions. Only when rock gardening extricated itself from mini-Matterhorns, grottoes and ferneries, did the virtues of the raised bed become evident to those who put emphasis on pleasing the plants rather than on achieving a landscape effect.

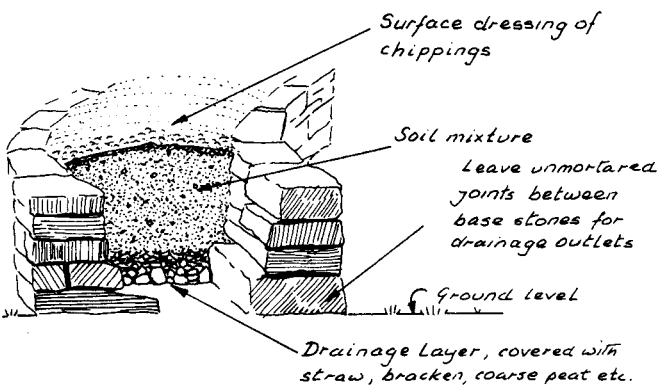
The raised bed is an adaptable object; it can be fashioned to compliment its surroundings. If sited close to a contemporary house it can be brick-built and formal in shape without losing any of its functional merits. After all, it is only a low wall forming a container for a special soil mixture and providing the excellent drainage that is so necessary for mountain plants.

Having personally built at least fifteen raised beds in a variety of situa-

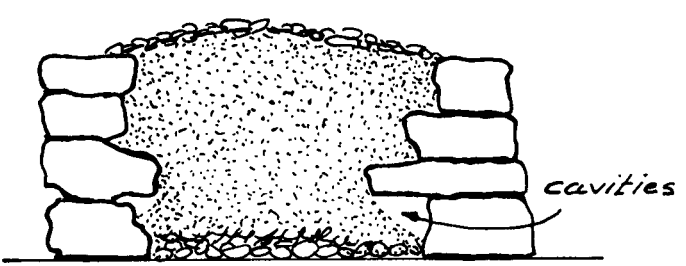
tions and materials and having made all the mistakes I think it is possible to make by the time I was erecting the tenth, I can offer some advice to present and future bed builders.

Don't build it in a place convenient to you; put it where the *plants* will benefit most. If you can, choose a site that is fully open to the sky and is in sun for the majority of the day (most alpines appreciate as much light as they can get) and avoid draughty canyons between walls, damp hollows and overhanging trees.

If the bed is built up from ground level, any excess water in it will scurry downwards to reach that ground level. All you need to do is to provide outlets at the bottom. The system is simple and the bed construction incorporates it. Below is a diagram showing the construction of a typical raised bed.

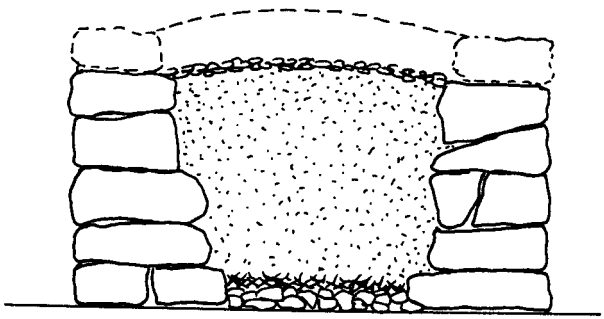


In stone-built versions be careful to lay the widest stones in the lowest levels. If they are incorporated later they will create problems in the filling operation as the sketch shows:

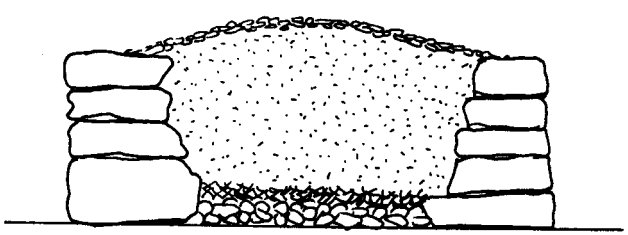


Even though problems increase as beds get taller, there can be good reasons for wanting them to be above knee height – plants nearer the eye (and nose), comfortable working, disability limitations, etc. – so it is not a case of don't build them high, but being aware of the consequences if you do.

The primary problem is settlement. In beds up to about 15 inches high it can be compensated for by over-filling, initially, making allowance for the future slumping of the fill mixture.

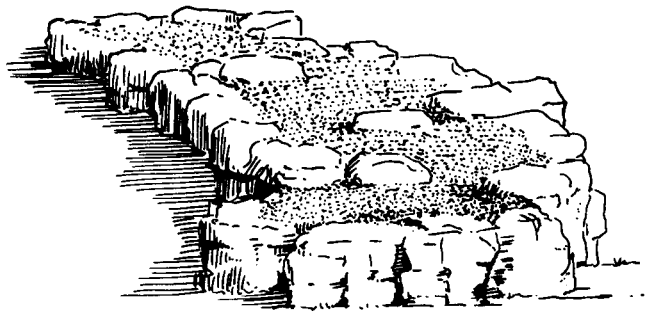


But this precaution is inadequate in taller beds. The compensation hump would be excessive and unmanageable, so a second allowance has to be incorporated. This takes the form of a temporary top course of stone (or brick) which can be taken off after a year or so when the surface sinks sufficiently – and it will.



The raised bed principle can be employed in less formal constructions. 'Islands' are often built on flat sites to introduce some vertical accent and, if these are formed by a wall of irregular but close-fitting rocks or boulders

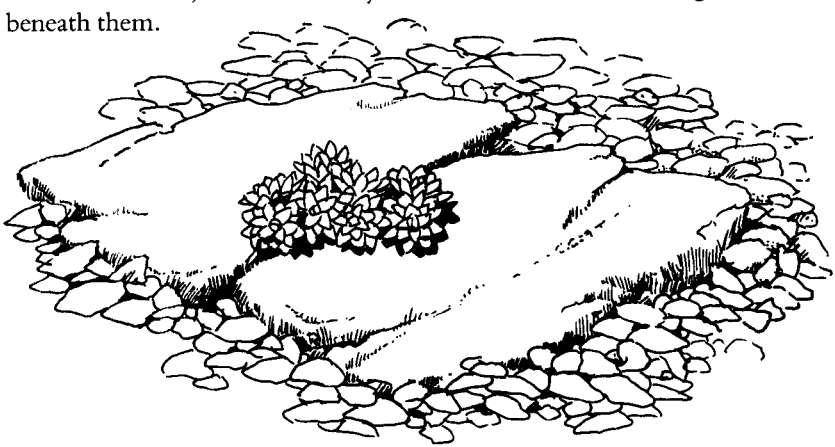
they form an excellent container which raises the growing level and ensures drainage just like the other types described earlier.



On a sloping site you have the immediate bonus of a natural run off for water. Walled beds can be built terrace-fashion, and it is easier to make rocks and boulders look comfortable. (Pit digging here is even more bizarre – think about paddy fields on mountain slopes!)

Do be cautious in planning the size of a raised bed. The amounts needed and the handling of heavy materials involved is invariably underestimated. Take, for example, a bed 18 inches high, 3 feet wide and 6 feet long. If you use stones of approximately 6 inches width, you will require in excess of two thirds of a ton of these, and to fill the bed you will need at least three quarters of a ton of soil mixture. Every stone must be lifted several times, and the preparation of the filling material will entail the work of mixing a similar amount of concrete.

Reliable planting crevices can be built in by arrangement of quite thin garnishing stones let into the surface dressing of the bed. Because they sit rather than stand, there is stability and no erosion of the rooting mixture beneath them.



The Scree

In the past, great effort was applied to creating artificial screes, more often referred to then as morraine gardens. Preparation was extensive, involving subterranean water pipes with automatic flow control mechanisms and systems for grading the size of stone used; largest at the base, smallest on the surface. From the records it is apparent that they worked, in terms of successfully supporting a variety of alpine plants which would spurn normal rock garden soils and conditions.

Largely by trial and error and need to reduce labour and cost, we have progressively simplified the construction to a point where the scree can be one of the simplest yet most effective forms of alpine garden. It is certainly the most weed-discouraging systemyou can build, and after a short period of intensive care after planting, the variety of alpines that will respond well is impressive.

Almost any style can be adopted in building a scree garden and can be put in one of two categories – the raised or the flat bed. The first is essentially a scree-filled version of the raised bed or island already described, but the second is the simple, low-cost, low-labour variety. The only real work is in preparing the ground, and this is limited to producing a clean area of soil, either by stripping off the turf and lightly hand-forking the surface, or thoroughly weeding an already cultivated patch. Soil type and condition is not critical, provided that it drains well. If it doesn't, then help it do so by creating a simple run-off channel; it's a matter, really, of choosing the right site in the garden.

Having prepared the soil surface, cover it with a layer of gravel or small chippings to a depth of around 4 to 6 inches and that is all. As a growing place the scree is now complete. You can improve its appearance by garnishing it with a few well-chosen rocks of compatible colour and texture.

Successful introduction of plants requires the right planting technique, which is not complicated but can distress those who are timid about rough handling their carefully raised seedlings or newly purchased nursery specimens. It is essential to fully liberate the roots of plants to be inserted in the scree, which means breaking up the root ball to rid it of soil. This allows the roots to be spread out in a hole scraped as deep as possible in the gravel or chippings, which are then pushed back to cover the roots. Depending on its preferences, the plant will then either root around in the scree and along the soil surface below, or drive straight down to burrow in the earth. In both cases the neck and rootstock of the plant remain in the much appreciated, perfectly-drained, open-textured scree.

The planting after-care operates for a few weeks whilst the plant recovers and produces new roots. In that period it should never be allowed to parch and should be shaded from direct hot sun. There will be the odd

casualty in such treatment, but spring planting, rather than summer, autumn or winter, will minimise these. As well as the natural scree dwellers, crevice plants and those from stony slopes will appreciate this particular form of alpine bed.

This essay was a response to our Editor's remarks in a recent Journal wherein he rightly observed that little is said, in present times, about the building of rock gardens – the plants are foremost, and so they should be. But there is still a place and a role for rock in the alpine garden, be it boulder, walling stone or merely surface chippings.

Seed Exchange

IT IS with a certain amount of regret that I relinquish office as Seed Exchange Manager, but it is high time that someone younger took it over. I have enjoyed making contacts worldwide with people with like interests and I must thank the faithful donors who have made the seed list possible; many of their record cards go back as far as the early 1960s.

Thank you also for the many charming letters I have received; it will be a pleasure to read them again when I have a bit of leisure, a very scarce commodity between October and March.

Mrs Wyllie has been helping with all aspects of the exchange, and I hope you will give her the encouragement and support that I have had over all these years.

I wish you all good gardening and hope the seeds you have acquired breed and are true to name!

JOYCE HALLEY

Fig 61 *A few well-placed rocks* (see p. 309) D. B. Lowe

Fig 62 *A rock fall* (see p. 309) D. B. Lowe

Fig 63 *A 'Symons-Jeune' masterpiece* (see p. 311) D. B. Lowe

Sheep, snowgrass, and a royal craspedia

DERRICK ROONEY describes a visit to Samuel Butler country with Brian Molloy and Tony Druce, botanists from the Department of Scientific and Industrial Research

WHEN SAMUEL Butler arrived in New Zealand on board the 'Roman Emperor' in 1860 he was a young man of 24 with a small sum of capital (given to him by his father) and two burning ambitions: to multiply his capital by farming virgin land in the colony and to make his name as a man of letters. In due course, he achieved both, returning to England with a 'friend' and a fortune to become the Author of 'Erewhom' and other books.

But the beginning was not easy. All the foothills and plains land had been taken up and only the backblocks, where it was possible to obtain leases of mountainous land for £1 per 400 hectares, were still vacant.

Butler bought a horse, explored the upper Waimakariri and Rakaia rivers without finding what he wanted, and subsequently turned his attentions to the Rangitata River where, just below the confluence of the three main branches which descend from the Main Divide, he found what he wanted:

'. . . A long and open valley, the bottom of which consisted of a large swamp from which rose terrace after terrace up the mountains on either side, the country is as it were crumpled up in an extraordinary manner, so that it is full of small ponds or lagoons . . .'

A little later he wrote to his parents in England:

'My companion and myself have found a small piece of country, which we have just taken up. We fear it may be snowy in the winter, but the expense of taking up the country is very small . . . We are sanguine that it may be a useful little run . . .'

Butler's useful little run amounted to about 6,000 hectares and comprised the Valley of Mesopotamia, a large intermontane basin bounded by the Two Thumb and Sinclair Ranges and drained into the Rangitata by Bush Creek, which, despite its name, is a full-scale river, too deep and swift to be forded comfortably for much of its length.

After a century and a quarter, the Valley still provides summer grazing for the sheep of Mesopotamia Station, which are driven in after the thaw and mustered out again in April over a high pass now known as the Bullock

Bow Saddle, but formerly called the Sinclair Saddle. A hut at the foot of the saddle serves as a base for the musterers, a good day's ride on horseback from the homestead and half a day's drive by Land-Cruiser over a steep and sometimes precipitous track.

From the hut, there is a climb of about 450m to the top of the saddle, following on foot the track up the long Finger Spur, which was probably the route also taken by Samuel Butler 126 years ago, when he crossed the Sinclair Range.

From the top of the saddle, at 1660m, a superb view unfolds of undulating tussock lands, tarns, and the peaks of the Two Thumb Range, the highest rising about 2,400m and permanently snow-clad. I was impressed, but Samuel Butler wasn't: 'There is no timber in this valley, and accordingly the scenery, though on a large scale, is neither impressive nor pleasing . . .'

Samuel Butler was no botanist. In the Valley the major feature of interest is the numerous and mostly interconnected tarns, which are beautiful and mostly above 100m, and thus of considerable botanical interest because the shoreline and cushion-bog vegetation associated with them have a strong alpine component.

A feature of the plant communities is the absence of wood. A century and a quarter ago there may have been subalpine scrub near the tarns, but the country was burnt first by Butler and later by subsequent owners, and today, except on some shady slopes and in the gullies, there is a virtually complete absence of woody vegetation. Most of the surviving scrub consists of species which could have been introduced or reintroduced by wind or birds – *Coprosma ciliata, Podocarpus nivalis, Brachyglottis* (formerly *Senecio*) *cassinioides*. Hebes and the native brooms are conspicuous by their absence.

Hebe haastii and *H. epacridea* grew – but not together – on the high screes, the latter in the small-leaved, thin-stemmed form which seems to be characteristic of its northern and southern populations in Canterbury; in between, in the lower Waimakariri basin, the plants are much bigger. High up in the Sinclair Range, on rocky outcrops, we found clumps of a glaucous-leaved hebe in the *H. pinguifolia-H. buchanani* group; similar plants occurred also at a lower altitude, on outcrops near the main river. Some of these plants appeared to be intermediate forms, but their taxonomic status is in doubt. Possibly they include at least one cryptic species – i.e. species which have no apparent morophological differences but have genetic or chemical differences. Sixty years ago, Cockayne and Allen[1] noted that further detailed study was required to determine the status of these plants, and that remains the situation today. Recent studies by Dr Brian Molloy have revealed that in mid-Canterbury the *H. pinguifolia* complex comprises at least two species, 'normal' *H. pinguifolia* and a similar-looking

plant which replaces it on outcrops at high elevations and is chromosomally different. Propagation material of the Rangitata plants has been brought back to be grown on for further studies, but it will be some time, if ever, before the problem of what to call them is resolved.

Apart from these, the only hebe I saw in the Valley was *H. lycopodioides*, which occurred on one shady face as scattered small plants among snow-grass. These appeared to be the typical form of the species, but seedlings are being grown on by myself and Tony Druce for comparison with specimens from other localities.

On the eastern side of the saddle, clumps of *Ranunculus crithmifolius*, with their abundant ash-coloured leaves, were hard to spot at first, but once sighted were seen to be abundant in fine debris on the track. Only a few carried seed. On the high screes were *R. haastii*, *Lignocarpa carnosula*, and *Lobelia roughii*. *L. linnaeoides* grew on a shady outcrop a stone's throw from its cousin – the first time I have seen the two in such close proximity. On the western side, descending into the Valley, we passed above hundreds, maybe thousands, of fine plants of the large vegetable sheep (*Raoulia eximia*) and trod on a probably unnamed cotula (belonging in the *C. squalida* group) on the track, but the major interest was in the tarns.

These were of two types – newish tarns, created probably less than 1,000 years ago by slumping from the mountains above, and old, interconnected ones on poorly drained moraines.

At the margins of the older moraine tarns is a rich cushion vegetation, mostly saturated with water, and often wind-eroded into complex inteconnected networks of peninsulas and islands, shaped like insane sausages. These are botanical treasure troves, bearing a plethora of species of short grasses, sedges, small herbs, and cushion plants. They included *Carex decurtata*, *Nertera balfouriana*, *Oreobolus pectinatus*, *Celmisia glaucescens*, *C. alpina*, *Pernettya nana*, and an unnamed drapetes thought to be confined to the area between Mt. Peel and Otago. Some of the drapetes plants were growing under water.

The newish tarns, having no outlets, fluctuate with the seasons, and above their high mark is a short, dryish turf, rich in species of tiny grasses, sedges, and herbs. Near one small tarn, Tony found a colony of a little green-leaved craspedia which may be a completely new species. It appeared to be confined to the one tarn, though no doubt further field work would reveal other colonies. We gave it the 'stable name' *Craspedia* 'Rex', in deference to the existence, not far away, of the Royal hut, where Prince Charles, lifted out by chopper from Mt. Peel, had a cup of black billy tea.

Craspedias are problem plants, and according to Tony, there may be 25 or more species in New Zealand, most of them at present unnamned.

Classification of the craspedias presents problems, but Tony is working on a system based on leaf-hair types, which fall in four categories – (a) cottony, (b) glandular, (c) multicellular, erect, and (d) the third type with an elongated, cottony tip. These hair types may occur individually or in various combinations on the upper or lower leaf-blade or on the margins or midrib. *Craspedia* 'Rex' has glandular hairs on both surfaces and the margins of the leaves, and a few erect multicellular hairs on the midribs. None of the plants, which were abundant within the very small area, was in flower, and although some had flowered, there was no good seed. A few seedlings were collected and will be grown for further study.

[1]Cockayne, L., and Allen, H. H. Taxonomic Status of New Zealand Hebes. Transactions of the New Zealand Institute, Vol 57, 1927.

Book Reviews

A Synoptic Guide to the Genus Primula
by G . K. HENDERSON
ISBN 0 935868 24 0. v.+213pp. 7″ × 10″ hardbound with dustjacket; 56 line drawings, 1 black and white photograph.
Available from International Specialised Book Services, Inc. 5602, NE Hassalo St., Portland OR 97213 [$40.00]. Available outside the USA from Wheldon & Wesley, Codicote, Hitchin. Herts SG4 8TE, England.

This book is intended to serve as a basic reference to the genus *Primula*. Approximately 1375 species, synonyms and hybrids are included, each with complete reference to author, initial publication, and current status; for non-hybrid taxa, details of typifiction are also given. Distribution, habitat, altitude, section, a cultural code, stature and colour are indicated for all currently accepted species. The several dozen species described since 1949 are included within this conspectus.

Chapters are devoted to the taxonomic history of the genus, its origins, and distribution. Other chapters treat cultivation of particular species or groups, growing primulas from seed, and pests and diseases.

J. N. A.

Sir Joseph Banks (1743–1820)

JAMES T. AITKEN

BANKS was the great organiser. He occupied in the scientific world a position unique in his day and probably in any day and in any country. He was a wealthy Lincolnshire land-owner who at school at Eton conceived an overwhelming interest in botany, which he went on to study at Oxford. Thereafter he undertook botanic exploration in Labrador and Newfoundland. So his credentials as a scientist, academic as well as practical, were above reproach. His social class conferred advantages not normally available to the scientist.

His widowed mother lived next door in London to First Lord of the Admiralty Lord Sandwich. When the Royal Society – then as now the association of the most eminent British scientists – petitioned the Admiralty to include a party of scientists in the complement of Captain Cook's "Endeavour" which was to proceed on a voyage of discovery to the Antipodes, their Lordships found no difficulty in acceding when the nominated leader was to be someone so acceptable as the young Joseph Banks, Esquire. It fitted in both with the Society and the Admiralty that the wealthy Banks was able to fit out and maintain the scientific party at his own expense.

So on Cook's first great voyage, Banks was leader of the scientific party, and the two men from the start fitted. Banks was the first botanist in New Zealand; he was the one who marvelled at the floral wealth of Botany Bay in Australia; from a botanist he expanded into a manager of a team studying and recording the general scientific achievements of one of the greatest voyages of exploration of all time.

When eventually the small ship returned to the Thames, its commander and Banks, as leader of the scientific party, were summoned to give an account of the voyage to the King. Then commenced a relationship between Banks and George III which was to develop into a friendship nurtured by the King's interest in scientific matters and particularly in gardening.

This friendship with the King led to Banks being entrusted with the gardens at Kew, where the King's mother had already laid out, under Chambers and the Earl of Bute, a botanical garden of international standing. Under Banks it progressed to pre-eminence as a distributor of plants throughout the globe and as the centre of botanical studies.

In 1788 at the age of 35, he was elected President of the Royal Society. For the rest of his life he dominated the scientific scene in Britain and

achieved an unprecedented international reputation. It was the age of discovery. Ships under command of outstanding navigators like Captain Cook and Vancouver charted new seas and surveyed new continents. And whenever such a ship sailed from Britain, Banks ensured that its complement included a party of scientists and particularly botanists.

He brought the Merino sheep to England from Spain and thence it went to Australia. The great mutiny of the "Bounty" took place when Captain Bligh, his protege, was transporting plants. He was one of those who met in Hatchard's bookshop in Piccadilly to found the Royal Horticultural Society. When the American colonies, by declaring independence, deprived Britain of settlements for prisoners, he persuaded the government of the potential for this purpose in Australia.

For forty years he dominated science in Britain and exerted much political influence. That would have secured his reputation in history.

But we who delight in gardens and plants must accord him particular acclaim. For it was Banks who organised a series of remarkable "King's Botanists" who, under Royal patronage and Banks' instructions, sent to Britain a flood of plants from all quarters of the globe.

Archibald Menzies of Aberfeldy (of *Menziesia*) was sent to western North America; Frances Masson of Aberdeen pioneered the study of South African plants; the Russian Pushkin from the Caucasus sent back *inter alia Gentiana septemfida*; William Kerr of Hawick (of *Kerria*) for £100 a year went to China; Mungo Park of Selkirk explored Sumatra and then died after mapping the Niger; the first American collector to operate outside his own country was John Ledyard, who travelled first to Siberian Kamchatka and then to West Africa; Flinders was the first to circumnavigate Australia; Allan Cunningham, who collected in Brazil and New Zealand, was ultimately hailed as the "Prince of Australian Botanical Explorers"; James Bowie and Nathaniel Wallich founded botanic gardens satellite to Kew at Cape Town and Calcutta respectively; there were others who were lesser only in relative terms.

And they were all organised by Banks.

The Genus Ranunculus Part IV – European species N-Z

ALASTAIR McKELVIE

Ranunculus nivalis L.

This species of Section Auricomus (Fig.55, p.284) is not an alpine but can be found throughout the Arctic in Europe, Asia and America, growing in base-rich areas. It is an unbranched perennial up to 20cm tall with the basal leaves reniform with five to seven deep lobes. The stems carry a single flower, large for the size of the plant and about 3cm in diameter.

It is of litle garden merit, but has been mentioned in one or two references including Farrer, who concluded that it should go into the moraine, "if thought worthy".

Ranunculus ophioglossifolius Vill.

This species of Section Flammula is a bog plant allied to *R. lingua* and *R. flammula*. It has ovate-cordate basal leaves and stems reaching up out of the water to a height of 20cm. The flowers are smallish, only around 5-9mm. It grows widely in southern Europe and can be found in the UK. It is of no great garden merit, but may be worth a place at the edge of a pond.

Ranunculus oreophilus Bieb.

This species of Section Ranunculus grows in the mountains of central and southern Europe. It is one of several small alpine grassland species closely related to *R. montanus*. It can be distinguished by its rounded, broad-lobed basal leaves and its deeply-cut stem leaves with narrow lobes. Stems are up to 40cm and the flowers to 4cm across.

There are no reports of its cultivation, but it may be worth trying because of its affinity with *R. montanus*. Seed from Rumania has been available in the SRGC Seed Exchange in recent years so that we may expect to hear of its cultivation.

There has been some confusion about this species and *R. sartorianus*; they are very similar, but the achene of *R. oreophilus* has a very short adpressed beak while *R. sartorianus* has a stout, rigid beak.

Ranunculus paludosus Poiret

This species of Section Ranunculus grows widely throughout the Mediterranean region and western Europe up into the Channel Islands. It has sometimes been known as *R. flabellatus*.

It is a pubescent perennial to 50cm tall, but usually much shorter in the mainly hot, dry soils it prefers. It resembles a small, hairy *R. bulbosus*, but with much more divided leaves which taper down into a bulbous base. The flowers are up to 2cm across, upstanding, large and golden yellow.

It grows readily in a sunny position and is quite attractive. It is short-lived but can be raised easily from seed.

Ranunculus parnassifolius L.

This species of Section Ranunculus (Fig. 64, p.339) grows over a wide area of limestone mountains from the Alps to the Pyrenees but is always a fairly rare plant. It can be found between 1,900 and 2,900m.

It is a perennial species with small, dark-green, leathery leaves, spade-shaped on short, hairy stems. The leaves have seven prominent main veins on the upper surface. Flowering stems are from 4–20cm tall and the stem leaves are amplexicaul (clasping the stem). Stems carry from one-several flowers, 20–25mm in diameter with white or reddish petals.

This is one of the most beautiful and precious of all alpine Ranunculi and, indeed, of all alpine plants. It is grown widely in gardens, is frequently written about, especially last century in the "Gardener's Chronicle", and has been collected in a wide variety of excellent, and sometimes not so excellent, forms. It is important to buy plants while in flower in order to ensure a good form.

Farrer described it as "the heartiest thriver", but not all gardeners would echo these sentiments. Where it is happy it will settle down and, although sometimes short-lived, it will seed itself around and thus remain established. In nature it tends to grow on damp, silty soils or on slaty scree, but in the garden its needs can be a bit problematical. Try it in a damp spot but, if it does not thrive, try it in a drier and sunnier spot. Once planted it should be left alone and, hopefully, it will seed itself.

One of the finest forms is 'Nuria', collected by Margaret and Henry

Taylor near the monastery of Nuria in the Central Pyrenees at an altitude of 2,500m. It is a gorgeous pink form which richly merited its AM in 1978.

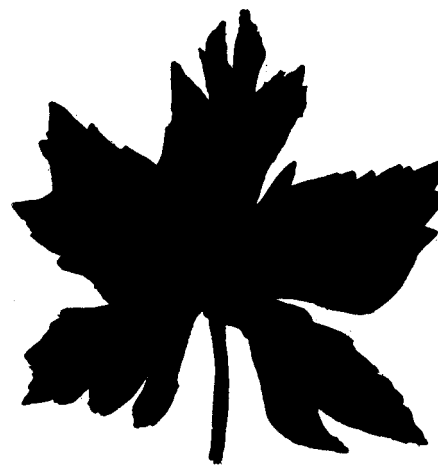
Propagation is possible by careful splitting of established plants, but, preferably, by sowing fresh seed or allowing it to seed itself. *R. wettsteinii* Dorfler. is a subspecies of *R. parnassifolius* which grows in Yugoslavia. It can be distinguished by its petioles which widen gradually into the lamina and by the five veins on the upper surface of the leaf.

Ranunculus phthora

This name has already been explained under the description of *R. brevifolius* in The Rock Garden, vol. XX, p.76, 1986. It is an invalid name which has also been confused with *R.* 'Phethora', which is a cross of no great beauty between *R. thora* and *R. brevifolius*.

Ranunculus platanifolius L.

This species of Section Leucoranunculus is very similar to *R. aconitifolius*, but is usually considerably larger reaching a height of 130cm. It is a plant of mountain woods in central and southern Europe, particularly in Yugoslavia and Greece.



It has large 5-7 lobed leaves similar to *R. aconitifolius*, but the middle segment of the leaf is free to the base. The flowers are white, 2cm in diameter and borne on a much-branched leafless inflorescence.

It is a summer flowering plant, which is happy in any reasonable soil and likes sun, but will tolerate some shade. In nature it prefers damp shady places at the margins of forests and is also found in shaded places by rocks. It is a useful species for the herbaceous border, but not for the rock garden.

Ranunculus polyanthemos L.

This species of Section Ranunculus is found in central and eastern Europe in wet meadows. It is a tall, much-branched perennial up to 130cm with splendid golden yellow flowers, but does not seem to have been in cultivation. If grown it would need a place in a damp herbaceous border rather than the rock garden.

Ranunculus purpurea grandiflora
This is a name which appeared from time to time in the pages of the "Gardener's Chronicle" but would appear to have no validity, and it is not clear what plant is being referred to.

Ranunculus pygmaeus Wahlenb.
This species of Section Auricomus is a small arctic and sub-arctic plant which also occurs in the mountains of central Europe. It only grows to about 7cm and the flowers are only 5-10mm in diameter. There are no records of it being grown in gardens, but it has been grown experimentally at Kew to test the growing requirements of arctic plants. It was successfully reared by growing at a temperature of 22°F from October to April and then simulating the lengthening arctic day with banks of lights.

Ranunculus pyrenaeus L.
This species of Section Ranuncella (Fig. 56, p.285) is found in the Alps, the Pyrenees, the mountains of Spain and in Corsica. It is often found growing with *Gentiana verna* and *Crocus vernus* up to a height of 2,400m.

It is a glabrous perennial growing to a height of 12cm. The leaves are linear or broadly lanceolate and sessile. The flowers are white, about 20mm in diameter; the sepals are glabrous and whitish while the petals are often imperfect or even lacking.

In the wild it is often found beside rivulets just as the snow is melting and is so profuse in places that it gives the appearance of a snowfield in its own right. It is a very variable species, but in general is akin to *R. amplexicaulis*.

As can be judged by the above accounts, it is a splendid species, but has proved difficult to grow well and for long periods in gardens. It has fleshy rhizomatous roots and likes good feeding in nature, often being found near cowsheds or sheep-pens. The few people who have had any success in cultivation have grown it in rich, deep soils.

Seed is frequently available in the seed exchange, and it germinates quite readily so that there is little difficulty in raising plants. The problem is flowering it.

Farrer waxed lyrical about this species, which he said was "abundant in alpine grass of all the southern ranges, flowering as the snow melts in such illimitable profusion that the huge greening hills look as if the snow had not gone at all".

Sub-species *plantagineus* grows in the Alps and is taller than the type species with longer leaves, swelling to the middle and then diminishing to the tips. Sub-species *alismoides* is found in the Sierra Nevada and has a

simple unbranched stem and lanceolate leaves.

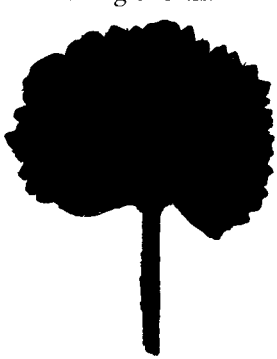
Various hybrids have been named and grown from time to time but seem somewhat ephemeral. They include:
R. pyrenaeus x *R. aconitifolius* = *R.* x *lacerus*
R. pyrenaeus x *R. seguieri* = *R.* x *yvesii*
R. pyrenaeus x *R. parnassifolius* = *R.* x *linzetii* and *R.* x *flahaultii*

Ranunculus repens L.

This species of Section Ranunculus is found widely throughout Europe except Crete and the Balearic Islands. It is a perennial species with long stolons, rooting at the nodes. The basal leaves are triangular or ovate, three-lobed. The flowers are yellow, 20-30mm in diameter on stems which can reach 60cm.

In its usual wild form, it is a highly invasive weed, not to be encouraged on any account, but there is a double-flowered form listed as *R. repens f.pl.* which is worth growing and which has been around since the 16th century when it was said to be common in every garden throughout England, known as double yellow field crowfoot or bachelors' buttons. Gerard in his Herbal claimed that, "if it be hung in a linnencloth about the necke of him that is lunatike in the waine of the moon, when the sign shall be in the first degree of Taurus or Scorpio then he shall foorthwith be cured".

The double form is worth growing and makes a good ground cover; Brian Halliwell recommends using it as a carpet under the stronger growing kinds of muscari. It creeps and roots as it grows but is never invasive like the single form.



Ranunculus rupestris Guss.

This species of Section Ranunculastrum (Fig. 58, p.286) is a somewhat hairy perennial of southern Spain and Portugal and into Sicily.

It has fusiform (spindle-shaped) tubers and kidney-shaped or rounded leaves. Stems grow as tall as 30cm, surmounted by large, yellow flowers up to 4cm in diameter.

It is rarely seen in gardens, but receives glowing accounts from all who see it in the wild. It was recommended by Eric Hilton (AGS Bulletin, 46, 108, 1978) who described it growing along roadsides in the uplands of southern Spain

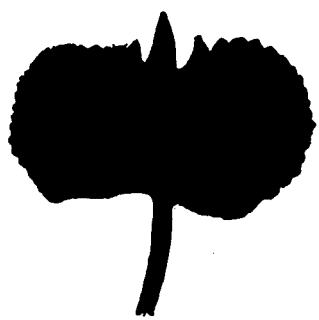
with its large, yellow blooms always attracting attention. After flowering it disappears from view until the leaves emerge in the autumn.

Many Mediterranean species of plants need moisture only when in active growth and can not be grown successfully in open gardens, but *R. rupestris*, though it flowers early and aestivates (becomes dormant in the summer), seems indifferent to summer rain in British gardens.

Ranunculus rutaefolius

The correct name of this species is *Callianthemum coriandrifolium* or *C. anemonoides*, which takes it outside the scope of these articles.

Ranunculus scutatus L.



This species of Section Thora is found throughout the Balkans, but is not sufficiently distinguished to have appeared very often in gardens. It is like a rather tall version of *R. thora* which is described later in this article. It has one or two enormous round, tooth-edged leaves sitting halfway up the stem. The yellow flowers are numerous but small on the top of 30cm tall stems.

Ranunculus seguieri Vill.

This species of Section Aconitifolia (Fig. 54, p.284) is the limestone equivalent of *R. glacialis*. It grows in the mountains of Europe through the Alps, Appenines to south-west Yugoslavia, as high as 2,700m. It is a perennial plant growing up to 20cm tall. The basal leaves are palmately lobed with finely divided segments. The large, rounded milk-white flowers are 25mm in diameter and retain this white colour until they perish.

It is worth any effort to grow, but is not easy and is not long-lived. Those growers who have been successful have grown it in a gritty, sunny scree or in a limestone trough. It can form quite large tufts and is most attractive when the large flowers nestle close to the warm stones sitting above the finely-divided leaves.

It sets seed very sparingly in cultivation and is thus difficult to propagate, but fresh seed is often available in the seed exchange.

Ranunculus spruneranus Boiss.

This species of Section Ranunculus grows throughout the Balkans and the southern Aegean. It grows at a height of 1,400m on Mt. Parnassos and is a buttercup of the *R. montanus* type but rather more spreading. There are very few records of it in cultivation.

Ranunculus sulphureus C. J. Phipps

This species of Section Auricomus is a smallish perennial from Arctic Europe and especially Spitsbergen. It is a somewhat larger version of *R. nivalis* and is apparently quite attractive with its bright yellow petals and reddish hairy sepals. There seem to be no records of its growing in cultivation; even if obtainable, it would probably prove next to impossible to grow.

Ranunculus thora L.

This species of Section Thora grows on calcareous soils throughout the mountains of Europe from the Pyrenees to the Balkans.

It is a perennial up to 30cm tall with rounded, kidney-shaped glabrous leaves. The yellow flowers are one to a few per stem 10-20mm in diameter.

It is strange species, somewhat akin to *R. brevifolius*, appearing in spring with its large, round, grey fleshy leaves and branching stems, with golden buttercup flowers. Farrer dismissed it airily, referring to its being filled with an intensively poisonous nature, but Jack Drake in his 1964 Catalogue thought it worth growing for "its fascinating leaves which are large and round and fold open like a scroll".

It is of no great garden merit, but is quite easy in a good soil in full sun, preferring limestone. It is best propagated by seed.

Ranunculus traunfellneri Hoppe in Sturm.

This species of Section Leucoranunculus (Fig. 65, p.340) is very similar to *R. alpestris* and is found in the high limestones of the eastern Alps, particularly in the Kamnik Alps of Yugoslavia where it grows along with *Gentiana verna* and *G. acaulis*.

It is a smaller and daintier version of *R. alpestris*, but the 7cm stems never carry more than one blossom. The growing conditions are the same.

Ranunculus villarsii L.
This species of Section Ranunculus is a high alpine form of *R. montanus* with flowers of notable size and brilliance according to Farrer. There seem no garden records, but it seems indistinguishable from *R. montanus* apart from its size.

Show Reports

Discussion Weekend
Bearsden – 20-21 September, 1986

Exhibits at this show came from all parts of the British Isles. We are especially pleased that those exhibitors coming from farther parts of England and Northern Ireland supported the show so splendidly. Members at the conference can see a wide selection of plants from many different genera, reflecting the different enthusiasms of all the exhibitors. Much patience and careful work is needed to produce the magnificent foliage plants at this time of year. The foliage plants are the backbone and mainstay of the autumn show as well as the autumn garden. The dark maroon, shiny shortias, the delicate, many-hued ferns, variegated *Arabis ferdinandii-coburgii*, silver cushions, autumn tints of sorbus – all compete to attract us, making the bright blues of the gentians and the lilacs and whites of the colchicums and crocus even more cheerful.

The Forrest Medal was awarded to Mr Alan Spencely's superb pan of *Gentiana depressa*, its tubby bells of striped pale and darker blue sitting squat on the light-green leaves.

Certificates of Merit were awarded to a fabulous *Cyclamen graecum*, exhibited by Mrs Alice Spencely and Mr David Mowle's marvellously-flowered *Cyclamen cilicium*.

Mr Brian Russ took four trophies home with him: The J. L. Mowat Trophy for Best Conifer; the Mary Bowe Trophy (most points in Section I); the Logan Hume Trophy (best miniature garden); the Wellstanlaw Cup (best arrangement of flowers). Among his plants were *Shortia soldanelloides*, *Sempervivum arachnoideum*, *S. giuseppi* and *S. hirtum*, *Lobelia linneoides* and *Origanum tournefortii*.

The East Lothian Cup for 3 pans rock plants went to Mr Alan Spencely's exhibit of *Gentiana depressa*, *Raoulia hookerii* var *sericea* and *Ourisia microphylla*.

The Peel Trophy for 3 pans Gentiana went back to what is becoming its regular home. Mr and Mrs Viv Chambers' exhibit of Gentians included the marvellous white-striped *G. sino-ornata* 'Edith Sarah', one of the stars of the show.

The East Lothian Cup for the best plant – Section II – went to Mr Bob Maxwell's excellent *Gaulthera cuneata*.

Mrs Margaret Gillison Todd donated three framed prints as special prizes. These were awarded as follows:

Best Autumn Foliage – *Shortia soldanelloides ilicifolia* exhibited by Mr

Fred Hunt; Best Cyclamen – *Cyclamen graecum* exhibited by Mrs Alice Spencely; Best Plant in Fruit – *Clematis marmorarina* – exhibited by Mr Sandy Leven.

Mrs Roma Fiddes staged an intriguing collection of *Cyclamen hederifolium* forms, all grown from seed from Mr Jack Brownlees from a Greek form. All the plants had leaves which were light jade green with darker margins but of varying shape. Some had almost circular leaves, others varied through many intermediate shapes to one with narrow, saggitate leaves. The latter was especially interesting and perhaps unique. All had nice pink flowers. It is to be hoped that this strain will breed true to form in leaf shape.

Mr Harold McBride brought some marvellous plants from County Antrim. He won in the fern class with *Cheilanthes eatonii* grown from spores collected in the wild in the Colorado Rockies. It is an upright fern with fronds tinted with silver and purple. Harold also stopped the crowds with his pink-flowered shrub *Crowea exalta*, *Androsace vandellii* and a wonderful *Celmisia hectori*.

Superb in its second flowering of the year (I saw it in Aberdeen in May) was Margaret and Henry Taylor's *Lewisia* 'Pinkie', a nice, dark-leaved plant with rich, pale-pink flowers. Miss Joyce Halley's *Conandron ramondioides* drew many admiring looks. Another unusual plant was Sandy Leven's *Biarum tenuifolium*, a Cretan aroid with a very long, dark-purple flower. Mike and Polly Stone brought some more rarely seen Gentians – *ornata*, *stragulata* and *melandrifolia*. It was illuminating, as well as interesting, to compare the Scottish native *Diapensia lapponica* (Alan Spencely) with *Diapensia obovata* (Mike and Polly Stone) from Japan. The latter is a much laxer growing plant with deep brownish/purple leaves.

We would like to thank our judges, Mr Eric Watson, Mr Jack Crosland, Mrs Evelyn Stevens, and a special thanks to Mr Reginald Kaye, who was asked to "sort out" the ferns.

A. J. LEVEN

Fig 64 *Ranunculus parnassifolius* (see p. 330) A. Stevens

Fig 65 *Ranunculus traunfellneri* (see p. 335) A. Stevens

Spring in Cyprus – Part II: The North

CHRIS AND MARIE NORTH

NORTHERN CYPRUS was occupied by the Turkish Army in 1974 and for some ten years it has been inaccessible to tourists. Now it is opened up again to holidaymakers with the proviso that one must travel there via Turkey. There is still a strong military presence in the area, but one soon discovers that the troops are well disciplined, helpful and friendly and we got on well enough with them to have a meal in an army canteen before we left. Nevertheless, some areas are still 'out of bounds', as in the south of the island, though this does not apply to many of the sites of special botanical interest.

The most obvious physical feature is the Kyrenia range, a narrow ridge some 50 miles long running parallel to the north coast and nowhere far from the sea. Composed mainly of hard limestone, it is jagged and spectacular – resembling the Dolomites. Much of the rain falls on the north and west of the range, and it is here that the vegetation is most lush and interesting. The lower, southern slopes are much drier and the plants are more scattered and generally of less interest to the plant hunter.

Our base was on the north coast about ten miles west of Girne (Kyrenia) near the village of Lapta. All place names have been changed by the Turks so that the better-known Greek equivalents on most maps available in Britain are meaningless to the traveller in the area. For the purpose of this article the place names are those on the map published by the North Cyprus Ministry of Tourism and a list of Greek equivalents is included at the end.

Once again we rented a car, knowing that car hire is very expensive in mainland Turkey, we were pleased to find that in northern Cyprus it is relatively cheap. In March 1986 the most costly car available in Girne was a Golf diesel at £9 a day, unlimited mileage and insurance, and petrol and diesel fuel were cheaper than in Britain. Costs were low all round and we never met any of the inhabitants who were 'on the make'.

Starting our visit, as we usually do, by walking around our hotel, we saw several interesting plants by the roadside. *Bosea cypria* is an unprepossessing shrub with spreading branches bearing privet-like leaves and insignificant greenish flowers. It is sometimes used as a hedge in Cyprus and is interesting because it is a distinct endemic belonging to the *Amaranthaceae*. In places the roadside verges were blue with the broomrape *Orobanche ramosa* and there were fine specimens of a wild hollyhock, *Althea setosa*. Another interesting plant was the extraordinary *Hypericum triquetri-*

folium with large heads of hundreds of small St John's Wort flowers on branches arranged neatly at right angles on the main stem. Walking southwards, up to the village of Lepta, there was much *Lamium moschatum* by the roadside. This resembles our white dead nettle, *Lamium album*, with white or very pale pink flowers. Its unusual feature is the frequency by which it sports to a form with variegated upper leaves that are centred with white or pink and rival a coleus for their decorative effect.

Climbing up from the village towards the Kyrenia range, one passes broadly through old terraces, then dryish garrigue and finally to the rock walls of the range itself, and all this is accessible on foot from Lepta in a few hours with a little physical effort. We explored this region on several occasions and the following notes summarise our findings.

The grassy terraces with olives and carobs harboured some low-growing shrubs including: *Cistus salvifolius*, *Lithodora hispidula*, and *Sarcopoterium spinosum*. Amongst them there was a variety of herbs in the short grass and boulders, notably: *Bellis sylvestris*, *Clematis cirrhosus*, *Lagoecia cuminoides* and *Lathyrus aphaca* including a form with red, instead of the usual light yellow, flowers. The *lagoecia* is a curious little annual umbellifer with finely-divided leaves and hanging heads of small white flowers. It is fairly common in the eastern Mediterranean region, but is easily overlooked because of its small size. There were also two interesting dwarf buttercups, *Ranunculus paludosus* and the aptly named rare local endemic, *Ranunculus millefoliatus* ssp. *leptaleus* (from Lepta).

The turf was home to many interesting bulbous and tuberous-rooted species, though these were in scattered groups and not always found together:

Allium neapolitanum
Arisarum vulgare
Arum dioscoridis
Bellevalia nivalis
Bellevalia trifoliata
Cyclamen persicum
Gagea sp.
Gynandriris sisyrinchium
Muscari inconstrictum
Ornithogalum pedicellare

Bellevalia nivalis is a rare species with pale blue or white flowers somewhat like a small version of the more common *Bellevalia trifoliata*. *Muscari inconstrictum* is a miniscule grape hyacinth with a distribution also in Turkey, Syria, Palestine, Iraq and Iran. *Ornithogalum pedicellare* resembles a delicate form of the common *O. montanum* and is believed to be endemic to Cyprus.

There were a number of orchids, especially the very small-flowered form of *Ophrys fusca* ssp. *fleischmanii* which is a speciality of Cyprus but found also in Lebanon and Turkey, and the beautiful large *O. fusca* ssp. *iricolor*. Others included *O. lutea murbeckii*, the rather special *O. fuciflora* ssp. *bommuelleri* found in Cyprus, Lebanon, Israel and Turkey, *Orchis*

italica and *Orchis morio* ssp. *libani* – the Lebanese green-winged orchid – with a whitish, unspotted lip.

The garrigue consisted mainly of the shrubs *Calicotome villosa*, *Cistus creticus*, *Genista sphacelata*, *Lithodora hispidula* and *Sarcopoterium spinosum* with groups of taller shrubs and trees in places, including *Crataegus azarolus*, *Cupressus sempervirens*, *Myrtus communis* and *Phillyrea latifolia*. Under these grow some of the bulbous and tuberous-rooted species already mentioned together with *Urginea maritima*, an unidentified colchicum, and, in places, *Onobrychis venosa*. In dried-up river valleys the shrubs were taller, there were bushes of *Styrax officinalis* and the interesting small maple *Acer obtusifolium* with ripe 'keys'.

On one occasion we walked along a road that went right over the range and saw other species on terraces with olives and scattered pines. There was the interesting endemic, *Rosularia pallidiflora*, like a flattened houseleek growing in cracks in the rock, the bicolour endemic vetch *Vicia cypria*, the endemic umbellifer *Ferulago cypria* and *Gagea graeca* (syn. *Lloydia graeca*). Several orchids grew here, including those we have seen earlier, but also *Orchis anatolica*, *Ophrys carmeli*, *Neotinea maculata*, and we came across an interesting hybrid which seemed to be *Ophrys carmeli* x *bornmuelleri* and is not recorded previously by Davis and Davis (1983). There were not many birds here, but we did see hooded crows, jackdaws, magpies, goldfinches and chaffinches together with one or two ravens amongst the crags. Lepidoptera were fairly numerous, including brimstone, cabbage white, painted lady, the small Gruner's orange tip *Anthocharis gruneri* and the charming humming-bird hawk moth.

Our first outing by car was towards the west end of the Kyrenia range to look for the Cyprus tulip *Tulipa cypria* (Fig. 59, p.303), a rare endemic that Meikle (1977) says "is locally abundant in fields about Dhiorios and Myrtou". Firstly, we discovered that these two places are now called Tepebasi and Camlibel and then that the area is 'out of bounds' to tourists. However, travelling along this road later we bought a bunch from children selling them by the roadside. This species has rather large, coppery red flowers with pointed tepals furnished with a dark blotch at the base and wavy leaf margins – it resembles *T. beotica* of the Greek mainland. It is an attractive species and we would liked to have seen it growing, but were unable to make ourselves understood by the children.

Driving southwards past Tepebasi and towards Kalkani, there are interesting thin woods of *Pinus brutia* on both sides of the road. This was an excellent place for orchids and we saw:

Orchis morio libani
Ophrys argolica elegans
Ophrys lutea murbeckii
O. carmeli

O. fusca fleischmanii	*Neotinea maculata*
O. fuciflora bornmuelleri	*Serapias vomeracea orientalis*

Ophrys argolica ssp. *elegans* is special to Cyprus but probably found also in southern Turkey. It is a distinct and rather weak-growing bee orchid with flowers that seem to 'hold their chins up high'. The *Serapias vomeracea* ssp. *orientalis* is also a Cyprus speciality. It is an attractive tongue orchid with large, brownish red flowers and superficially resembles *S. cordigera* which is absent from the island. Accompanying these orchids there were many plants of the white *Gagea graeca* and yellow *Gagea peduncularis*, the buttercup *Ranunculus paludosus* and the curious little parasite *Cytinus hypocystis*.

Returning along this road past Tepebasi in a cool grassy roadside area near Gecitkoy, we came across our first *Ophrys kotschyi* (Fig. 60, p.304), the renowned Cyprus bee orchid. It is certainly a magnificent plant with a large lip having clear markings that are nearly black and white. Back on the coast at Guzeyali, growing in the beach, we saw an attractive anthemis that we have not been able to identify, together with *Anchusa undulata* ssp. *hybrida*, *Calendula arvensis*, *Centaurea aegiolophila*, *Helichrysum conglobatum*, *Mercurialis annua* and *Scabiosa prolifera*. On a diversion to Kayalar we saw *Salvia fruticosa*, the large-flowered storksbill *Erodium gruinum* and fields of white-flowered *Ranunculus asiaticus*. In places the orchids grew in such profusion here in the short turf that they were like weeds in an ill-kept lawn – including *Ophrys kotschyi*, sometimes in groups of four of five plants. There were many butterflies, with a fine, large form of the eastern festoon (*Allancastria cerisi*), clouded yellow, Gruner's orange tip, red admiral, swallowtail and wall brown.

To get to the higher parts of the Kyrenia range we drove eastwards out of Girne and on the road past Arapköy which crosses over the mountains near Buffavento castle, close to the highest point of the range (980m). Near the top there was a magnificent view, and we had the good fortune to see two imperial eagles soaring over the jagged peak of Pentadaktylos (720m). This rare bird replaces the golden eagle in Cyprus. In woods of *Pinus brutia* there were *Salvia fruticosa* and magnificent large rosettes of *Mandragora*. What species was it? It had large flowers like *M. autumnalis*, yet it flowered in spring like *M. officinarum*. At the highest point of the road, overlooking the south of the island, it was cold and windy. There was garrigue under stunted pines and *Cupressus sempervirens*, and amongst bushes of *Cistus creticus*, *C. salvifolius* and *Pistacia lentiscus* grew *Sideritis cypria* with thousands of miniscule plants of *Orchis anatolica*, some with white flowers. There were also a few plants of *Ophrys argolica elegans* and *Ophrys scolopax orientalis*.

Another easy way to get to the top of the range is to take the road from

from Girne (Kyrenia) to Lefkosa (Nicosia) and then, at a signpost, turn to climb to the St Hilarion crusaders' castle. Here are many plant treasures, including *Arabis cypria* with pink flowers like *A. purpurea* we had seen in the south, *Brassica hilaronis*, a typical cabbage with large, white flowers and possibly the original parent of the cauliflower, and the beautiful *Scilla cilicia*, found also in Turkey, Syria and Lebanon. Other plants we noted here were *Centaurea aegiolophila*, *Acer obtusifolium*, *Antirrhinum majus*, *Rosularia pallidiflora* and *Hyoscyamus aureus*. It is remarkable how often one finds the last mentioned growing on crusaders' castles throughout the Mediterranean. Could it have been used by the knights and their retinues as a medicinal drug, or as a poison? On our way down we carried out a commission for one of our friends at home to visit a Swede and his wife who live in Girne. Whilst we were there one of their little daughters came in with a bunch of *Ophrys kotschyi* she had picked behind the house.

Another trip we made along the coast road eastwards to Kaplica. This area is practically deserted and there are many ruined farms as a result of the recent fighting, though in some places unsophisticated farm folk from Turkey have been settled there – they wear mainland native costume. Hundreds of *Cyclamen persicum* flowered on the north-facing bank of the road and there were fields white with *Ranunculus asiaticus*. We saw also magnificent groups of *Serapias vomeracea orientalis*. By the sea shore near Kaplica grew *Medicago marina*, *Onobrychis venosus*, *Pancratium maritimum* and *Citrullus colocynthis*. Passing in the car the citrullus at first looked like a discarded load of oranges but, on stopping, we saw that they were in fact fruits of some kind of gourd or melon and that they were attached to last year's dead vines growing in the shingle. This is the bitter apple or bitter cucumber, allied to the watermelon and originally a native of India. It occurs as a weed in a few places in the Mediterranean, though probably cultivated there originally for its purgative properties.

Retracing our road some five miles from Kaplica, we turned south to Mersinlik. The road climbs rapidly through acid rocks with much *Arbutus andrachne*, heather and bracken. There were many cyclamen here, and we were surprised to find *Astragalus lusitanicus* ssp. *orientalis* that can be seen in the Troödos Mountains in the south but is not mentioned by Meikle (1977) as occurring in this area. We made our way to Kantara, which was once a fashionable summer resort but is now more or less a ruin as a result of the fighting. Here *Cyclamen persicum* grew in thousands in the deserted gardens, by the roadside and even came up through the tarmacadam road surface. Approaching the crusaders' castle at Kantara, the ground was carpeted everywhere with cyclamen and studded with *Orchis anatolica*. There were no other visitors to the castle than ourselves, and the views from there were magnificent. *Scilla cilicica*, we had seen at St Hilarion, grew

amongst the stones.

We made three visits to the Mesaoria, south of the Kyrenia range. In the west by Güzelyurt there are citrus plantations and promising marshland which is 'out of bounds', but all the way eastwards to Gazi Magusa and round the monastery of St Barnabus near the interesting ruins of Salamis there are cereal fields. Most of the weed is charlock, mallow and corn marigold, but we saw stands of what seemed to be a completely white-flowered form of *Chrysanthemum myconis* (syn. *Coleostephus myconis*) and some interesting forms of *Adonis annua*.

We recommend Northern Cyprus to plant enthusiasts. It would be worth going there for the orchids alone, for we have seldom seen them growing in such profusion, but there are many other endemic plants of interest and the stands of *Cyclamen persicum* in the north-east have to be seen to be believed. Do not be put off by the military presence . The Turkish Cypriots and the Turks are kind, well-mannered and friendly. At present, prices are very favourable to British visitors, so go before things get spoiled.

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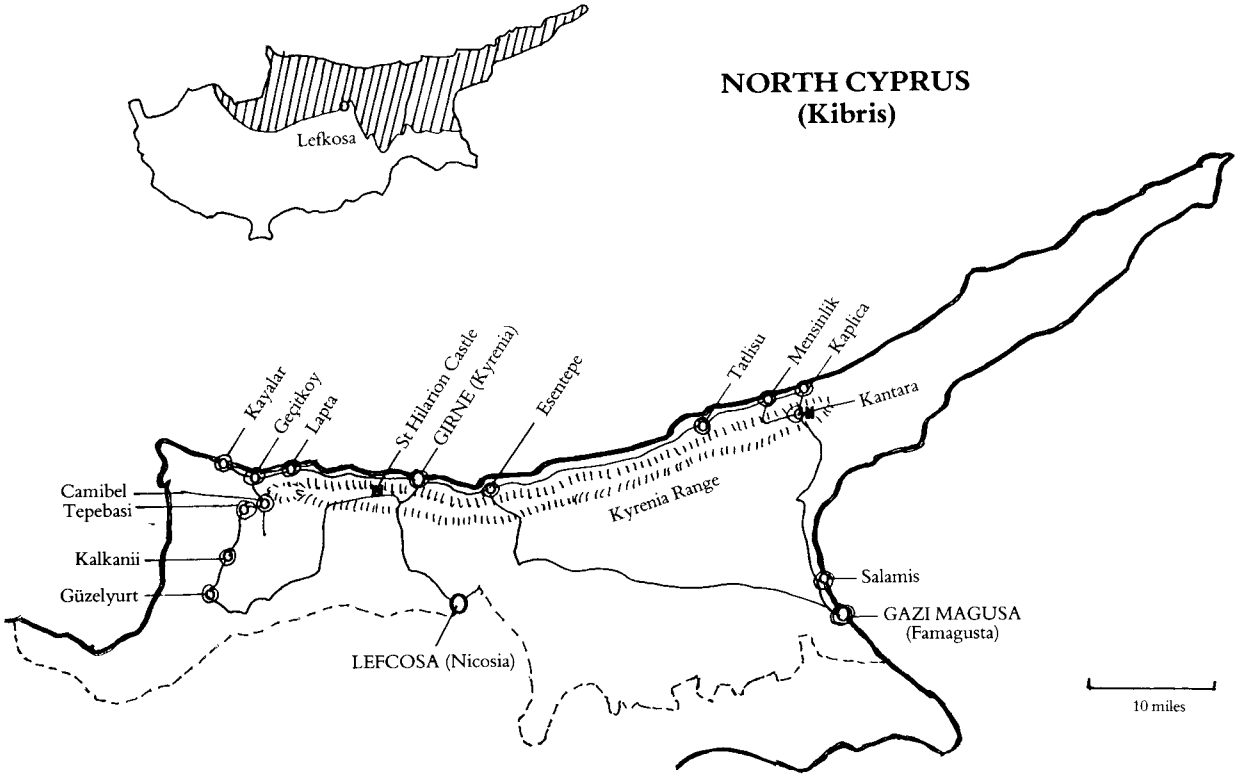
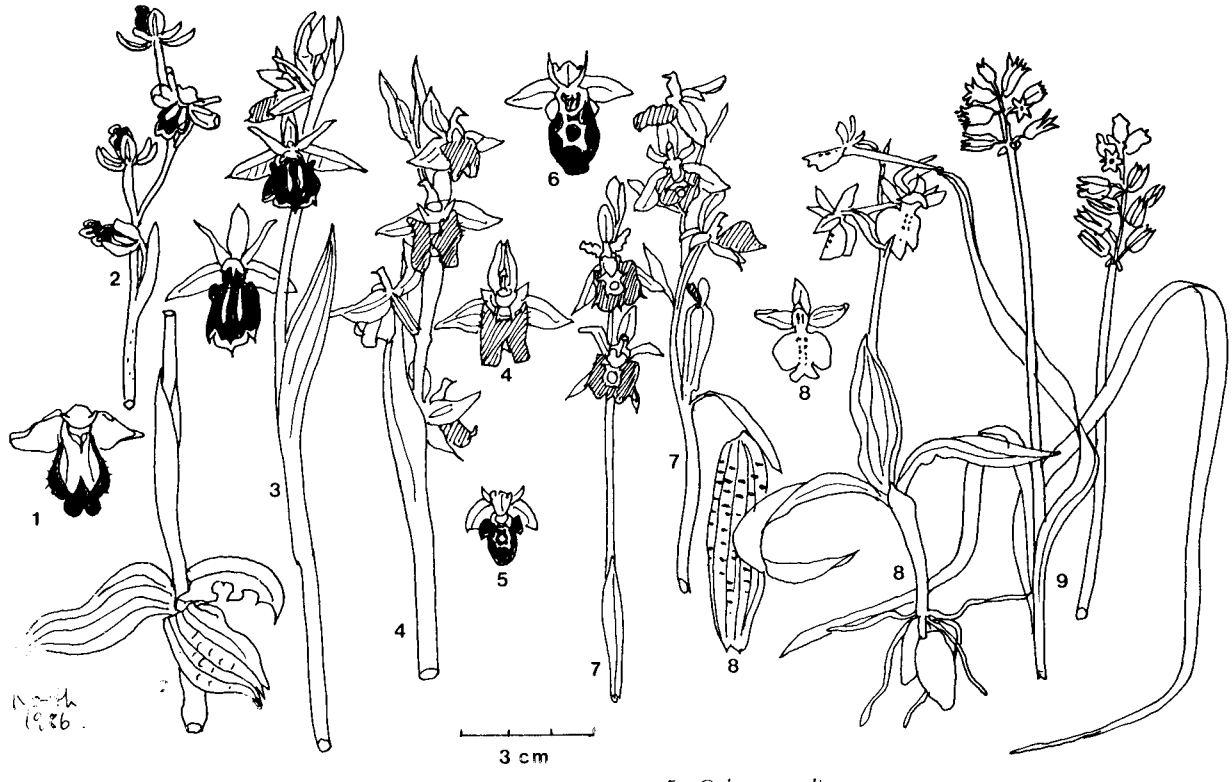
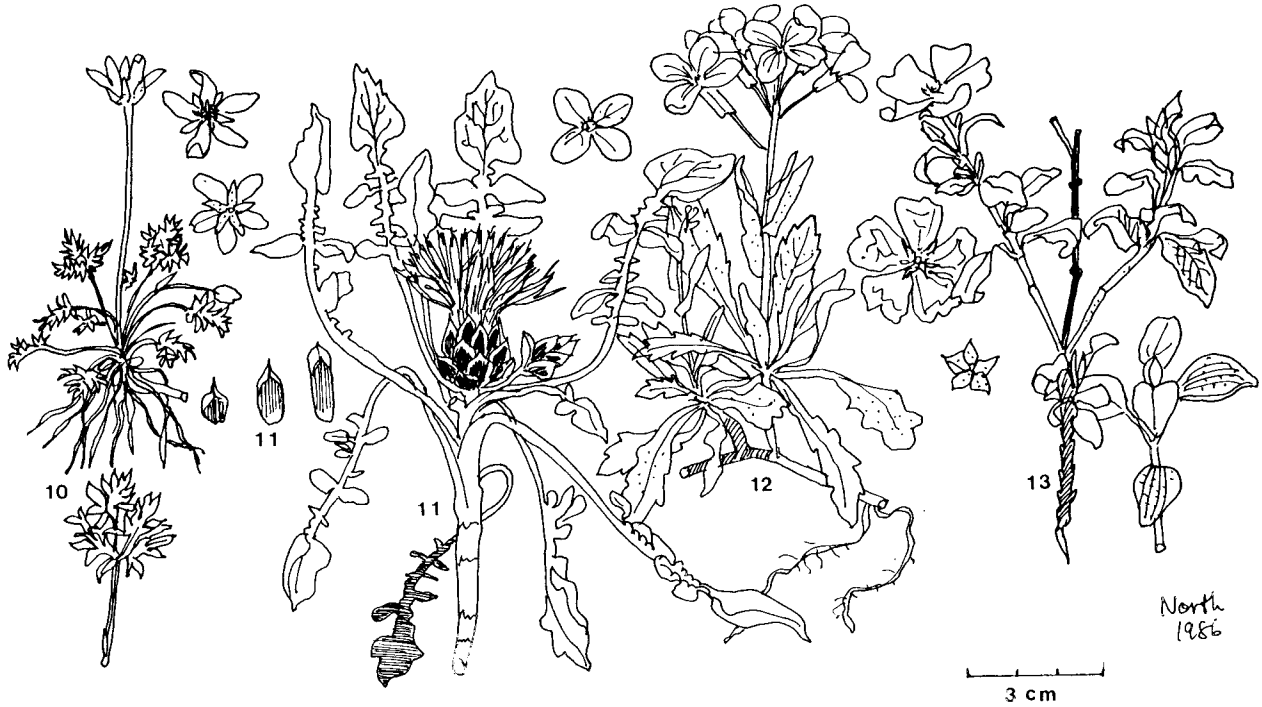
Turkish (left) and Greek Cypriot (right) names of places mentioned in the text:

Arapköy – Klepini
Camibel – Myrtou
Gazi Magusa – Famagusta
Geçitkoy – Panagra
Girne – Kyrenia
Güzelyurt – Morphou
Kalkanii – Kalokhorio
Kantara – Kantara
Kaplica – Dhavios
Kayalar – Orga
Lapta – Lapithos
Lefkosa – Nicosia
Mersinlik – Phlamoudhi
Tepebasi – Dhiorios

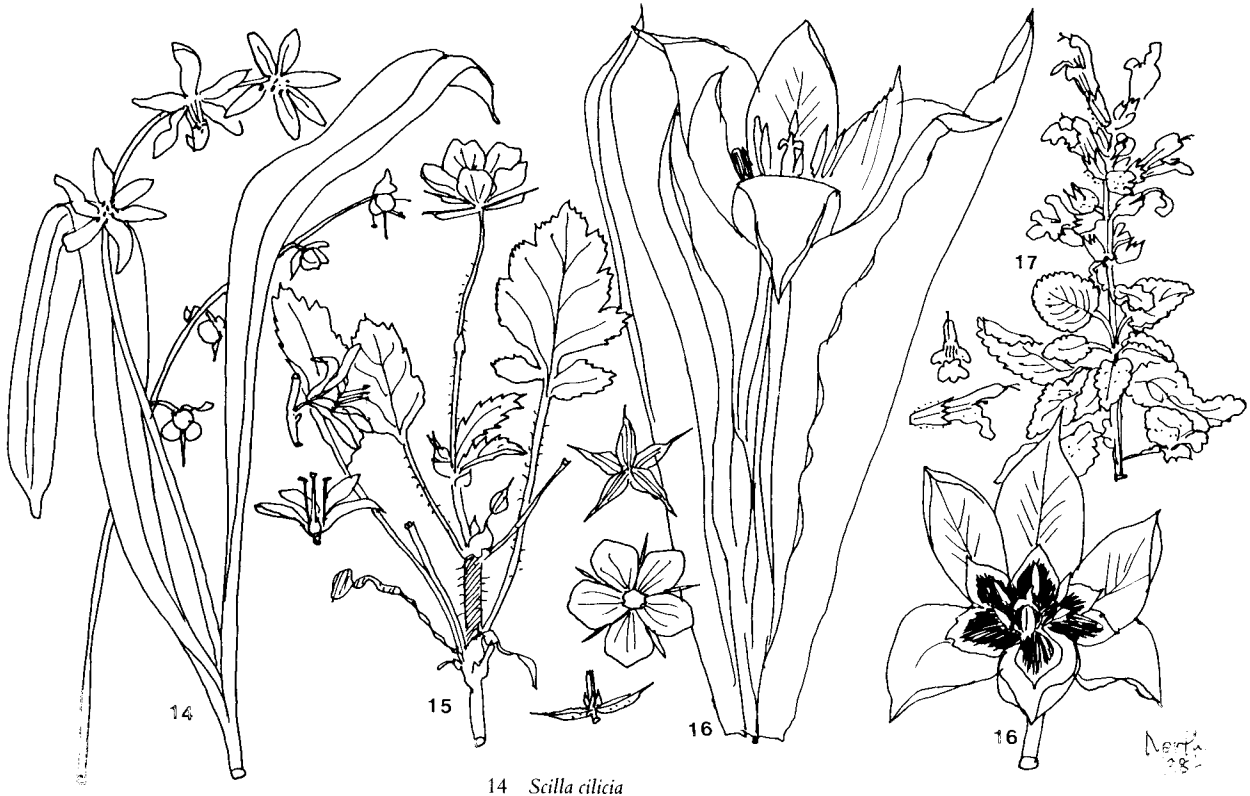

NORTH CYPRUS
(Kibris)
Lefkosa
Kayalar
Geçitkoy
Lapta
St Hilarion Castle
GIRNE (Kyrenia)
Esentepe
Tatlisu
Mensinlik
Kaplica
Kantara
Camibel
Tepebasi
Kalkanii
Güzelyurt
Kyrenia Range
Salamis
GAZI MAGUSA
(Famagusta)
LEFCOSA (Nicosia)
10 miles



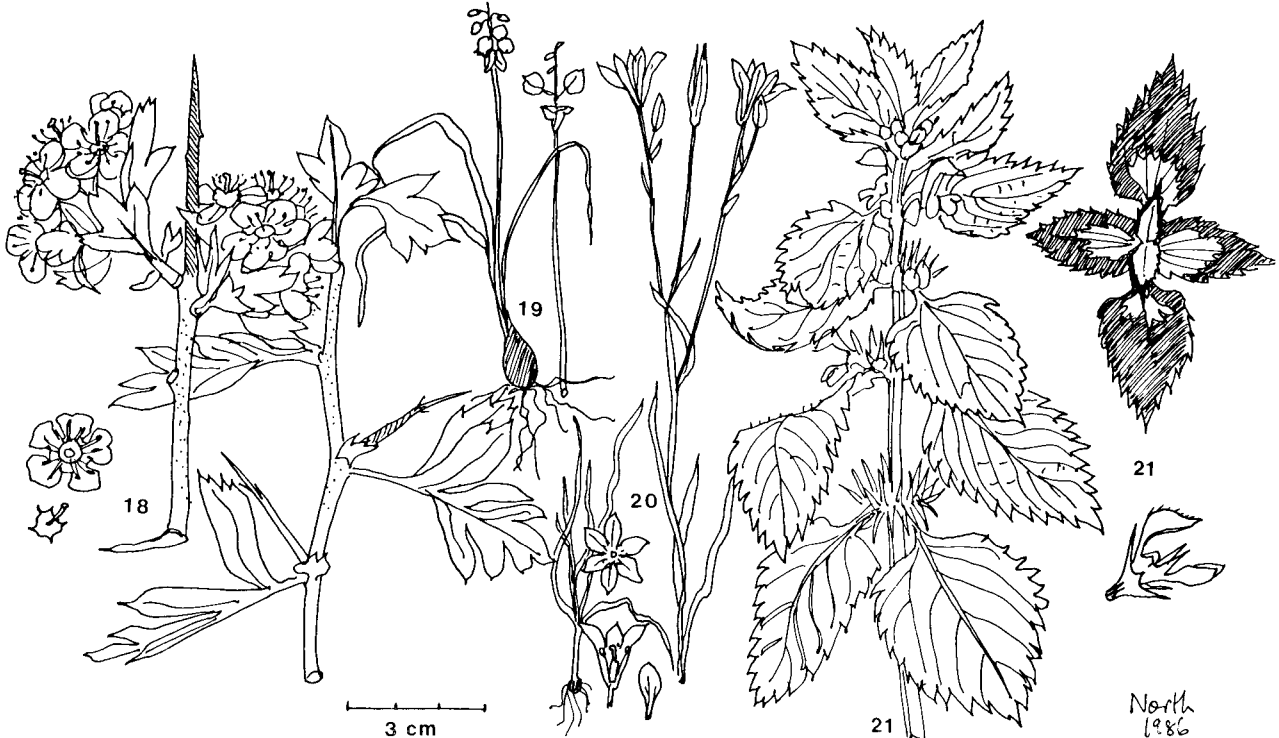
1 *Ophrys fusca* ssp. *iricolor*
2 *Ophrys fusca* ssp. *fleischmanii*
3 *Ophrys sphegodes* ssp. *sintenisii*
4 *Ophrys fuciflora* ssp. *bommuelleri*
5 *Ophrys carmeli*
6 *Ophrys kotschyi*
7 *Ophrys argolica* ssp. *elegans*
8 *Orchis anatolica*
9 *Bellevalia nivalis*



10 *Ranunculus millefoliatus* ssp. *leptaleus*
11 *Centaurea aegiolophila*
12 *Arabis cypria*
13 *Cistus parviflorus*



14 *Scilla cilicia*
15 *Erodium gruinum*
16 *Tulipa cypria*
17 *Salvia fruticosa*



18 *Crataegus azarolus*
19 *Muscari inconstrictum*
20 *Gagea graeca*
21 *Lamium moschatum*

Letters to the Editor

48 Hamilton Drive, Whitley Bay, Tyne & Wear NE26 1JQ

Dear Sir,

Some weeks ago I wrote to you on various matters, one of which was the statements justifying removing plants from their natural habitats as discussed in the Stone Column (vol. XX. No. 79).

First in praise thereof – I always read this first for its never failing interest. Now the bad news – we shouldn't really condone the sentiments about collecting plants. The Botanical Society and the Alpine Garden Society are full of wise counsel on this point.

There is no excuse for removing plants to cultivation unless it is in the interests of conservation or for research. Because the commercial world indulges in such practices is no justification whatsoever, even if a species is gloriously abundant.

The case of the primrose and cowslip is sufficient warning of what may happen. For a time these became much less abundant in areas known to me.

I think the great British public has taken the message now, so I am saddened to see our columnist reversing a healthy respect for the countryside, be it in the UK, Alps or whatever.

Please, members, keep to seed collecting, what a glorious assemblage of plants are available from such sources. Do we really need to be so selfish and uncaring that future generations are deprived? Are there such things as discriminating enthusiasts?

Yours sincerely,
Richard C. Simpson.

Beech Park, Clousilla, Co. Dublin.

Dear Sir,

Having read your article in the SRGC Journal, I can not resist mentioning that this is the second time advice is given on growing *Ranunculus millefoliatus* in dry conditions. I have grown it here in a humid climate in semi-shade in a peat bed for up to 10 years in perfect health.

Yours sincerely,
David Shackleton.

Dates and information on the Seed Exchange

1. Seed and list of seed to reach me by end of October.
2. Seed name and your name printed on each packet.
3. Seed in seed-proof packets – see SRGC Journal, June 1984.
4. If you donate seed, you will automatically be sent a seed list. (If you want it First-class post, – home donors only – send me stamps – 18p – otherwise it goes second-class.)
5. All overseas members are sent a seed list. (Ireland comes under home.)
6. Home non-donors should send me a SAE (4½″ × 8″) before the end of December.
7. Lists are sent out at end of December. If you are due one and it does not arrive by mid-January, please contact me.
8. Requests for seed must be sent to me by the end of February on the form on the back of the current seed list.
9. Please read page two of the list.
10. Orders are date-stamped as they arrive. Home non-donors are not started till the end of February, even if they arrive during January. (They have lowest priority.)

The seed exchange can only supply what is donated. Please keep up the good work and send in clean seed. Looking forward to keeping up the past standard. Thank you, Joyce, for all the help over the past year in making my takeover much easier.

My address is:

Mrs Jean Wyllie,
1 Wallace Road,
Dunblane,
Perthshire FK15 9HY

Discussion Weekend September 1987

St Andrew's College of Education, Bearsden, Glasgow
Friday 18 to Sunday 20 September 1987

Programme

Friday 18	
4.30pm-6.00pm –	Registration
6.30pm –	Dinner
8.00pm –	*A Walk in Old Lazistan*
	Michael Almond
Saturday 19	
8.30am –	Breakfast
9.00am-10.00am –	Show Room open to receive exhibits
10.00am-12.30pm –	Registration
1.00pm –	Lunch
2.15pm –	Welcome by the President
2.30pm –	The William C. Buchanan Memorial Lecture
	Acid Screes, A Useful Gardening Tool
	Bob Mitchell
3.45pm –	Tea
4.15pm –	*The Genus Crocus*
	Brian Mathew
6.30pm –	Dinner
8.00pm –	Informal Discussion and Members' Slides
Sunday 20	
9.00am –	Breakfast
9.45am –	*Tufa, A Rock For All Ages*
	Peter Cunnington
11.00am –	Coffee
11.30am –	The Harold Esslemont Lecture
	From Arizona to Washington State, A Journey Through the Western USA
	Henrik Zetterlund

1.00pm –	Lunch
2.30pm –	*Preparing Places for Precious Plants* Jim Cobb
3.45pm –	Close of Proceedings
4.00pm –	Tea

Accommodation will be in single student type bed-sitters. The Conference centre, formerly Notre Dame College of Education, is situated at the junction of the A809 and A810. Full directions and a map will be sent on application.

The Autumn Show will be held in conjunction with the Conference. Donations of plants will be very welcome for the Bring and Buy Stall.

Charges

Full board from Friday dinner till Monday breakfast	£69.00
Full board from Friday dinner till Sunday tea	£53.00
Full board from Saturday lunch till Sunday tea	£39.00
Saturday: Lunch, tea, dinner	£18.00
Sunday: Coffee, lunch, tea	£11.00
Saturday and Sunday	£29.00

Applications for bookings, together with the appropriate remittance, should be sent to the Registration Secretary, Mrs E. M. Bezzant, Monievreckie, Port of Menteith, Stirling FK8 3RD.
ALL BOOKINGS MUST BE RECEIVED BY 29 AUGUST 1987.

Diamond Jubilee

Our attention has been drawn to the Diamond Jubilee (1927-1987) Catalogues of W. E. Th. Ingwersen Ltd. at Birch Farm Nursery and Holden Clough Nursery at Holden. Without wishing to draw attention to one nursery at the expense of the many which supply our members with plants, it is worthwhile mentioning that these catalogues list thousands of plants.

We naturally hope that nurseries will continue to advertise in The Rock Garden but would welcome articles from nurserymen describing their nursery and the types of plants they grow. There would be no fee paid for such articles, but it should be a useful means of free advertising. Anyone interested should contact the Editor.

Colour Illustrations

The production of good colour illustrations in the Journal depends to a great extent on the quality of the material submitted to the Editor, so it may be worthwhile pointing out a few important things to bear in mind.

Colour can be accepted either as colour prints or as colour slides, but in both cases the pictures should be as clear as possible and in really sharp focus.

While text can be accepted for printing as late as a few days before the deadline, colour material should be sent in at least three months before the text deadline. This is in order to assemble a suitable collection of colour which matches in format, colour tones, density and transparency or print. It is quite uneconomical to do colour separations of single pictures; but groups have to be matched.

Any author who wishes to illustrate an article with colour should contact the Editor as early as possible; it does not matter how soon in advance of the text the colour arrives; it can be kept indefinitely.

With the increasing difficulty of obtaining good black and white prints nowadays, the Journal is gradually moving over to having all illustrations in colour. It will be possible to achieve this and to have good quality if authors bear in mind the above points.

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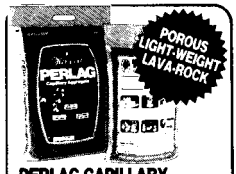

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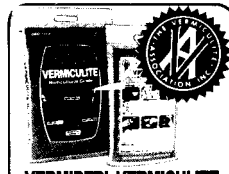

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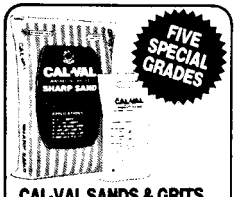

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See under Subscriptions for the Club Giro Number.

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