The JOURNAL of THE SCOTTISH ROCK GARDEN CLUB

VOLUME XVII Part 3
No. 68

APRIL 1981

Editor R. J. MITCHELL • University Botanic Garden • St. Andrews • KY16 8RT

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NOTICE

The ANNUAL GENERAL MEETING will be held at the Clarkston Hall, Clarkston, Glasgow, on **Saturday 31 October 1981, at 2 p.m.**

In accordance with the Constitution and Rules amended in 1980, members are notified that nominations are required for President, Secretary, Treasurer, Subscription Secretary, Editor, Publicity Manager, Publications Manager, Curator Davidson Slide Library, Overseas Liaison Secretary and four Ordinary Members to serve on the Council. Nominations *in writing, and seconded by another Club member or members*, must be sent to the Honorary Secretary no later than **15 May 1981,** the nominator having ascertained that the nominee is willing to serve if elected.

All Executive Office-bearers retire annually, but are eligible for re-election.

The following, having served for three years as Ordinary Members, retire and are not eligible for re-election as Ordinary Members for one year:—

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Discussion Week-End 1981

NOTRE DAME COLLEGE OF EDUCATION
BEARSDEN
GLASGOW

SATURDAY and SUNDAY, 19th and 20th SEPTEMBER 1981

PROGRAMME

Saturday 19th:

1.00 p.m.	Lunch
2.15 p.m.	Address of Welcome
2.30 p.m.	The W. C. Buchanan Memorial Lecture ''The Second Ten Years'' Jim Sutherland
3.45 p.m.	Tea
4.15 p.m.	''Plants of the Tali Mountain Ranges, Yunnan'' Bob Mitchell
6.30 p.m.	Dinner
7.30 p.m.	''Settling in With New Plants From Nepal'' David Mowle

Sunday 20th:

9.00 a.m.	Breakfast
9.45 a.m.	''Orchids of Europe in the Wild and in the Garden'' Chris North
10.45 a.m.	Coffee
11.15 a.m.	The Esslemont Lecture ''Looking for Bulbs in the Eastern Mediterranean'' Ole Sonderhausen
1.00 p.m.	Lunch
2.30 p.m.	''Plant Photography'' Sidney Clarke
3.45 p.m.	Close of Proceedings
4.00 p.m.	Tea and Disperse

Accommodation will be single student type bed-sitters which may be arranged as twin-bedded rooms on request. The College, which is pleasantly situated on the outskirts of Bearsden, is at the junction of A809 and A810. It is easily approached from the Clydeside Expressway, which connects with main routes from North (M73, M8), East (M8) and South (M74, M8). There is ample car parking space within the grounds. A full and interesting programme has been arranged.

The Autumn Show will be held in conjunction with the Conference. For details see Show Schedule. A meeting of the R.H.S. Joint Rock Garden Plant Committee will be held at 12 noon on the Saturday of the Show.

Donations of Plants, Books, Pottery, Paintings, etc., will be much appreciated for the 'Bring and Buy' Stall.

CHARGES, INCLUDING V.A.T. AT 15% AND CONFERENCE FEE

Full board from Friday dinner till Monday breakfast ..	£45.50
Full board from Friday dinner till Sunday tea ..	34.50
Full board from Saturday lunch till Sunday tea ..	23.00

Day Charges:

Saturday: Lunch, tea, dinner	10.50
Sunday: Coffee, lunch, tea	7.00
Saturday and Sunday	15.50
Lectures only, per day	5.00

ALL BOOKINGS, RESIDENTIAL AND DAY, MUST BE RECEIVED BY 28th AUGUST 1981.

As final numbers have to be confirmed with the College administrative staff some time before the Conference, it will not be possible to accept late bookings.

Applications for bookings, together with the appropriate remittance (payable to E. M. Bezzant) should be sent to the Registration Secretary, Mrs. E. M. Bezzant, 24 North Grange Road, Bearsden, Glasgow G61 3AF.

In the event of a change in V.A.T. rates, charges may have to be adjusted.

NEW POSTAGE DATES FOR THE JOURNAL

Council have agreed that, in order to reduce expenses, only two postings will now be undertaken. This will mean that the coming autumn journal will be held over and will be included with the Yearbook and Show Schedules. Thereafter the journal will be posted to members in June and January.

The current journal is larger than normal to offset this new arrangement.

Scottish Mountain Flowers

by JAMES R. AITKEN

THE COMPLEX and varied rock formations which make up the Scottish Highlands give rise to an equally varied plant life. The following plants which I name are by no means an exhaustive list. Indeed, they are merely a selection of the more interesting plants which have given me pleasure during many years of wandering over this extensive terrain. Much of our flora gradually spread north from the Continent at the close of the last Ice Age — approximately 20,000 years ago. At that time the British Isles were joined to the land mass of the Continent. As the ice retreated plant life advanced north to colonise the barren land, from the hard acid Lewisian gneiss of the north west, to the softer mica schists of Ben Lawers, Ben Ledi and mountainous areas of more recent formation. When the English Channel was formed by land subsidence, further spread from the Continent halted. This is partly the reason for the much richer flora of the Swiss Alps compared to the Scottish mountains but even so, the botanist will surely find much of interest, many thrilling moments of discovery, and days of great pleasure on our high places.

Ben Lawers (3984 ft.) has long been recognised as having the richest plant community of any British mountain and is the only known location of some species in this country. The cliffs of An Stuc and the south west corries around 3500 ft. level are clothed with a great variety of alpine plants and low shrubs. First to flower in March and April is the early purple saxifrage (*Saxifraga oppositifolia*), found in great abundance and usually associated with the moss campion (*Silene acaulis*), rose-root (*Rhodiola rosea*) and the yellow saxifrage (*Saxifraga aizoides*). On the higher ledges and crevices are found many treasures — *Saxifraga nivalis*, *Saxifraga cernua*, alpine cinquefoil (*Potentilla crantzii*) and *Gentiana nivalis* are but a few. If one happens to glimpse a small flower of a rich deep blue on some high rock face, this will be the rare and lovely *Veronica fruticans*; also rare is the alpine fleabane (*Erigeron borealis*). Perhaps the most interesting prostrate shrub to be found here is the reticulate willow (*Salix reticulata*), so called because of its deeply veined leaves. It usually chooses to drape itself over exposed rocky places and is in fact more at home in the arctic regions. Later in the season (July/August) the cliffs are bespangled with the intense blue of the alpine forget-me-not (*Myosotis alpestris*) which is a

close relative of the King of the Alps (*Eritrichium nanum*), said to have the brightest blue of any known flower.

In the Sow of Atholl on similar base rich soils the rare *Phyllodoce caerulea* (fig. 39) grows. Recently further sites have been found to extend its distribution further west towards Rannoch Moor.

In complete contrast to the mountains of central Scotland are the Torridonian sandstone mountains of the north west highlands which rise from sea level at Loch Torridon to heights of round 3000 ft. Some of the high tops are covered with a formation of white quartzite and pipe rock which is the earliest of the Cambrian series and looks from a distance like a permanent layer of snow. In this area of magnificent scenery are the remnants of the Caledonian pine forests; in one such area on the slopes of Ben Eighe our smallest British orchid, the lesser twayblade (*Listera cordata*) grows on moss-covered fallen tree trunks along with the alpine bladder fern (*Cystopteris alpina*) and the green spleenwort (*Asplenium viride*). Higher up on the slopes of crushed quartzite is the home of many sub-shrubs, including alpine bearberry (*Arctostaphylos alpina*) (fig. 40) which has black berries and leaves which turn red and scarlet in autumn, and common bearberry (*Arctostaphylos uva-ursi*) with red berries. On the bare rocky slopes around 3000 ft. that smallest of shrubs — the creeping azalea (*Loiseleuria procumbens*) (fig. 41) grows in spreading mats, hugging the ground for protection, and all around are hard hummocks of the moss cyphal (*Cherleria sedoides*). On the exposed summits of these mountains, the northern rock cress (*Cardaminopsis petraea*) is found, a slender-stemmed plant bearing small white flowers which hardly look capable of withstanding the elements at these heights, while snug between large blocks of quartzite, the delicate fronds of the parsley fern (*Cryptogramma crispa*) find shelter from the wind.

Before leaving the Torridon area, a walk along the sea-shore might be rewarded by a sight of the oyster plant (*Mertensia maritima*); this grows among the boulders a short distance above high water mark, and the red sandstone forms a perfect setting for the glaucous blue leaves.

In 1951 *Diapensia lapponica* (fig. 42) was found growing on mica schist on a remote mountain in Inverness-shire. This is a shrubby plant which is more at home in the arctic regions, and caused quite a stir in botanical circles when it was discovered. In early June the conspicuous creamy-white flowers are borne on short stems over a tight dome of minute foliage.

Fig. 39—Phyllodoce caerulea
Photo—R. B. G. Edinburgh

Fig. 40—Arctostaphylos alpina
Photo—J. Aitken

Fig. 41—Loiseleuria procumbens
Photo—J. Aitken

Fig. 42—Diapensia lapponica
Photo—A. Evans

Fig. 43—Primula scotica
Photo—J. Aitken

Fig. 44—Oxytropis halleri
Photo—J. Aitken

On the wild rocky coast of the Pentland Firth in the far north, outcrops of limestone of the Moine Thrust are exposed near Bettyhill and also at Loch Eriboll. Where this occurs, a great change takes place in the surrounding vegetation. Heather and other acid loving plants come to an abrupt halt and one steps on to short green turf between rocky places carpeted with the mountain avens (*Dryas octopetala*). In the fissures of the limestone many dwarf ferns find a congenial home. The holly fern (*Polystichum lonchitis*), maidenhair spleenwort (*Asplenium trichomanes*), black spleenwort (*Asplenium adiantum-nigrum*) and the hart's-tongue fern (*Phyllitis scolopendrium*) are all found there.

The short turf along the top of the north-facing sea cliffs of Caithness and Sutherland is the home of our own lovely *Primula scotica* (fig. 43). People come from near and far to kneel before this little plant which seldom grows more than two inches high so that one must go down on one's knees to appreciate its full beauty. *Primula scotica*, along with the dwarf cornel (*Chamaepericlymenum suecicum*), cloudberry (*Rubus chamaemorus*) and dwarf willow (*Salix herbacea*) which all grow in this neighbourhood, are thought to have survived the Ice Age by growing in small ice-free areas or nunataks, for all have the ability to survive for long periods under snow and ice.

Growing at the edge of the cliffs in dry situations is a showy member of the legume family. *Oxytropis halleri* (fig. 44) has large purple flowers which are well set off by the lovely silky foliage and the drier the site, the more silky it becomes.

Many varieties of orchids are found here. The slender white orchid (*Leucorchis albida*) and the fragrant orchid (*Gymnadenia conopsea*) grow together on the cliff tops, and in spring the early purple orchid (*Orchis mascula*) appears on ledges all over the cliffs, often flowering in association with the globe flower (*Trollius europaeus*).

Amongst all the cliff-top plants is found our smallest native bulbous plant, the vernal squill (*Scilla verna*). It grows in vast numbers among the *Primula scotica* and is of a similar stature. In spring, the soft blue flowers colour the ground when seen from some way off. From July till the end of August, the turf is gay with the white flowers of the grass of parnassus (*Parnassia palustris*). Here it grows from one inch to three inches high and is considered to be distinct from the inland form which can attain a height of nine to ten inches in suitable conditions.

The Outer Hebrides are almost entirely composed of Lewisian gneiss which is a very hard rock, impervious to water, and has been subjected to much glaciation. The prevailing westerly winds bring a high rainfall

to the islands, and inland a deep layer of blanket peat has formed. Harris is a rugged and mountainous island, having the highest mountain in the outer isles — The Clisham (2622 ft.) — and numerous other summits between 1000 and 2000 ft. Down the west coast are extensive sandy bays between headlands and in places, where the sand has been blown inland, good turf has ensued. This is known as the machair and, in season, is covered with wild flowers in great profusion. The centaury plant (*Centaurium erythraea*) with its bright pink flowers is found on the drier areas. This little plant was called after the legendary Greek healer who used the herb to heal an arrow wound. The machair is covered in places with wild thyme (*Thymus drucei*) and a careful search may result in the finding of the red broom-rape (*Orobanche rubra*), which is a parasite on the roots of thyme. On slightly damper places the frog orchid (*Coeloglossum viride*) is found in great abundance, growing two to eight inches high, while underneath the taller plants the tiny bog pimpernel (*Anagallis tenella*) spreads about.

At the area known as Temple Park, the meadows which slope westwards to the sea are covered in July with sheets of the kidney vetch (*Anthyllis vulneraria*) and among this protrude spikes of the sweetly scented butterfly orchid (*Plantanthera biflora*), and the marsh orchid (*Dactylorhiza incarnata*) in shades of deep purple and brick red.

In contrast to the sands of the west coast of Harris, the east is completely rocky with countless peaty lochans set in the undulating gneiss and all around are huge glaciated boulders, sometimes perched precariously on top of the low hillocks. Here also is a contrast in vegetation, a change to acid loving plants and a wealth of water and bog plants.

Round the rocky margins of many of the lochans, the royal fern (*Osmunda regalis*) is found growing among dwarf willow and birch scrub, and on one loch a small island is mainly composed of this handsome fern, growing from three to four feet high. Some of the larger lochs are massed with white water lilies (*Nymphaea alba*) and where the water is shallow with sand or gravel on the bottom the water lobelia (*Lobelia dortmanna*) grows with its pale flowers held sufficiently high above the water so that no damage will be done to the blooms even in a stiff breeze.

If one looks closely among the bog asphodel (*Narthecium ossifragum*) and sundew (*Drosera rotundifolia*) in wet areas of the moorland, the little pink butterwort (*Pinguicula lusitanicum*) may be found. It has very small pink flowers and flesh-coloured leaves and is only found in the north and western regions of Scotland.

In these northern parts, autumn colours begin to show in early September. *Rhodiola rosea* turns red on the cliffs before the leaves drop, and the common blaeberry stains the moors in yellow and scarlet colours.

Prostrate junipers (*Juniperus communis*) are massed with blue-black berries and the last flowers of the field gentian (*Gentianella campestris*) are hastening to set seed before the season is over.

One of the last wild flowers to brighten the shortening days is the devil's bit scabious (*Succisa pratensis*). It is in bloom from August till the end of September, and often into October, the powder blue flowers standing erect amongst the multitude of seed heads of the earlier meadow plants.

By this time the first snow will have descended on the higher tops and the alpine plants will be having their winter rest. Under the snow, the early purple saxifrage will have already formed its flower buds and now awaits the melting of the snow in spring.

SUBSCRIPTION SECRETARY OFFICE VACANT

The Council is looking for a successor to David Donald who has resigned from the office of Subscription Secretary, because of ill-health. At the time of going to press the work of the Subscription Secretary is being greatly simplified with the help of a Computer Bureau which specialises in the needs of societies such as ours. By the A.G.M. in October 1981 the new Subscription Secretary should be able to take over from David Simpson who is acting as Interim Subscription Secretary, a straightforward and much less complex job.

No knowledge or experience of working with a computer service is required; communication with the Bureau could be either by post or telephone, so the Subscription Secretary could be based anywhere in the country.

The office carries an Honorarium.

The Council is very anxious to make an appointment at the coming Annual General Meeting. Anyone who might like to undertake this interesting and important job should contact the Honorary Secretary for further details.

Isobel J. Simpson, Hon. Sec., 2 Dalrymple Crescent,
Edinburgh EH9 2NU. Telephone 031-667 7747

Some Facts and Fancies on the Genus Primula

by KEN HULME

The W. C. Buchanan Memorial Lecture given in Bearsden 1980

THE FAMILY *Primulaceae* is easily separable in the flowering stage from all other plant families. Herbaceous plants with joined petals, stamens attached to and opposite the petal lobes, and also free central placentation can only be placed in *Primulaceae.* Anyone who doubts whether they can recognise a case of free central placentation need only remember diagrams of the capsule of scarlet pimpernel reproduced in standard botany textbooks. A sharp knife and a x10 hand lens will enable one to identify the same arrangement in all members of the family *Primulaceae.*

The following key adapted from standard floras is easily used.

1. Leaves all radical, or rarely, the cauline leaves borne in several irregular whorls:
   2. Corolla lobes reflexed (i.e. turned back round tube)
      3. Anthers exserted from corolla tube — *Dodecatheon*
      3. Anthers included in corolla tube — *Cyclamen*
   2. Corolla lobes spreading or erect, but not turned back around tube
      4. Anthers barbed
         5. Petals fringed — *Soldanella*
         5. Petals entire — *Cortusa*
      4. Anthers blunt
         6. Corolla tube shorter than lobes — *Androsace*
         6. Corolla tube longer than lobes
            7. Scapes 1-flowered; sepals, corolla lobes and stamens 6; corolla limb irregular — *Omphalogramma*
            7. Scapes (1-) many-flowered; sepals, corolla lobes and stamens usually 5; corolla limb usually regular, though the tube may be curved
               8. Corolla with 5 scales in the throat — *Douglasia*
               8. Corolla without scales in the throat
                  9. Plants small, usually aromatic, densely tufted, or forming cushions; lower parts

of the stems woody; corolla tube often curved *Dionysia*

9. Plants often larger, rarely aromatic, not forming dense tufts or cushions; all parts above ground herbaceous; corolla tube usually straight *Primula*

1. Leaves present on flowering stems, at least the lower ones alternate

10. Corolla regular; calyx without glands or spiny teeth

11. Ovary superior

12. Aquatic or subaquatic plants with finely dissected leaves *Hottonia*

12. Land plants with simple leaves

13. Sepals, corolla lobes and stamens (5-)7(-9); uppermost leaves in a whorl, larger than the alternate lower leaves *Trientalis*

13. Sepals, corolla lobes and stamens 5; all leaves alternate

14. Capsule opening by means of a lid *Anagallis*

14. Capsule opening by valves *Lysimachia*

11. Ovary ½-inferior *Samolus*

10. Corolla irregular; calyx with black glands between the spiny teeth *Coris*

Some difficulties arise in separating some lesser known genera from *Primula*. There is no clear character on which *Dionysia* can be separated from *Primula*. The suggestion that the woody rootstock of *Dionysia* is sufficient to separate it from *Primula* meets with difficulty when one considers that *Primula forrestii* from W. China and *P. suffrutescens* from western N. America also have woody rootstocks.

The geographical distribution of the genus *Primula* is interesting. Of the 450 or so recognised species by far the greater number are concentrated around Western China and the Himalayas. The genus is divided into 30 sections. There are 33 species listed in Flora Europaea. Twelve are found in North America and 3 species are described from an area "approaching" the southernmost part of South America.

If one represented the distribution of species in graph form the peak concentration would be around the eastern extremities of the Himalayas; travelling west one would note a progressive decline until

reaching the Middle East. At this point there is a sudden dip before species numbers in Europe cause the graph to rise. Placing *Dionysia* within *Primula* would make the graph much more *probable* (dare I mention there is often logic in plant name changes).

As one would expect with a genus largely centred in the far east, many of the species with which we are familiar are of fairly recent introduction. George Forrest alone discovered some 50 species. Add to these the range first encountered by F. Kingdon-Ward, G. Taylor and Ludlow and Sherriff and it will be realised that approximately one-third of the known species have been reported in the present century. Unfortunately there are only around 150 species represented in cultivation, including our native *P. vulgaris*, *P. veris*, *P. scotica* and *P. farinosa*. Inevitably there are many charming species which have only made a fleeting appearance in cultivation. The writer's brief contact with so many in this category came through raising plants of Ludlow and Sherriff's expeditions just thirty years ago. One recalls the late Sir W. Wright Smith surveying the 'Primula frames' in the R.B.G. Edinburgh and repeating one of his favourite sayings, "Take a good look at them, you won't see them again in cultivation for forty years". If prophetic significance is attached to the late Professor's words then we have only ten years to wait before we see again such interesting plants as *Primula wattii*, *P. eburnea*, *P. reinii* and *P. tayloriana*.

It was a common experience to find it possible to raise and flower a whole catalogue of species only to see them perish before producing viable seed. Our present day knowledge of seed storage should make it possible to raise large importations of seeds in relays over many years. In this way we may begin to detect vital clues in cultural requirements which are impossible to learn under the old — "all one's eggs in one basket" — approach.

PROPAGATION

Seed is by far the most important way of raising new plants. Even in cases where vegetative means of propagation are satisfactorily operated, there appears to be evidence of a lack of vigour in the progeny. It would be reasonable to expect a carry over of disease in repeatedly divided plants which might be eliminated if seed is the method of propagation. Certainly *Primula clarkei* shows a decline in robustness with repeated division and some expert growers argue that *P. aureata* is a parallel example.

In most cases seeds can be collected and stored until the following late winter or early spring, when on sowing they germinate readily.

The exceptions are to be found with members of the *Petiolaris* section — *Primula edgeworthii, P. gracilipes, P. whitei* — in which the seeds rapidly lose their viability. With these species the seed should be sown as soon as it is ripe and germination will take place within weeks. The seed capsules of the *Petiolaris* section are interesting in that they become almost transparent at maturity when the seeds are just visible. As soon as the seeds begin to turn brown the capsule will begin to crack. Collection and immediate sowing in a lime-free John Innes seed compost should then be carried out. Attempts to store the seed without the controlled conditions of a seed bank are almost sure to end in failure. *Primula chungensis* though not exhibiting the ultra-short viability characterised by the petiolarid primulas is often best sown when ripe, unless one has good dry storage conditions. An opposite case of seed requirement is seen with *P. scotica.* If stored dry through the winter and then sown in spring the seeds fail to germinate for some months. The most appropriate treatment seems to be to sow the seed in pots in winter, cover the soil with a layer of coarse sand, and then stand the pot outdoors. The seed then germinates in spring.

With some species all possible methods of propagation are recommended. Lift and replant all petiolarid primulas after flowering and keep moist until established. *Primula clarkei* and *P. reptans* should similarly be divided as often as possible, the latter in vigorous early season growth. The special forms of *P. denticulata* should be divided or possibly multiplied by means of root-cuttings. Quite a number of species, e.g. *P. bracteosa, P. boothii, P. gracilipes,* and *P. edgeworthii,* can be propagated by leaf cuttings taken in early October. Mature healthy leaves from the fringe of rosettes are selected and at a favourable time separate neatly with a simple tug. Inspection reveals the embryo bud at the base of the petiole. When these leaves are semi-inserted, semi-laid on a peat and sand mix they root and form new plants at the base of the petiole. As a rule the bright *P.* 'Inverewe' can only be propagated vegetatively, which usually means by division. As yet, its undetermined hybrid origin and triploid status make the production of fertile seed highly unlikely.

With the exception of *P. scotica* found on the machair in northern Scotland and in the Orkney Islands our native species are found growing in moist heavy soil. *Primula farinosa* occurs most frequently in wet flashes on highly calcareous clay. Dr. Halliday who manages a reserve for the Cumbria Naturalist Trust has reported the re-establishment of virtually a pure stand of *P. farinosa* on marl following deep excavation

for pipe-laying. One frequently finds members of the *Auricula* section growing in positions where moisture oozes from the mountainside.

Members of the *Candelabra* section are described as "bog plants"; in other words most thrive in a situation where the permanent water table is very near the surface of the soil. The same is almost true for members of the *Sikkimensis* section. In the case of species belonging to other sections of the genus the ideal is to give them a site with good drainage but with the availability of moisture throughout the growing season. Some of the best stands of *Primula* I have seen have been on sites with water continuously moving through the soil, either with a high water table for the candelabra *Primula* or with a water table at least 30 cms below ground for most *Petiolaris* section.

Almost all sites appear eventually to show the *Primula* sickness syndrome. The only sites where this disorder is avoided is where there is continuous percolation of moisture through the ground. Rotation in planting, re-soiling or sterilization are possible solutions depending on the options presented to the grower.

The *Farinosae* section is the most widely distributed with representatives in Europe, North and South America as well as Asia. Many species in the section have been subjected to cytological investigation and generally possess a haploid chromosome number of 9. The subarctic species now named *Primula nutans* though classified with the *Farinosae* has a reported haploid chromosome number of 11 in common with all other species of *Primula* (*i.e.* except *Farinosae* sect.) for which chromosome counts are known. Polyploidy is far from common in the genus as a whole. Only a few non-European species *e.g. P. japonica* and *P. involucrata* are tetraploids. There are two high polyploid European species *P. scotica* (2n=54) and *P. scandinavica* (2n=72).

Review of the Sections listed

Amethystina Section

Primula kingii is the only member of this section with a foothold in cultivation. It likes a moist very acid soil and cool conditions. Produces rich wine coloured semi-pendulous flowers.

Auricula Section

These species provide us with a range of garden and alpine house plants, some *e.g. P. auricula, P. minima* and *P. spectabilis* flowering more readily in the wild than they do in gardens. Many are easily raised from seed.

BULLATAE SECTION

Primula forrestii is the best known member of the section. Forrest discovered this plant trailing down limestone crevices with a long woody rootstock. In milder districts it is seen growing outdoors in the face of drystone walls but is most frequently grown in cold greenhouses. *Primula redolens* is regarded as a near relation with white or lavender coloured flowers.

CANDELABRA SECTION

This is one of the most important from the horticultural point of view. The characteristic superimposed whorls of flowers are quite distinctive. Flower colour and pigmentation together with the degree of farina coating on scape and pedicel are used to separate one species from another.

Primula bulleyana and *P. chungensis* have orange flowers, the former is a sturdier plant with very obvious farina on the scape not found in *P. chungensis*, which has fewer flowers at each whorl giving it a more slender appearance. *Primula aurantiaca* as the name indicates also has orange flowers; they are borne on chocolate coloured flower scapes lacking in farina.

Primula helodoxa and *P. prolifera* have clear yellow flowers, the former has obvious farina on the scape which is lacking in the latter.

Primula burmanica, *P. beesiana*, *P. japonica* and *P. pulverulenta* have reddish-purple flowers. *Primula beesiana* is to all intents a purple-flowered edition of *P. bulleyana*. *Primula burmanica* lacks farina, as does *P. japonica*, but the latter has homostylous flowers as opposed to the pin- and thrum-eyed arrangement in related species. *Primula pulverulenta* is heavily farinose and flowers earlier than most candelabra species. *Primula cockburniana* is a smaller biennial plant with generally distinctive, burnt orange flowers though occasionally pure yellow forms disconcertingly arise. *Primula poissonii* has slightly pendulous purple flowers which are salver-shaped as in most other species in the section. There are reputedly two species with wine coloured flowers in cultivation; both are said to have bell-shaped corollas but differ in flower colour. They are *P. wilsonii* and *P. anisodora*; the latter should have a green eye against blackish purple, the former a yellow eye against a less deep background. As far as I can ascertain *R. wilsonii* is common in gardens and is either a variable species or hybridizes with a related plant. *Primula anisodora* we virtually never encounter.

There are some interesting hybrids between species of the *Candelabra* section. Perhaps the most striking is *P.* 'Inverewe' which Mrs. C. M.

Shields investigated and found to be a triploid. Her attempts to produce a tetraploid form of *P.* 'Inverewe' by means of colchicine treatment met with negative results. Attempts to establish the precise parentage of this hybrid also failed, partly due to the extreme drought of 1976 when her programme was in its most active phase. Her breeding programme shows some very interesting results. It is, for instance, possible to predict that the suggestion that *P.* 'Inverewe' is the result of crossing *P. cockburniana* and *P. pulverulenta* is most unlikely. Reciprocal crosses between these two species produced identical progeny with pink flowers and foliage very different from that of *P.* 'Inverewe'. There are many reasons to suppose that *P. pulverulenta* is involved, perhaps with *P. aurantiaca.* The strong orange colour indicating the double set of chromosomes derives from the opposite partner to *P. pulverulenta.* It was striking to see how in almost all cases the reciprocal crosses produced identical progeny — the variable colours in hybrid swarms arising in the F_2 generation. The suggestion that colour varies, depending on which plant was used as the female parent in the original cross, is without foundation. *Primula beesiana* x *bulleyana,* the F_1 hybrids, are intermediate and are identical in the reciprocal crosses. When *P. pulverulenta* and *P. chungensis* are crossed the result is an interesting apricot flowered hybrid called *P.* x *chunglenta.* One of the earliest candelabra hybrids reported, *P. bulleyana* x *P. pulverulenta* — *P.* 'Inverleith' can be reproduced at will as can many other similar hybrids. The question of nomenclature for these hybrids is less easily resolved.

Capitatae Section

This is represented in cultivation by the species from which it takes its name. There are said to be two subspecies in cultivation, *P. capitata* ssp. *mooreana* and *P. capitata* ssp. *sphaerocephala.* All have flowers concentrated into a capitulum on the scape. They are notably farinose and the flowers are bluish purple. Seeds sown in spring will flower freely in late autumn the same year.

Carolinella Section

This is made up of a small group of Chinese species not represented in cultivation.

Cortusoides Section

This section is so named because the species in it resemble *Cortusa matthioli.* A number of species make reliable woodland garden plants. *Primula polyneura* is a most amenable plant, easily raised from seed.

The magenta flowers are shown off against dark green leaves. *Primula saxatilis* has much paler leaves but many more flowers on each scape. *Primula sieboldii* is extensively used in Japanese gardens where many colour forms are selected. *Primula heucherifolia*, *P. jesoana* and *P. kisoana* are encountered in gardens, the last two being slender plants with graceful qualities.

CUNEIFOLIA SECTION

This is represented by species found on different sides of the Pacific Ocean and it is the Rocky Mountain plant *P. suffrutescens* which survives in cultivation. Side shoots from the woody rhizome can be used as cuttings in propagation. It survived for many years and possibly still does, on a moraine in the R.B.G. Edinburgh.

DENTICULATA SECTION

This section is also represented by a single reliable garden plant, the "drum-stick" *Primula denticulata*. Its use in spring bedding displays are testimony of the ease with which it can be raised from seed; it can also be propagated by division or root cuttings.

DRYADIFOLIA SECTION

This has been represented in cultivation from time to time by *P. dryadifolia* and *P. jonardunii*. Like many *Primula* species they persisted for a longer time in Scottish gardens.

FARINOSAE SECTION

Primula farinosa is the most widely distributed species. As with *P. scotica* and *P. halleri* it will grow freely but for a limited period on base rich soils. *Primula frondosa* is by far the easiest plant in the group to cultivate. The North American members of this group are far from easy to grow and I have had no experience of the South American *P. decipiens* and *P. comberi*, and only slight experience with *P. magellanica*. The Himalayan *P. involucrata* and the similar *P. yargongensis* can be described as very amenable to cultivation. *Primula rosea* is also easy to cultivate but regrettably it doesn't always produce a good crop of seeds.

GRANDIS SECTION

This is represented by a single unspectacular species, *P. grandis*.

MALACOIDES SECTION

We can regard this as a small group of species for warm greenhouse cultivation.

MALVACEA SECTION

This consists of a small group of species which have not survived in cultivation. *Primula blattariformis* (fig. 45) is perhaps the best remembered.

MINUTISSIMAE SECTION

Primula reptans is the striking member of this group with a slight hold in cultivation. It is strongly rhizomatous and produces compact cushions of bright green leaves above which the large blue flowers are held. In active growth it presents few problems growing through moist moss but when it goes into the dormant phase it is prone to disappear completely.

MUSCARIOIDES SECTION

This section contains three cultivatable species. The blue *P. muscarioides* itself, *P. bellidifolia*, which might roughly be described as a variation of its relation with a globose flower head, and *P. viali*, which is one of the most striking plants of the genus; the arrangement of the flowers in *P. viali* into a concentrated spike is similar to the inflorescence of *P. muscarioides*. The colours in *P. viali* are noteworthy as the calyx is bright red and the corolla is a lavender purple. In the beginning the inflorescence is red and then the lower flowers open to reveal the purple petals and a gradual change is effected.

NIVALIS SECTION

In general appearance the members of this group are like a large edition of the *Farinosae* section. The commonest species in cultivation is *P. sinopurpurea* and what is regarded by many as the white edition, *P. sinopurpurea albiflora*, still named in some collections as *P. chionantha*. *Primula sino-plantaginea* is regarded as separable on farina colour, leaf width and size of flower. *Primula melanops* has superposed whorls of flowers instead of predominantly terminal umbels of flowers in related species. *Primula macrophylla* is a smaller plant than the above with a dark eye. *Primula obliqua* with pale yellow to white flowers has reappeared in cultivation from collections made in Nepal since the mid nineteen-seventies.

OBCONICA SECTION

The plants here can be regarded as suitable only for warm greenhouse cultivation.

PETIOLARIS SECTION

This is one of the largest sections and is centred on the Himalayas and west China. Most are early flowering scapeless species in general habit rather like our common primrose. *Primula gracilipes* has clear pink flowers held above efarinose leaves. *Primula boothii*, *P. bracteosa* and *P. scapigera* have flowers in the same general colour range. The pale mauve flowers of *P. edgeworthii* are held above distinctly stalked and farinose leaves.

In *P. whitei* the ice blue flowers are surrounded by almost stalkless but distinctly farinose leaves. *Primula sonchifolia* develops a distinct scape on which the upright umbel of generally purplish blue flowers are borne. It also forms a large winter resting bud. I have only seen this species survive outdoors in soil with a high water table with the water constantly moving through the ground. There is a sub-group of the section represented by *P. calderana* with wine coloured flowers, *P. griffithii* with rich purple flowers and *P. tsariensis* with pinkish purple flowers. They are efarinose and have a distinct scape.

PINNATAE SECTION

This is a small group of species not represented in cultivation.

PYCNOLOBA SECTION

This consists of the single species which gives its name to the section. It is unlikely there are any plants of *P. pycnoloba* in cultivation.

REINII SECTION

A small group of Japanese species of which the principal members are *P. reinii*, *P. takedana* and *P. tosaensis* is of quiet appeal, they resemble members of the *Cortusoides* section.

ROTUNDIFOLIA SECTION

This small group of species is Himalayan in distribution and some are reappearing in cultivation as a result of the numerous Himalayan expeditions. As the name implies, they are characterised by their rounded leaf blades.

SIKKIMENSIS SECTION

This section contains some very important garden plants with typically campanulate flowers on slender pedicels hanging from the tip of the scape. There are three predominantly yellow flowered species, readily identified in leaf characters. *Primula sikkimensis* has glossy leaves with

wedge shaped base. *Primula alpicola* has a rounded base to the leaf which is characteristically 'matt' finished. *Primula florindae* has large cordate leaves. There are colour variants in each of the three species. *Primula waltonii* is superficially a pink to maroon flowered edition of *P. sikkimensis*. *Primula secundiflora* is a more slender plant with purplish pink flowers. The smallest member of the section in cultivation is *P. ioessa*, its flowers varying in colour from pale pink to violet. The flowers are very sweetly scented.

SOLDANELLOIDAE SECTION

Those here have features in common with the *Capitatae* and *Muscarioides* sections, though the individual flowers are generally larger. To this group belong some of the most charming plants in the genus. Only one species is hardy, that known to gardeners generally as *P. nutans*, but now to be known as *P. flaccida* because under the rules of priority an arctic species is now called *P. nutans*. The blue flowers suitably powdered with farina are sweetly scented.

Primula reidii var. *williamsii* occasionally survives outdoors but is really an alpine house plant where again its most pleasing perfume can be enjoyed to the full. *Primula cawdorana* has a narrower corolla and frilly petals. The flowers perhaps bear more resemblance to those of *Soldanella* than any other *Primula*. *Primula sandemanana* (fig. 46) is related to it but is not presently in cultivation. *Primula sherriffae* might be regarded as the most unusual *Primula* with its long narrow curved corolla tube and with the large lobes of the petals at right angles to the tube.

Primula wollastonii and *P. buryana* are reappearing in cultivation from Himalayan collecting trips. *Primula wollastonii* is slightly rhizomatous and has delightful Capri-blue nodding bell flowers. *Primula eburnea* with ivory-white flowers one would hope to see again in cultivation. As with so many species of *Primula* it first received an Award of Merit when exhibited by Mr. A. K. Bulley, the founder of Ness Gardens.

SOULIEI SECTION

This is another of the small sections not represented in cultivation.

VERNALES SECTION

Includes our native primrose *P. vulgaris*, cowslip *P. veris*, and oxslip *P. elatior*, as well as *P. megaseaefolia* which has distinctly petioled orbicular leaves and pink flowers borne in winter and early spring.

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William C. Buchanan

THE CLUB'S Autumn Discussion Weekend always begins with the W. C. Buchanan Memorial Lecture but an increasing number of members may never have heard of that remarkable plantsman, Willie Buchanan, in whose memory these talks are given. The Editor has asked me, therefore, as an old friend and neighbour of Willie, to write a few notes about him as a preface to the 1980 report of the Buchanan Lecture given by Mr. Ken Hulme, Director of Liverpool University Botanic Garden at Ness, a garden very well worth a visit.

Willie Buchanan farmed for most of his life at Garscadden Mains on the outskirts of Glasgow where his forebears had toiled for over 150 years. I never saw his garden at the farm but I have heard many glowing accounts of the plants he grew there. His interest in rock garden plants began when he was in his early twenties, that is about 1910, and he raised many plants from seeds received from the Forrest and Farrer expeditions and later from those of Ludlow and Sherriff.

Soon after the second World War his farm was taken over for housing development and he bought a bungalow in Bearsden from which he looked out towards where his farm had been. His garden extended to a little over half an acre. His house was at a higher elevation than the two streets which bounded part of his garden and thus he had a situation which lent itself to the construction of a rock garden with a variety of aspects. He planned it and constructed it himself, a no mean task at the age of 61. The work involved in making his scree alone would have daunted most of us and yet much later, indeed some months before he died at the age of 77, he was talking of re-making it as he thought his saxifrages were growing too soft. May I say that only he saw anything wrong with his plants, but then he was a perfectionist in all he did. Skilful planning and construction made it possible for the visitor to see large areas of the garden without his house obtruding on the view. Winding grass paths took one in and out the rock garden and he used conifers and shrubs to give height and background to the

general rock work. Individual trees such as *Pinus lapponica**, and *Cedrus libani* 'Sargentii Pendula', a very beautiful specimen, were used to break up the larger areas of grass. The skilful planning of the garden is well illustrated by eight black and white photographs taken after Willie's death and published in *Journal* No. 34, April 1964. He also had a considerable collection of well planted stone troughs and querns no doubt brought from his farm.

Willie was a keen and able propagator to which his 22 garden frames bore testimony. He liked nothing better than to say to a visitor "you can't go away without a plant" and being the generous man that he was, that meant not one but a number of plants. Whether the visitor was an expert or a novice he could always find some things suited to his skills.

Willie Buchanan rarely exhibited and therefore his name does not figure prominently in the list of Forrest Awards, nor did he write much about his plants. He did, however, like a good going argument on the growing of rock garden plants as those who judged with him at Shows or visited his garden well knew. He was no garden snob; if he liked a plant, whether it was a species or variety, whether it was rare or common, he grew it. I suggested to him once that *Campanula cochlearifolia*, which he grew, was a pest since it was so invasive, to be met with the response "aye, but it's a nice pest". To illustrate my point further, elsewhere in his garden one found such rare and difficult campanulas as *C. cenisia*, *C. morettiana* and its white form, and *C. zoysii*.

A list of the plants he grew would be enormous and would show just how many he grew successfully are no longer available even from the best of our specialist nurserymen. Here are a few of the rarer of his plants which I remember well: *Bryocarpum himalaicum*, *Cassiope hypnoides*, *Cypripedium calceolus* (magnificent with 60 or more flowers growing in lime rubble against a privet hedge), *Diapensia lapponica*, *Dicentra peregrina* var. *pusilla*, *Orphanidesia* (*Epigaea*) *gaultherioides*, *Rhododendron nivale*, *Rh. riparium* and *Saxifraga sherriffii*.

I end by quoting from Willie's obituary written by the late Dr. Henry Tod, then President of the Club, "His like are too few; generous, quiet, unassuming, gentle and as helpful to the veriest novice as to the so-called expert and we miss him sadly". We did, we still do, miss him sadly, yet although he died 17 years ago we who knew him feel a warm glow in remembering Willie and his plants.

DAVID LIVINGSTONE

* A geographical form of *Pinus sylvestris*. Editor.

Fig. 45—*Primula blattariformis* Photo—The late D. Wilkie

Fig. 46—*Primula sandemanana* Photo—The late D. Wilkie

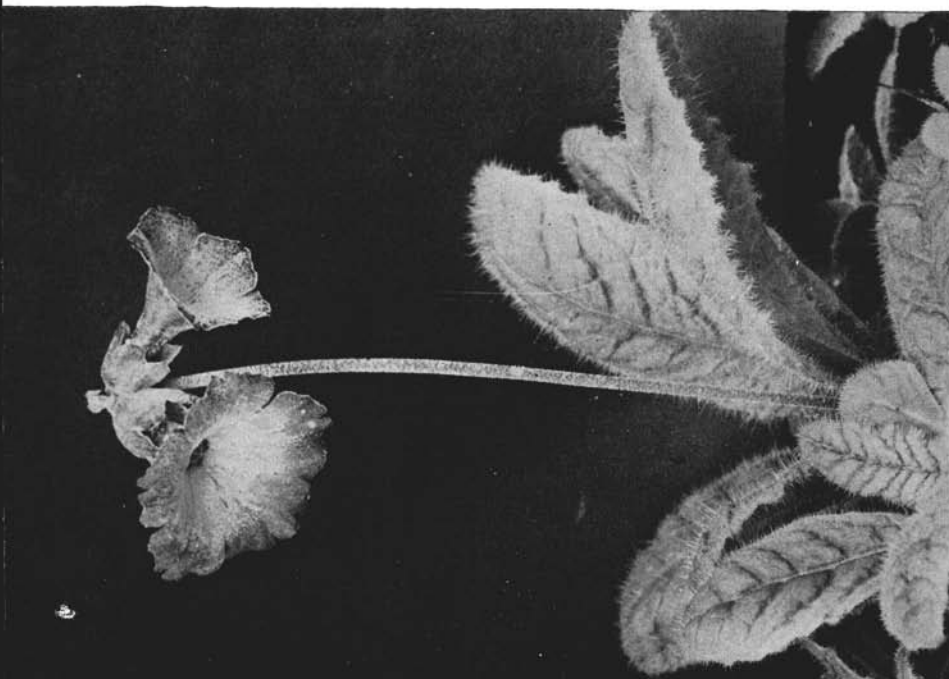

Fig. 48—*Primula verticillata ssp. simensis* J. Forbes

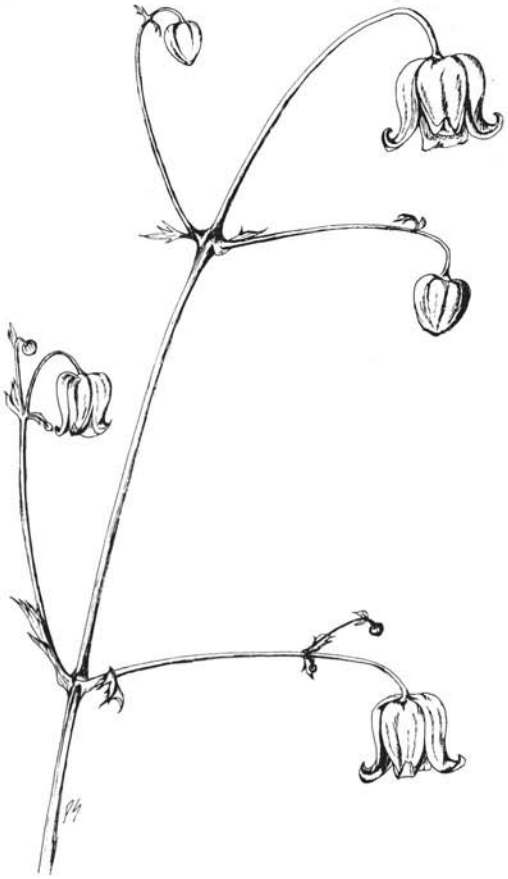

Fig. 47—*Clematis connata* Polly Stone

Fig. 49—*Nomocharis mairei* Photo—H. Esslemont

Fig. 50—*Saxifraga oppositifolia* 'Splendens' Photo—John E. Good

Fig. 51—*Primula clarkei* Photo—John E. Good

Fig. 52—*Pygmaea pulvinaris* Photo—Dr. D. M. McArthur

Some New Nepalese Plants at Fort Augustus

by M. A. and P. J. STONE

ONE OF the hazards of writing for any Journal is the exposure of one's opinions to the scrutiny of the reader. In "Seeds" part 5, I used the expression, "excessively egalitarian times" and was promptly taken to task by a socialist friend. Living in the Highlands where feudalism still survives, we cannot but believe that the distribution of wealth still leaves much to be desired. I was referring, not to material wealth, but to the pursuit of excellence which is sadly out of fashion in some circles. To carry this egalitarianism to its logical conclusion would mean that no-one would be permitted to grow *Jankaea*, *Fritillaria alburyana*, or *Cassiope hypnoides*, unless we all could have one. Prizes in Shows would be abolished, as they have been in some schools, because they imply that some people have better plants than others. Yet in the world of alpine gardening the keen grower has always sought the challenge of the "new, rare or difficult" and having attained his rarity has always tried to propagate it to share with people of like mind.

It is inevitable that the "new, rare or difficult" plants should almost always be wild-collected either as seed or as living material. If the former, little if any damage is done to the stock unless one collects pounds of one species as in the days of Forrest. In the latter case some justification is necessary in view of the current concern for conservation typified by a letter in the last Journal (Sept. 1980, p. 160). In our view, Cama has aimed his broadside at the wrong target. A nurseryman who collects carefully, propagates at home, and sells the propagands does far less harm than wholesale digging by a party. If one member finds a rarity and digs up a little, the rest of the party, being human, also want it, and take their own. We know of several cases recently where a population was decimated in this way. Then there's the bulb collector who takes many mature bulbs: "3 each for my friends and 6 for myself". Perhaps, if they survive, those 6 will appear on the show bench in due course; where they will prove, not the owner's skill as a cultivator, but his greed as a collector.

At the other extreme there is the responsible collector who selects a good form, preferably a multiplying clone, which should prove vigorous

in the garden, and takes a small part of the clump, carefully replacing the soil. The wild plant will continue to grow and no harm will be done. The collected piece is grown on, propagated if possible, and distributed to other growers to help ensure its continuance in cultivation. It was in this way that some of Dr. G. F. Smith's collections from Nepal arrived at Fort Augustus.

Another good way to obtain new plants is to take out a subscription with an expedition visiting an area of interest to the subscriber. In the following notes, B numbers refer to the seed collections of the late Leonard Beer, B.M.W. numbers to a more recent Edinburgh group; both expeditions visited east Nepal.

Cassiope fastigiata (B 542)

Cassiope fastigiata is best known as a prolific parent, being responsible for some of the finest garden plants in the genus: 'George Taylor' (*fastigiata* x *wardii*), 'Edinburgh' (*fastigiata* x *tetragona*) and, in particular, the grex (*fastigiata* x *lycopodioides*), which includes such relatively easily grown clones as 'Badenoch', 'Bearsden', 'Medusa', 'Randle Cook' and others. *Cassiope fastigiata* itself is rarely seen, and we regret to say that some of the plants in the trade are not correctly named. We obtained seed under B. 542 with a note that this was a selected large-flowered form found at 13,000 ft. in the Iswa Khola. In cultivation the seedlings have varied somewhat in flower shape and size. Most are very fine, second only to some forms of *C. selaginoides*, in particular that grown under L. and S. 13284, and much superior to any of the hybrids mentioned above. Many have quite a pronounced pink stain at the base of the corolla. So far they appear to be quite hardy here, superior to our previously grown L. and S. form in this respect, and also in quality of bloom.

Clematis aff. *connata* (B. 654) [fig. 47]

Two seedlings were grown from a little seed collected at 11,000 ft. in the Mewa Khola. One died in the winter 1978-79, but the other survived to reach 3 m (10 ft.) on the East wall of our house. This flowered well in September 1980, unfortunately too late for a seed set. The pale yellow-green bells have something of the appeal of the better-known *C. rehderana* and like this species are fragrant. Less showy than *C. tangutica* or *C. orientalis*, the petals share the thick texture of the latter.

Gaultheria hookeri

The late Len Beer collected this species twice in 1975, B. 405 from the Kasuwa Khola at 11,400 ft., a purple fruited form; and the sky-blue fruited B. 547 from the Iswa Khola at almost the same altitude, 11,500 ft. Both have grown well and flowered for us, but only the latter has so far set fruit. With shiny evergreen leaves, up to 10 cm (4 ins.) long and a tufted gently stoloniferous habit, they form an interesting contrast with the lower smaller leaved gaultherias. Some earlier introductions from west China were grown as *G. veitchiana*, but this must now be regarded as a synonym.

Gaultheria pyroloides

Although a member of the *G. cuneata-miqueliana* group, *G. pyroloides* is perhaps closer to the N. American *G. procumbens* in garden effect. The Himalayan species has the finer leaves, close to those of *G. procumbens* in shape, but with much more prominent venation. For autumn display it is perhaps inferior, its blue-black fruits being less showy than the American's scarlet ones. B. 459 was collected in the Iswa Khola at an altitude of 13,000 ft. sufficiently high to ensure complete hardiness, and is already starting to spread and fruit here.

Two other Beer collections, *G. griffithiana* (B. 669) and *G. semi-infera* (B. 668) were collected at a rather lower altitude of 9000 ft., and neither proved hardy here.

Gentiana depressa

This beautiful mat-forming species came our way in 1976 direct from the collector, Dr. G. F. Smith. Grown in our ordinary lime-free compost, no difficulties attended cultivation, or propagation by rooting the offsets, and the large original plant twice produced its tubby pale-blue and white stemless flowers. However, pride came before a fall, as all our plants, including the mother, (by then filling a 5 in. pot), were killed when the winter of 1978-9 froze their pots solid for many weeks. The top growth was still green in late March, but all the roots were dead, and the rosettes refused to root again as cuttings.

We were fortunate to be given a replacement this year (1980) and will try it planted out in our petiolarid primula frame. We hope this will protect the roots rather better than pot cultivation.

Gentiana elwesii

Another of George Smith's collections, this species has proved perfectly hardy here, grown in pots or outside in a trough. The flowers

are produced in clusters over a very long period from early summer onwards. The corolla is medium blue with a prominent white band at the contracted mouth. In pots, growth has proved a little brittle, but any pieces broken off will root as cuttings at almost any time. Trough-grown, in full sun, the plants are more compact and less prone to accidental damage from heavy rain. Seed has also been set.

Gentiana ornata

We have a fine vigorous form of this species again collected by George Smith. From a prominent central rosette, more than a little reminiscent of *G. veitchiorum*, radiate short stems bearing the typical tubby pale blue corollas of *G. ornata*. No seed has yet been set in spite of hand pollination, but increase by division has been possible as the rosettes multiply quite freely.

Gentiana prolata

This species is quite common in Nepal and most expeditions to the region have collected it. Two recent ones we grow are B. 603 and B.M.W. 165. The latter is quite typical of *G. prolata*, indistinguishable from several other forms grown here, but the former is a dwarfer plant with shorter annual shoots bearing more lanceolate leaves. It needs to be placed in full sun to ensure that the flowers open, and grows well in a trough. A preliminary commendation was awarded in 1979, when shown by Alastair McKelvie.

Gentiana staintonii

A new species in the *Ornatae* group, first discovered by the S.S.W. expedition in the 1950s and named after one of the expedition's members. Introduction of living plants had to await the discerning eye of Dr. George Smith, who found the plant growing on a cliff. This immediately distinguishes it from its relations which are essentially turf plants. Unfortunately it has not proved a very vigorous plant here, only flowering once for us so far. Our small stock was reduced to a single thong by the 1978-9 winter and we are slowly attempting to rebuild it. Cuttings of the annual shoots do root; but one is loath to weaken the plant by removing more than one out of a total of 3 or 4. We are now trying this species planted out in the *Primula* frame along with *G. depressa*. We hope it will eventually settle down in cultivation as it is a most distinct species. The corollas, as large as those of *G. ornata*, lack the black lining of the other members of this section, but bear alternate bands of dark and light blue.

Gentiana tubiflora

Completing the quintet of George Smith's gentian introductions which have decided to accept cultivation at Fort Augustus, *G. tubiflora* has proved as easy to propagate as *G. staintonii* has been difficult. Viable seed is set, the small mats can be carefully divided, and cuttings root well in spring. An easy pot plant, it also grows well in a trough, and enjoys full sun up here, which again helps the flowers to open, and keeps the growth compact. This species was described and illustrated in A.G.S. Bulletin Vol. 48, no. 1.

Juniperus indica (B. 636)

A Ludlow and Sherriff collection of this juniper is described in Hillier's manual as a small columnar tree, whereas Len Beer states that he found it as a small bush reaching only 2 ft., at an altitude of 14,000 ft. In view of this comparatively high habitat, it is hardly surprising that our seedlings from this gathering have proved completely hardy in the open. They are slow growing, and if they maintain a compact habit will be a valuable addition for the rock garden.

Lilium nanum (B. 510)

What we call the "ordinary" form of *Lilium nanum* has been with us for many years. Our original bulb came from Jack Drake, and still regularly produces 2-3 of its dull red-purple bells on a stem of about 15 cm (6 ins.). We were pleasantly surprised when B. 510 produced much dwarfer plants, only 5 cm (2 ins.) in stem, with fine, lighter-green, grassy leaves. The corolla is a more tapering bell, of a lovely soft lilac. Seed has been set and germinated. We hope it will come true to type, as the bulbs of *L. nanum* do not multiply with us.

Lilium sherriffiae (B. 417)

We were very excited when B. 417 was identified as *Lilium sherriffiae*. If correct, then this finding in the Kasuwa Khola extends the range of the species some 220 miles east from Ludlow, Sherriff and Hicks original discovery in Central Bhutan. Although we have some two dozen seedlings, growth has been very slow and none have flowered as yet. We are keeping our fingers crossed that they are indeed true; and would be interested to hear if any member has flowered this number.

Lyonia villosa (B. 658)

We have no information on this species other than the field-note which stated that it was a 4 m (12 ft.) evergreen shrub, forming small thickets at 10,500 ft. in the Mewa Khola. It is not mentioned in 'Bean'

or Hillier's manual, and we have no flora for Nepal. So far in cultivation the plants raised have formed upright, twiggy bushes about 30 cm (1 ft.) high with attractive, elliptic, glaucous foliage. They are completely deciduous here, with dull red autumn colour. It has not flowered yet.

Meconopsis grandis

Most gardeners' conception of *M. grandis* is determined by the frequently seen G.S.600 form. This is, however, a far from typical *M. grandis* as it grows in the wild. Unlike the leafy stem and axillary flowers of G.S.600 which bear more than a passing resemblance to *M. betonicifolia*, ordinary *M. grandis* produces a stout scape surmounted by a rosette of cauline leaves and a ring of flowers on long individual pedicels of roughly equal length. Sometimes the scape is missing, in which case the only sure way to tell the species from *M. simplicifolia* is by the filaments; white in *M. grandis*, matching the petals in *M. simplicifolia.*

We raised two batches of *M. grandis* under B. 613 and B. 628. All the plants, bar one of the latter, were unattractive meaty purple shades. The exception was scapeless, with good dark blue flowers on 3 ft. individual stems. Seed of this plant was collected.

Meconopsis simplicifolia

There were three gatherings of this species in the Beer collection, the best being B. 405, a robust plant with reddish-purple flowers on slender 3 ft. stems They proved to be monocarpic here, but we are attempting to keep this one going as it is distinct from our other two forms, the biennial sky-blue "Bailey's var." and the perennial lavender-blue "Sherriff's var.".

Potentilla microphylla

Among the treasures we were given by George Smith, on a visit in September 1979, was his sole plant of *Potentilla microphylla.* We were told that it had been collected very high and was not enjoying life in the Manchester area. On our return to Scotland we repotted it as we do with all new acquisitions, and it promptly lost all its leaves! One can imagine the anxiety with which we watched the woody rootstock next spring for any signs of growth! Fortunately all was well, and a new crop of tiny 2 in. pinnate leaves, resembling those of a microscopic *Sorbus*, were produced. Flowers followed in late August, and seed was set, but did not fully ripen in the wet autumn of 1980. We must hope for better luck next time as the woody growth from a central stock cannot be divided, and are too few to take as cuttings.

Paris polyphylla

We are including this larger version of the native herb paris because, like *Eranthis* x *tubergeniana*, *Meconopsis quintuplinervia* and *Primula* 'Inverewe', it has been slandered by the suggestion that it is sterile in cultivation.* All the above have set viable seed here, the *Paris* in the autumn of 1978. Sown fresh, this germinated after two winters in May 1980, so it may be that it shares the double-dormancy of its close relations the *Trillium*. We have only two divisions of one clone in the garden so we can state categorically that *Paris polyphylla* is not self-sterile. We hope we can raise the seedlings as this most distinctive plant deserves to be more widely grown. It is illustrated in colour in Alf Evans's, "The Peat Garden".

*It is interesting to speculate on how these stories get started. For *Eranthis* x *tubergeniana*, it could go back to the statement in the Botanical Magazine, that it didn't set seed in pots at Kew. We have only germinated *Meconopsis quintuplinervia* seed sown fresh in August/September, stored spring sown seed always failing for us as we have heard it does for others. In the case of *Primula* 'Inverewe', it certainly does have low fertility, one or two seeds being found in the odd capsule, after a patient search.

Primula barnardoana (B.M.W. 102)

This was a real bonus from the B.M.W. seed, as it was listed as *P. rotundifolia*. The "distaff half" was suspicious at the vegetative stage as the leaves were a different shape from our *P. rotundifolia*, and the farina on the undersurfaces was yellow instead of creamy-white. When yellow flowers were produced in the spring of 1980 a search through the other members of the section in Ingwersen's 6d booklet "Asiatic Primulas" came up with *P. barnardoana* as the closest description. This suggestion was confirmed by David Mowle, whose researches had reached the same conclusion.

Grown in our *Primula* frame, and covered in winter, it appears reasonably easy, and seed has been set. We hope it will condescend to remain in cultivation.

Primula calderiana (pink form)

Stated in the field-note to be yellow-flowered, we were most surprised when the two plants we had raised from B. 414 produced beautiful, clear medium pink, flowers. Dried seed of petiolarid primulas is notoriously unreliable; and we count ourselves lucky to get two germinations. No seed has been set here yet, but we have managed to increase our stock to about 10 plants by division. An interesting colour break and one we will do our best to keep going. Flowers of the type plant had a shade of magenta or purple colour.

Primula capitata subsp. *glomerata* (B.M.W. 35)

Worth recording as distinct from the ordinary form of *P. capitata* for two reasons, the dense head of flowers are a more intense rich purple and the leaves, forming the densely farinose rosette, do not lie flat, but stand up at an angle of 45° or more from the horizontal. It is sometimes regarded as a separate species, *P. glomerata*, on the grounds that the upper flowers tend to be erect. In our plants they are scarcely above the horizontal.

Primula edgeworthii (Ghose form)

It may be stretching a point to include this amongst new Nepalese plants as the precise provenance of the seed is unknown; but as it is offered by at least one nurseryman it is worthy of a mention. Raised by Bobby Masterton from seed supplied by the firm of Ghose, it was immediately recognised as a larger-flowered and more vigorous plant than the forms of *P. edgeworthii* he had previously grown. Well worth looking out for.

Primula hookeri (B. 465)

As previously mentioned by David Livingstone, "Petiolarid Primulas: A Gardener's View", S.R.G.C. Journal No. 62, seed of *P. hookeri*, collected at 14,000 ft. in the Iswa Khola, germinated for Bobby Masterton and ourselves. Much smaller than other petiolarids with small white, almost stemless flowers, it is not a showy plant, but has value as an early flowerer; with us well before *P. edgeworthii*. It is also a precocious species in the wild, often flowering through melting snow. Seed has been set and germinated here and the original plants divided. It was previously collected on several occasions by Ludlow and Sherriff under the name *P. vernicosa*, which Dr. Richards states is a synonym.

Primula obliqua (B. 413)

Primula obliqua has been intermittently in cultivation, at one time flowering well for Jack Drake, but failing to set viable seed. For us it has grown slowly but steadily in the "petiolarid frame", sometimes flowering twice a year: in spring and autumn. It intensely resents disturbance in growth, a plant lifted for show being a travesty of itself the following day. Seed was set during 1980 and division is possible in early spring before the long strap-shaped leaves develop too far. A photograph taken in the wild is included in the A.G.S. publication, "Asiatic Primulas".

Rhododendron camelliflorum (B. 662)

Although rated H 1-2 by "The Rhododendron Handbook", and H 2-3 by Peter Cox, in "The Larger Species of Rhododendron", this collection has so far survived as pot plants in a cold frame at Fort Augustus. The cold winter 1978-9 which killed several pot-grown gaultherias, vacciniums and pernettyas by freezing their roots for many weeks, only scorched the young tips of *R. camelliiflorum.* It has not flowered yet, nor have we tried one outside. Len Beer found it at 10,000 ft., usually a high enough altitude for hardiness, growing as an epiphyte on *Abies spectabilis* in the Mewa Khola.

Rhododendron setosum (B. 633)

Usually included in the *Lapponicum* Series, *R. setosum* is really a link species between this series and the rhododendrons of the *Saluenense.* Collected at the high altitude of 14,000 ft., our plants have proved semi-deciduous, losing all but the leaves near the tips of shoots. Thus in winter the distinctive bristly branchlets can be clearly seen. The flowers are larger than those of the other lapponicums we grow, and show considerable affinity with such as *R. keleticum* in shape and colour — a bright reddish-purple.

Rubus fragarioides (B. 483)

We were sent four species of *Rubus* amongst the Beer gatherings: B. 587: the evergreen creeping *R. nepalensis*; B. 588: *R. lineatus*, a vigorous climber with large silky hairy leaves, neither of which proved hardy here; a bramble with delicious orange fruit, B. 535; and the only real alpine of the quartet, *R. fragarioides*, B. 483 from 11,700 ft. in the Iswa Khola. As its name suggests, this resembles a tiny strawberry, spreading by plantlets on short runners. The collector's note mentioned large juicy orange berries; but, unlike the Chinese *R. calycinoides*, our plants have yet to oblige. They are deciduous, and appear quite hardy.

Saxifraga stolitzkae

There are a great many Asian species of *Kabschia* saxifrages; Drs. Horny, Sojak and Webr list no less than 58 in their review reprinted in the A.R.G.S. Bulletin Vol. 33, No. 4. Only two of these are in general cultivation: *Ss. andersonii* and *lilacina*, so further species collected by Dr. G. F. Smith are especially welcome. *Saxifraga stolitzkae* is the only one of these we have grown long enough for it to be worth including. We planted it out in a shady trough where it has become rather lax and failed to flower. This spring we intend moving it to a

position in the sun. We should have known better as *S. lilacina* does not require shading here in the far north, contrary to Winton Harding's advice in the A.G.S. guide to "Saxifraga". *Saxifraga stolitzkae* is described and illustrated in A.G.S. Bulletin Vol. 46, No. 2.

POSTSCRIPT

There is little in the above brief notes for the bun and cushion fancier. We do have two further species of Himalayan kabschias, and six of *Androsace* from the same area, all at the rooted cutting stage. The latter we hope to try in troughs covered for the winter and will refrain from commenting until we have some experience to report.

Seed Collecting in North East Nepal

by G. WRIGHT

The Harold Esslemont Lecture given in Edinburgh 1979.

THE IDEA of an Edinburgh "Plants of Nepal" Expedition, 1978 was first mooted in 1976 when the acclamations of Chris Bonington's Everest triumphs were very prevalent throughout climbing circles. It was during this period that the question was asked—could we plan a plant collecting expedition to Nepal? It took two years to plan, the biggest problem being finance, which finally amounted to approximately £6,000. A lot of help in raising the sum required came from the Regius Keeper at Edinburgh Royal Botanic Garden. It was decided to issue seed shares and 73 shareholders, who would contribute approximately half the expedition costs, were sought and finally obtained. The thought of providing these shareholders with a worthwhile supply of seeds was a tremendous burden which never lifted until the seeds were finally deposited at Kathmandu airport en route for Edinburgh. This final operation was not without incident, for unbeknown to us the seed package was lost somewhere in the cargo shed and only after a lot of frantic letters and phone calls did the package eventually arrive about one month late.

The expedition consisted of three persons: David Binns was the leader and he was accompanied by Ron Mason and Graham Wright. Ron's sister acted as our overworked secretary, but did not accompany the party to Nepal.

At last the day arrived for our departure (7th July); it was to be an overland journey of 8,000 miles across Europe and Asia. This overland journey would be very hazardous today as Iran and Afghanistan were on our route. The journey to Nepal was not without incident; on our first day abroad the alternator bearing seized and had to be replaced, then at each of the Asian frontiers we never knew how the customs officers would react to a vanload of equipment and food. The Indian frontier proved very tense because the officer wanted to charge us duty on all our equipment and food, but the matter was referred to higher authority, and was resolved by giving a lift to one of the customs officers who wanted to go to his home at Amritsar. At the Nepal frontier there was another tense moment and this time the van had to be completely emptied and an inventory made of its contents.

After 30 days we reached Kathmandu, the capital of Nepal. The Kingdom of Nepal is wedged between India and China (Tibet). It was only about 1950 that Nepal came out of its isolation and allowed foreigners into the country. The first to enter were mountaineers, whose goals were the highest and most dangerous mountains in the world. It was not long before plant collectors began to take an interest in the flora, notable among those being Stainton, Sykes, Williams and Polunin and more recently Beer, Lancaster, and Morris. Our aim was to collect in the region to the east of the previous expeditions, close to the Sikkim Border (Kanchenjunga District). A word of warning to any would-be plant hunters: always have a number of alternatives in mind, because though permission may be granted, it can just as easily be refused, due to departmental squabbles as to who should supply the expedition with a Liaison Officer and whether the desired region to be visited is acceptable.

On September 9th we reached base camp, a place called Yalung at 12,500 ft. It had previously been a village but was now derelict except for a single-roomed house used by shepherds and yakmen. The immediate vicinity of base camp was thoroughly explored, but being just above the tree line the vegetation consisted mostly of herbaceous plants and scrubby *Juniperus indica.* In the area around Base Camp we found *Erigeron multiradiatus, Cotoneaster conspicuus, Anaphalis, Leontopodium, Primula petiolaris, P. sikkimensis, Gentiana depressa, Meconopsis napalensis, M. grandis* and various dwarf and scrubby rhododendrons. A wider area was botanized so that a greater range of plant species could be collected, hopefully something of interest for all our shareholders!

The expedition was in the field for six weeks and during this period 183 species were collected ranging from *Abies spectabilis* to *Arenaria glanduligera*; from *Rhododendron falconeri* to *Anaphalis*; from *Pleione* to various ferns. The collecting area ranged from base camp and its environs to Yalung Glacier and then to Yamatari Glacier and the Sikkim Border.

A typical plant-hunting day would begin at 6.30 a.m. with a mug of very sweet tea. Breakfast followed at 7.30 or 8.00 depending on whether porridge or alpen was on the menu. If we were lucky we might also have a boiled egg and if not, we had ryvita and jam. After a quick wash we checked our plans for the day. At first the weather was sunny and fine in the morning while the afternoons were wet due to the monsoon. All seed collecting was done in the morning, usually by a party of two expedition members and two camp staff, leaving the other expedition member and three camp staff at base camp. They would dry, clean, and packet seeds, change herbarium papers, write up plant descriptions, collect wood, prepare food and wash clothes. All outdoor activity ceased about noon, when the collecting party returned and lunch was eaten. The afternoon saw a hive of activity inside, while we wrote up diaries, photographic albums and letters home, discussed our plans for the next few days, and spent some time seed cataloguing and even entertaining visitors. The highlight of the day was the evening meal when cook would prepare a substantial meal — on special occasions, such as Ron's birthday, there would be a three course meal! The day ended soon after the meal as the days were now getting shorter and it was dark by 6 p.m. The only problem of going to bed so early was that the mug of coffee which we had just had after our meal would wake us up in the early hours of the following day!

Departure day was 25th October; this had originally been determined by the length of our 3-month visa but we exceeded it by 12 days due to miscalculations and delays. An understanding customs officer charged us a fine which seemed very reasonable to us! We had planned to be home for Christmas and here our timing was more accurate as we limped into Dover on 20th December with a fractured exhaust system, worn universal joints and a defective front light, but we did not have even one puncture on the whole 17,000 mile journey.

Soon after Christmas the expedition was together again, this time at the R.B.G., Edinburgh, where the seed was sorted, and then dispatched to the shareholders. The expedition is still functioning although members have gone their separate ways. The job of naming several

unknown species is being carried on by the herbarium staff at Edinburgh. The most exciting news to come from the botanists is the naming of a *Primula* which at first was thought to be *rotundifolia* but had now been identified as *barnardoana*. A second *Primula* that has been named is *concinna*. Another little gem which has just been named is *Arenaria glanduligera*. The expedition is still hopeful that other unusual plants may be discovered among the developing seedling.

Angus Group Seed Exchange

THE EDITOR has intimated to me that the *Journal* cannot wait any longer for my reminders as there will be no September publication, so my exhortations about time limits have to come now. We are only about half way through the present distribution, so it is difficult to think so far ahead.

The Club is indebted to the donors of seed who have made the list so interesting and, while a lot of seed is in very short supply, we think most people will be satisfied with their allocation so far.

We have another month of work and already a quarter of the *Crocus* and *Cyclamen* are finished, and more than half the *Galanthus*, so we appeal for more of the rarer varieties of these as well as other treasures — *Androsace*, *Lewisia*, *Gentiana*, *Primula*, etc.

It was noticeable when we started recording at the beginning of the season that some of our donors' cards started in 1960, 20 years of gathering and cleaning seed for the exchange, 18 in the home file and 4 in the overseas, the last representing Canada, Japan, Sweden and U.S.A. It is with regret that I have received notice from the Swedish member, Mr. K. von Scheele, that he is resigning due to pressure of business and we wish him good health and good gardening. Notable in the home list is Mr. Bruce Robertson of Penicuik, whose donations over the 20 years average about 300 per year, not a printer's error, three hundred.

Perhaps an article for the *Journal* on the collecting, cleaning and packing seed would be of assistance to new members. A suggestion for the Editor?

Now for the grouses! We have extracted 6 packets of *Silene hookeri* seed, (they go into the surplus), which are obviously not correct. We suspect they are *Silene flos-jovis* which has small, round, brown seed,

while *S. hookeri* is oval, larger and black; please check. We think all *S. hookeri* sent out this year is true. *Silene flos-jovis* is an excellent garden plant but it should not be masquerading under the wrong name.

Ericas, lavenders and cassiopes have obvious seed; do not send in dried flowers; and send spores of ferns, not fronds.

When ordering surplus seed please send lists of numbers, not names. Once the seed list is completed we deal only with numbers and someone has to make a list and it might as well be you and not one of us.

Our indefatigable typist would be delighted if you would print your names and addresses on the order forms. Some signatures are a trifle difficult to identify, particularly unfamiliar names of overseas members.

Occasionally we are asked for the name of one of the donors of certain seed and as we do not keep a record of who donates what — except for seed collected in the wild — it would be an advantage to members if you would put your names on the packets.

All overseas members and home donors receive a seed list. Home members who wish one should send a stamped addressed envelope ($8\frac{1}{2} \times 5\frac{1}{2}$) or a sticky label to:—

Miss J. HALLEY
16 Abercrombie Street
Barnhill
Dundee DD5 2NX

S.R.G.C. Seed Lists are posted before the end of the year. If you are a donor, an overseas member, or have sent the required S.A.E. and have not received your list by mid-January, let me know. Do not wait till mid-February.

We have a leaflet on the cleaning of seed which can be applied for by sending a S.A.E. to the same address.

Finally, we would like to thank all the members of the Angus Group who so willingly packet your seed and some of them will heartily endorse the sentiments expressed by our resident cartoonist.

JOYCE HALLEY

uncleaned seed

Plant Portraits

PRIMULA VERTICILLATA (fig. 48)

Primula verticillata belongs to the *Floribundae* section. There are three subspecies of this plant. *Primula verticillata* ssp. *verticillata* is found in the Yemen; ssp. *boveana* grows on Mt. St. Catharine in the Sinai Peninsula; and ssp. *simensis*, probably the only *Primula* native to Africa grows at an altitude between 2000-3500 metres in the mountains of the Simen region of Abyssinia now known as Ethiopia.

Primula verticillata ssp. *simensis* differs from the type plant by its broader flower bracts, the less divided calyx, and a shorter corolla tube. Its entire calyx lobes distinguish it from *P. verticillata* ssp. *boveana* which has much smaller flowers. The flowers are sulphur yellow and are slightly fragrant.

This group of plants is not hardy outside being susceptible to the winter wet. They are, however, long-lived plants in the unheated alpine house where they grow in a mixture of John Innes compost with added leaf mould. They are given slight shade in summer and plenty of water during the growing season. Water is given at a much reduced level in winter.

This plant suffers like most primulas from vine weevil, which can be controlled by watering with Lindane miscible oil.

Dairsie J. FORBES

NOMOCHARIS MAIREI (fig. 49)

Nomocharis, meaning Grace of the Meadow, have always been rare in gardens. It is also considered that they grace the gardens in which they agree to grow. They are certainly in demand by knowledgeable enthusiasts. Their cultivation has been attempted by competent gardeners and yet they are still not often seen.

Nomocharis, like lilies, take years to produce flowering size bulbs from seeds — some species may reach that state more quickly than others — but, invariably, the seed sowing and the initial rearing of seedlings have always been problems and taken heavy toll.

Certain lilies multiply quite rapidly from the division of their bulbs and this is fortuitous but, regrettably, although closely allied to *Lilium*, this is not a pronounced character in *Nomocharis*. Furthermore, some lilies produce stem bulbils which, within a few years, can be grown on to produce bulbs of flowering size. This plainly gets over the seed

sowing and weaning problems. Once more it has to be said that this is not something that one considers when faced with the task of increasing *Nomocharis* stocks.

However, there are always exceptions and as long ago as 1957 I had a note published in the Lily Year Book, page 129, in which I drew attention to a particular clone of *Nomocharis* which did, in fact, produce stem bulbils. It was a form of *N. mairei* but, unfortunately, there is no clear record as to where this clone originated.

Since that time bulbils have been collected annually from the original group and from the stems of plants which themselves had been grown on to flowering size from harvested bulbils.

Many have been distributed from the Royal Botanic Garden, Edinburgh, to interested lily growers in the hope that this form would prove more amenable to cultivation and therefore allow others to enjoy the beauty of this lovely species. A number of growers have been successful, as the illustration accompanying this note proves, but not many satisfactory reports have been recorded.

One very interesting point about the production of these bulbils is that when the plants are in flower there is no indication that bulbils will form, and a month may pass after the flowers have faded before the tiny buds are obvious which will eventually swell to bulbil size.

The question is sometimes asked, "Are *Nomocharis* long-lived plants?". In this instance the original group, planted in 1947, lasted 30 years while the off-springs — two crops in the Royal Botanic Garden, Edinburgh — are at least 20 years and 10 years respectively. The colour illustration of *N. mairei* included in the September 1980 issue of this journal is of the original plant.

Virus infection in members of the lily plant family is a great fear, but providing this bulbil-producing form of *N. mairei* can remain free from this dreaded disease its position in gardens should be reasonably secure.

Edinburgh A. EVANS

SAXIFRAGA OPPOSITIFOLIA 'SPLENDENS' (fig. 50)

Saxifrages, although still among the 'backbone' genera for the rock garden, are not as popular as they once were and this is probably more true of *S. oppositifolia* in its various forms than of most. It is difficult to know why this should be, although fashions come and go in the alpine garden as elsewhere, but perhaps the widespread abandonment of rock gardens proper in favour of screes, raised beds and troughs has worked against it since *S. oppositifolia* is essentially a plant of the

moist, shady ledge or rock crevice. It prefers, in my experience, a rather heavy if well drained soil to the 'sharp scree' mixtures favoured by many high alpines and their cultivators.

S. oppositifolia 'Splendens' is a clone, originally collected in the Pyrenees, which is notable chiefly for its vigour and the freedom with which it produces its large, well-formed flowers. These are paler in colour than those of most other forms, tending to pink rather than the more usual purple or crimson. The plant seems to be less fussy about position in the garden than its brethren, growing well even in exposed positions provided that there is always adequate moisture at the roots. Lime in the soil helps to pick out the attractive lime pits around the leaf edges, but it is not essential for successful cultivation. The plant is not difficult to cultivate in pots but it never looks as good if kept permanently under glass as it does in the open. A frame, closed only in the depths of winter and shaded from the hottest summer sun is, therefore, a much better home for potted specimens than is the alpine house. The compost should be rich but well drained, say J.I. No. 2 plus half its volume of coarse sand, grit or tufa lumps, and it should never be allowed to dry out.

Like other cultivars 'Splendens' is an early flowerer and few sights in the rock garden can give more pleasure than a plant or two in full bloom on a mad March day, heralding the pageant of colour, beauty and interest to come.

North Wales JOHN E. GOOD

PRIMULA CLARKEI (fig. 51)

This charming hardy member of the *Farinosae* section of the genus, to which our own *P. scotica* belongs, was introduced from Kashmir in 1936, having been mentioned nearly twenty years earlier by Farrer. The true plant, which can be confused with hybrids between this species and *P. rosea*, notably *P.* 'Peter Klein' (syn. *P.* 'Rose Clarke': see A.G.S. Bulletin Vol. 40 No. 4, p. 331), has never been common in cultivation, although it is always in demand. Its merits are immediately apparent at flowering time (March-April) when it covers itself with blooms almost as large as those of *P. rosea* and of a similar, if somewhat less striking, rose-carmine with a cream 'eye'. These are held aloft in small (1-5 flowered) umbels on slender but resilient 1-5 cm scapes. Flowers in an umbel open sequentially while new scapes are continually being produced, so that many flowers in good condition are borne at any one time almost regardless of the weather. As the photograph

shows, the leaves are only beginning to unfold at flowering time, but later they will become 5-10 cm long, with a slender petiole and an orbicular, reniform or broadly ovate blade which may be dentate or serrate at the margin; quite different from the elliptic leaves of *P. rosea.* Hybrids are likely to exhibit intermediate leaf shapes.

The scarcity of *P. clarkei* suggests either that it is not particularly easy to grow or that it is difficult to propagate, or perhaps both. The literature and conversations with other growers suggest, rather, that like many of its race it is a fickle plant, doing well for some but refusing to grow for others. It certainly prefers the open ground to a pot, largely I think because it appreciates a cool rooting medium and a moist atmosphere. Here in North Wales it has flourished in a bed that is shaded from the afternoon sun, the soil being a stony, rather heavy loam, liberally dressed with moss peat. The dressing is given in late winter when it has the advantage of covering the roots which have often, as with other primulas, become exposed as the developing crowns have pushed upwards. Watering during dry periods ensures that the plant never dries out, probably the commonest cause of death in this and many other Asiatic primulas. I grew *P. clarkei* in a pot when I lived in Midlothian because I had no suitable spot for it in my diminutive garden. Success was achieved using a very rich, leafy but well drained compost in a clay pot kept plunged in damp sand in a frame which was open to the elements from March to November but which received only a few hours of direct sunlight, in the morning. Generous watering throughout the growing season, using a liquid feed at frequent intervals, gave way to less watering as the foliage started to senesce, the compost being kept just moist during dormancy. Leaves were removed as they decayed and the whole plant was dusted with green sulphur in November to control mildew during the winter.

Propagation is extremely easy, the plant being lifted immediately after flowering and pulled apart into rooted pieces, each of which will make a nice plant by the following autumn if well fed and watered. Division is necessary every few years anyway to retain vigour and a nice bed can soon be established. I have yet to see a plant bearing seed but this may well be because, like many other primulas, pin- and thrum-eyed forms are required for seed set and most gardens possess only one (pin or thrum) clone.

The pests most likely to attack *P. clarkei* are aphids and, more dangerously, vine weevil larvae which eat out the crowns and roots from below ground. I find this devastating insect can be controlled only

by regular spraying throughout the growing season with a systemic insecticide such as 'Rogor' or 'Malathion', one of the very few cases where I resort to the use of these extremely unpleasant compounds.

Primula clarkei received the Award of Merit when shown before the Joint Rock Garden Plant Committee by Randle Cooke and (separately) Mrs. Crewdson in 1939. A full description of the type plant is given in the Journal of the Royal Horticultural Society, Vol. 63, p. 485, 1938 and it is worth consulting this if you are in doubt about the pedigree of your plant.

North Wales JOHN E. GOOD

PYGMAEA PULVINARIS (fig. 52)

The cushion forming *Pygmaea pulvinaris* is a plant from the South Island of New Zealand, where it is widespread over the screes and stony places of the Southern Alps from Canterbury north to Nelson above about 1500 m. The tiny linear-spathulate to linear-oblong leaves are only 2.5-4 mm long and 1 mm wide. The long bristle-like hairs which grow mostly from the leaf tips give a lovely sheen to the deep green cushion. The flowers, some 6 mm across, appear in December and January in the wild but in cultivation in the British Isles in April.

The plant illustrated has been grown for twelve years in a gritty humusy compost. Over the years the proportion of leaf-mould in the compost used to fill each larger pot has been reduced, starting at about 50% with 4 mm granite chippings and falling to about 25%. The plant spends each summer, from late April to early October, in a sunny plunge-bed in the open garden. During the evening, following any hot dry summer day, it is watered copiously overhead either by watering can or sprinkler. As the rainfall increases in August and September and the rate of evaporation falls, the amount of extra water given is reduced. The plant is turned through 180° two or three times during the summer, to promote even growth as growth is noticeably laxer on the shady side of the cushion.

By mid October, when stagnant, wet days predominate, the pot is plunged to its rim in an alpine house bed and dead rosettes are carefully removed using tweezers. This brings away a complete stalk almost from the centre of the plant. If this is not done, patches of mildew can spread rapidly across the cushion, necessitating more drastic surgery. Before this point was understood, it was necessary on one occasion to remove one third of the whole plant. This operation revealed that fine roots were growing at intervals from each stem down through the

cushion and the need to keep the cushion slightly moist even in winter was appreciated. This is in marked contrast to the superficially similar European androsaces which need a dry cushion in winter to thrive.

It is in October also that the plant should be examined carefully for aphids. Although not particularly susceptible to aphis attack during the summer, a tiny greenfly appears on the cushion each October and should be discouraged with a spray of insecticide as soon as it is seen, otherwise the patch of cushion affected rapidly becomes unhealthy and, later, mildewed.

Watering is reduced during the winter but the compost must never become dry.

Buds are first noticeable in late February or early March and slowly develop into 3 mm white spires projecting from the cushion surface. As these white spires unfurl into five-pointed white stars, they reveal two violet spots which are the tips of the developing stamens. These turn over and hide their colour as the flower ages. In recent years seed has formed and in July the capsules, which are held slightly below the surface of the cushion, open at the top on wet days and close again on dry days. The seeds are bounced out on to the cushion surface by rain drops and wash away. None of the small amount of seed collected has yet germinated.

A plant has also been grown outside in full sun in a raised bed made up of one part each of soil, peat and 6 mm chippings. It grew to 8 cm across and flowered sparsely until it succumbed to a wet autumn after six years. The next attempt outdoors will be in a mixture of equal parts of leaf mould and chippings with very light shade to reduce the need to water in summer. Successful cultivation in a trough has also been reported.

Pygmaea pulvinaris is one of those plants, beloved of enthusiasts, which respond magnificently to just a little extra care in cultivation.

Lancaster DAVID MOWLE

FRITILLARIA GIBBOSA (fig. 54)

Fritillaria gibbosa is a member of the *Rhinopetalum* group along with *F. bucharica* and *F. stenanthera.* They are distinct in having flattish flowers with deeply pitted nectaries which show as humps on the upper segments.

My plants, which have pale pink flowers, were collected by Brian Mathew in Iran in 1965. I have seen some attractive brick coloured forms at Wisley collected by the late Admiral Furse.

My three bulbs have flowered every year, sometimes better than others. They have never increased, nor can I persuade them to set seed. Brian Mathew suggests that the plant may be self-sterile.

Cultivation is straightforward. I repot my fritillaries in September in a gritty mixture in clay pots.

For the larger bulbs, I use long toms or deep pans and, in the case of the rarer bulbs, plant them on a base of sharp sand. The pots are then plunged in sand in the alpine house house or in frames and, from 1st October, the sand only is kept moist. The pots are watered when top growth appears, usually in January and February. A little gentle feeding is given in Spring and after growth has died down, water is withheld and the bulbs are given a good summer baking.

Fritillaria bucharica is a recent acquisition and has not yet flowered with me. It has white flowers tinted green. *Fritillaria stenanthera* is growing on from Soviet seed.

These three fritillaries can be recommended as a worth while addition to any bulb collection.

Aberdeen H. ESSLEMONT

The Spanish Pyrenees—Bielsa 1980

by NORMAN WOODWARD

HAD Robert Louis Stevenson been a member of the S.R.G.C. I doubt if he would have written,

'— it is better to travel hopefully than to arrive —'

That other Robert — Robert Browning — seemed to be nearer the mark when he wrote,

'Grow old along with me, the best is yet to be —'

Bielsa is almost in the centre of the Spanish Pyrenees, between the Ordesa National Park and Benasque. To get there, we had to leave Cleveland on the morning of Wednesday, 28th May to arrive in time for dinner on Friday. Having flown to Barcelona, a three hour coach journey took us to Balaguer, a smallish town where we had an overnight stay in one of the Government Paradors. The country we passed through was flat and fertile, with crops of wheat, barley and maize, and orchards of cherries, olives, peaches, apricots and nectarines. The old town of Balaguer, across the river from our hotel, was picturesque, with arcaded, narrow streets and a large town square where the local ladies set up their stalls of fruit and vegetables. Overlooking the old town is a high, rocky ridge with a large church, a ruined castle and an

even larger monastery. There seems to be little tourist trade, and the shops were of quite a high standard. We even found a good 'Flora of the Spanish Pyrenees', but at 2500 pts (£16.00), and in Spanish, we left it there. Continuing next day, the countryside gradually changed. The rich, reddish-brown soil became more stony, with more grassland and fewer crops. Our road started to climb and wind over low, rocky hills, becoming increasingly greyer as we moved into limestone areas. There were continually tantalising glimpses of colour from the roadsides, reds, blues, yellows and whites. *Papaver rhoeas* was easily identified and much of the yellow was the Spanish gorse, *Genista horrida* (or should it now be *Echinospartium horridum*?). There must have been flaxes, the blues of *Linum perenne/narbonnense*, the white *Linum suffruticosum* and the red of *Linum viscosum*. Such villages as we passed were often set away from the road, usually on higher ground, and gave an impression of dust and dirt, some even being deserted and derelict. How much of this was due to current economic conditions, and how much was still an aftermath of the Civil War, we could not tell. We began to wonder about Bielsa. But, at Ainsa, 35 km still to go, things began to change. The hills had been slowly changing into mountains, and snow could now be seen on some. Moreover, the road which had circled, twisted, climbed and dived for the last hour or two straightened itself out, became a broad, well surfaced highway, and climbed gently and sedately up the valley to Bielsa, small, compact, neat and very tidy.

Colonel Meadows[1] reported that he found Bielsa almost a new village with a multitude of bars after it had been virtually destroyed in the Civil War. The bars are still there, but what he would not have seen were the five very comprehensive little supermarkets. Six bars for a village of some three or four dozen habitations does not seem unreasonable, but the groceries take some explaining. The reason lies along the new road from Ainsa to Bielsa. Instead of petering out as a disused minetrack a little further on, it now plunges into a long tunnel and emerges into France. As a result, Bielsa and the Valle de Pineta with its Parador have become very popular for a day out from France to do the shopping, or for longer weekends or holidays. Nevertheless, with no facilities for skiing, the area was still surprisingly quiet and unspoiled at that time of the year. Another consequence is that the village is practically bilingual and 'bi-financial'. Convenient this may be, but it was somewhat ego-deflating when we aired our 'Holiday Course' Spanish to be asked, 'Parlez-vous français?' On the other

hand, my wife was delighted, having picked up an 'old penny' whilst walking, to receive 105 pts change after buying two beers and three coffees with it — a 10 franc piece, no less!

And so to the business of flowers. The old road through the village and the new one by-passing it on the other side of the river provided an easy first day circuit for roadside flowers, and plenty there were too. Small cushions of white-flowered arenarias, tall, silvery velvet verbascums, two mignonettes, *Reseda glauca* and *R. lutea*, with *Erinus alpinus* and *Saponaria ocymoides*, were common along the verges. Backing these up were large plants of *Helleborus foetidus*, just past their best but still very handsome, columbines, *Aquilegia vulgaris*, and snapdragons, *Antirrhinum majus*. In the meadow walls grew two saxifrages, *Saxifraga granulata* and *S. paniculata*, spleenworts, *Asplenium* species, moonwort, *Botrychium lunaria*, and navelwort, *Umbilicus rupestris*, living up to its name by growing on apparently bare rock. The meadows used for grazing had not much left in them, but still of note was a purple milkwort, *Polygala comosa*, a large, upright speedwell, *Veronica ponae* (?), and several geraniums, dove's foot cranesbill, herb robert, bloody cranesbill, meadow cranesbill and, perhaps less well known, *Geranium rotundifolium* and *G. pyrenaicum*. This region seemed to be too cool or too wet for the flaxes that we had seen en route, and all that we found was one patch of large flowered, deep blue *Linum narbonnense*. The small pastures, terraced up the hillside opposite the village, looked very inviting, but promised more than they yielded. This grazing land has been wrested from the mountainside by much hard labour, and it is now grazed equally hard. Some flowers do survive, for a time. The tassel hyacinth, *Muscari comosum*, perhaps more curious than beautiful, was fairly plentiful, and there were some good specimens of the burnt orchid, *Orchis ustulata*, to be found. Here also were the first broomrapes, *Orobanche* species. We found many more during our stay, but identification was tentative, as they either grew in such a mass of herbage that they might have been parasitic on any one of several plants, or else they appeared in isolation in a stony roadside patch. In any case, identification got off to a poor start, for when we returned later in the day with books for on-the-spot study, it was to find that our first broomrapes were already being converted into milk.

The hay meadows on the lower and more level areas had some of their own special offerings. The most charming of these was the endemic *Hyacinthus amethystinus*, half the size of our (English) bluebell,

and with much less prominent foliage. Rather less frequent were the *Dianthus* species, mostly the tall, dark, clusterheaded *Dianthus carthusianorum*, definitely fragrant, with here and there a scattering of *Dianthus segueri* and *D. deltoides*. Perhaps we were too early for campanulas, for only two or three *Campanula glomerata* were seen at the end of the tour. However, the flower of the village was without any doubt *Ramonda myconi*. It grew in the stone walls opposite the hotel, in shady cracks and crevices in the rocks through which the road had been cut, huge clumps bloomed prolifically on shaded, vertical rock faces alongside the river, and, finest of all, was where the new road tunnels through a huge mass of rock, whilst the old road deviates round the end of it. On the steep east and northeast end of this rock, sheltered by overhanging trees, the *Ramonda* occupied every nook and crannie. Where the crevices were already filled, it had seeded into the moss, giving a magnificent display of hundreds of huge flowers. Growing profusely in the woods bordering the meadows was *Hepatica nobilis*, remarkable in that throughout the area we saw practically nothing but the white form, usually with a light green, slightly variegated leaf. Keeping it company in rather less shade was the ubiquitous cowslip, *Primula veris*. The higher we found it, the larger and more robust this plant seemed to get.

Such paths as there are round Bielsa are connected with forestry work or water supplies. Over the main road and river to the east were three such routes. A little way down the road a forestry track started behind the sawmill and climbed steadily up through the plantations of conifers. Floristically this path had little to offer. *Thymus vulgaris* and *T. serpyllum* grew in large mats, basking in the hot sun on the trackside rocks, together with the Spanish gorse. For the rest there were a few globularias, *Globularia punctata* and *G. repens*, and some motley legumes and cresses, whilst in the meadows downstream of the sawmill, not very accessible, a few narcissi, possibly *Narcissus poeticus*, were found. Another common roadside plant around Bielsa was *Helianthemum nummularium*. Near the sawmill there were cream and yellow forms, but mostly the predominant colour was pink, a form which seems to be accepted as *H. n.* var. *pyrenaicum*, and which has quite large flowers. Directly opposite the village, from the end of the new road bridge, a narrow rocky path climbs the hillside to reach, eventually, the small Lago de Cao. This hillside, like many others, was covered with the common box *Buxus sempervirens*, anything up to three metres high, and overgrowing the path for much of the way.

Fig. 53—Map of Bielsa

Fig. 54—*Fritillaria gibbosa* Photo—H. Esslemont

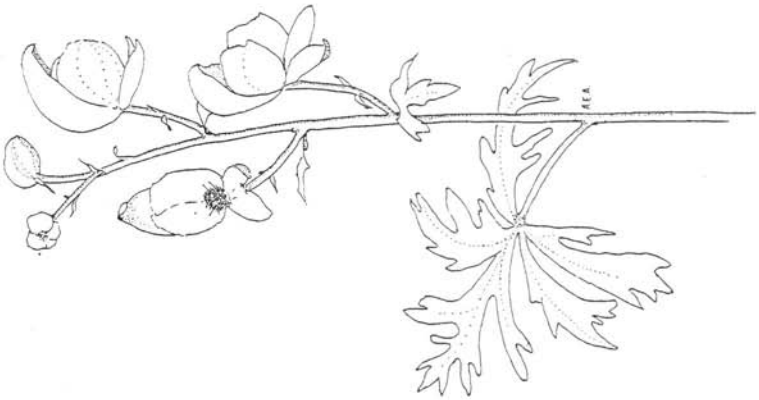

Fig. 55—Aconitum delphinifolium
Ann E. Aikin

Fig. 56—Chrysanthemum integrifolium
Ann E. Aikin

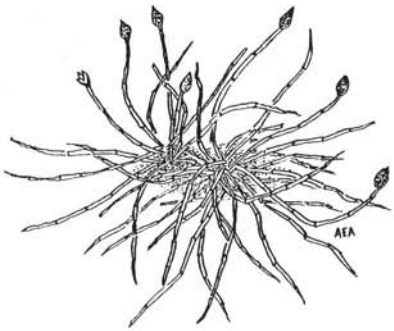

Fig. 57—Equisetum scirpoides
Ann E. Aikin

Fig. 58—*Babiana pygmaea* Photo—J. Holmes

Fig. 59—*Romulea subulosa* Photo—J. Holmes

Fig. 60—*Monsonia speciosa* Photo—J. Holmes

The weather was showery that day, and the box ensured that we stayed wet long after the rain had ceased. All we found for our troubles was one patch of a greenish-yellow *Sempervivum*, which could have been *Sempervivum cantabricum*, and a *Silene* which looked as if it should have been Nottingham Catchfly, *Silene nutans*, but which had bright yellow, pendant flowers, looking like clusters of hanging spiders.

The hamlet of Parzan is another 2 kilometres up the main road. Near Parzan, by the river, was the only *Eryngium bourgatii* to be anywhere near in flower, although the plant itself was fairly common. Another forest track leads from Parzan to the larger Lago de Urticeto, at least fourteen kilometres away. We climbed slowly but steadily for nearly three hours, with quite impressive scenery, but virtually no flowers. At length the track levelled out at some small, high meadows which rewarded us with a patch of diminutive *Viola tricolor* and a small shrub of *Daphne*! A little further on than Parzan, and, incidentally, beyond the frontier control post where passports may be required, is the Valle de Barrosa where lead and silver were once mined. The mines are now no more, but, thanks to British Leyland in the shape of the hotel Landrover (locally known as a jeep), we were conveyed along the remains of the mine track, a route that had everything, steep gradients, hairpin bends, boulders of every shape and size, and washed out river gullies, but very few straight and level stretches. The view up to the head of the valley was magnificent. Green turf below sloped down to a tree-lined stream, steep limestone screes rose beyond the turf, behind which towered near-vertical limestone cliffs silhouetted against a deep blue, cloudless sky; a perfect setting for alpine flowers, but, were we too early or too late? True, we found some flowers, but no great masses, a few *Anemone narcissiflora*, one or two patches of *Caltha palustris*, a white crucifer that was probably a *Draba*, some *Primula elatior* and *Corydalis solida*, the odd *Gentiana verna* and even a small piece of *Saxifraga oppositifolia*. There was also at the top end, near the few remaining snow patches, some *Hepatica nobilis* with a distinct blue tinge about them. The most striking plant along the valley floor was the spurge laurel, *Daphne laureola*, looking very attractive with its shining green leaves and heads of yellowish-green flowers fully out. At the far end of the Valle de Barrosa, up on the right, is a small hanging valley, the Circo de Barrosa. After lunch we tackled the ascent, discovering en route that there was a well graded path zigzagging up from the Refugio hut near the bottom of the hillside. At the top, two hundred metres higher, we found ourselves in a green,

grassy valley, surrounded by smooth turf-clad slopes, very much in contrast to the rock encircled valley below. There were flowers, too, but not in any great profusion. Our list looked impressive, even if the numbers were not, a good sprinkling of gentians, *Gentiana verna* and *G. acaulis* (*kochiana* or *occidentalis*?), a little *Saxifraga moschata*, *Viola biflora* and *Anemone narcissiflora*. Two finds, though, made our visit worthwhile far more than the scenery. On the north-facing brow of a grassy rise near the stream was a flush of tiny five-petalled, pink flowers just showing through the short grass. This turned out to be *Androsace carnea* var. *laggeri*. Further on, on the right hand side, was an impressive waterfall. To the left of it, a wet steep hillside sported reddish splashes of colour, and there we found *Primula integrifolia*, growing like its alpine cousin *Primula hirsuta*, in running water in most places.

A whole day was given to visiting one of the more spectacular limestone gorges in the area, the Valle de Anisclo. Our coach left the Ainsa road at Escalona, and headed westwards, with glimpses of those white and yellow flaxes again on the way. The gorge starts quite suddenly, and is certainly dramatic. Over countless years the river has cut a deep channel into the rock with sheer vertical sides for most of the way. How high these cliffs are is difficult to say, for the tops were rarely visible from the coach. The road clings precariously to one river bank, sometimes right at the foot of the cliff, but often undercut into the rock itself with a considerable depth to the river below. The road is single track, with occasional passing places, and does have the protection of Armco fencing. In between trying to catch a glimpse of the top of the opposite cliff, gazing, or not gazing, down to the river far below, and admiring our driver's skill in scraping round the many corners with no more than a few centimetres to spare, we did notice plants. *Saxifraga longifolia* could not be missed, but others were not so obvious, such as those that grew like small clumps of seaweed on the cliff walls, and two others, growing in similar positions, with creamy-white and reddish flowers respectively. The motor road ends where the valley opens out a little at the junction of two streams, and we were able to alight and look around. A track continues up the valley beside the river, passing a large hermitage built into the underhang of the cliff. Two of our 'unknowns' were found growing here. The light green cushions with the creamy flowers was *Sarcocapnos enneaphylla*, a dainty member of the fumitory family. The red ones were not quite so simple. We appeared to have found a *Petrocoptis*

species, but much larger and more succulent in appearance than the well known *Petrocoptis pyrenaica.* The 'usual books'[2] were not much help, and we left it as *Petrocoptis glaucifolia* (?). Both these plants were growing in vertical rock faces, largely, but not all, limestone. We found our 'seaweed' again a little way beyond the hermitage, *Pinguicula longifolia,* with flowers as large as *Pinguicula grandiflora,* but with less rounded petals, and narrow twisted leaves 15 cm or more long, hanging down below it. The path continues up stream for another 8 kilometres or so (about the length of the gorge itself), but the heat and the extreme dilapidation of the second bridge that we met soon discouraged any distant exploration. A leisurely stroll around revealed some *Thalictrum tuberosum, Aphyllanthes monspeliensis,* yellow *Helianthemum nummularium,* a few lesser butterfly orchids, *Platanthera bifolia,* and a patch or two of *Globularia repens.*

On another not too promising day we set out to have a morning in Sin! Nine kilometres down the Ainsa road at Salinas we turned east up the Rio Cinqueta valley on a passable road towards Plan and Gistain. This was another scenically impressive valley, green fields and trees along the riversides, and huge snow-capped mountains rising very steeply on all sides. Before reaching Plan, we turned off onto a very minor road, with a very steep mountainside, apparently all boulders, rising some hundreds of metres on our left. Our jeeps went up it! The tracks we used that day, we were told, had started as mule tracks, the equivalent of the old pannierways at home. The only improvement to them is that they will now accommodate two mules, or one jeep. We were glad, especially as there were no Armco barriers here, no fencing at all, in fact, that those in the second jeep did not tell us until the end of the day how many times they counted our jeep having a wheel 'over the edge'. Some time later, and considerably higher, we reached Sin, the first of a trio of remote hamlets. The Civil War would seem to have bypassed Sin and its neighbours, but the economics of the twentieth century are doing what the war, and others before it, failed to do, slowly destroying these communities. Sin dates from the fifteenth century, but its inhabitants, once numbered in three figures, are now reduced to ten. Perhaps the main reason is the lack of services. There is, at least, some electricity, but no proper water supplies or sewage, no shops, no medical services, and poor and difficult access roads, probably blocked for long periods in winter. Senes, the next hamlet, is now completely deserted, but Serveto, the last of the three, still has some two dozen inhabitants. Here was the only glimmer

of coming to terms with the twentieth century. Amongst the inhabitants there is still a Catalan weaver, producing traditional blankets, using local materials, wool and vegetable dyes. There is a good market for such products, but whether it might still be possible to expand this into a viable cottage industry, particularly as most of the young people seem to have left already, remains to be seen. The local 'met' man, or rather woman, gave her opinion that it would not rain before early afternoon. Thus assured, it was decided that we should make a dash for the heights beyond, the Collada de la Cruz de Guardia, using farm roads, forestry tracks and, all else failing, apparently open hillsides. The Cruz, rather like the ancient crosses on the Yorkshire Moors, is a meeting place, or crossroads, of the mule tracks linking Bielsa, Gistain, Plan and other smaller hamlets. These tracks, where they survive, are now used for farming, forestry and communications (access to telephone and radio relay stations). They are very unlikely to appear on any maps with any accuracy, if at all, and are certainly not suitable for the casual tourist. Expert local knowledge and a robust, four-wheeled drive vehicle are essentials. One of the reasons for our visit was visible long before our arrival, for we could see a yellow carpet spread round the south-facing concave slopes just below the summit. *Narcissus* is another Iberian genus whose nomenclature is far from clear, but we were happy to accept these as *Narcissus pseudonarcissus*. Even though lacking the background of trees, streams and moors which set them off so well in the Yorkshire Moors, this was still an impressive display. Supporting the *Narcissus* was another highlight of the tour. For the last kilometre of our journey we had been seeing tantalising glimpses of small flowers along the edge of the track, many of them, ranging from light to deep red. An especially fine form of *Androsace carnea* var. *laggeri* we wondered? No, this was *Daphne cneorum* var. *pygmaea*, between five and ten centimetres high growing under and through the grass over large areas, covered with flower heads ranging in colour from the deep red of unopened flower buds to the much lighter hue of fully open flowers, and very fragrant. As a supporting cast to these two prima donnas, there was some good *Gentiana acaulis*, rather fewer *G. verna*, many patches of *Vitaliana primuliflora*, growing both in the turf and in bare shaley patches, and, to us, a new buttercup. At the Col du Lautaret in the Dauphiné Alps, *Ranunculus pyrenaeus* had grown profusely. Here, in the Pyrenees, we saw little of it, but its place was now taken by another large white buttercup, with spear-shaped, pointed leaves which clasped the stems, *Ranunculus amplexicaulis*.

But we had too little time to admire these new finds. Already clouds were drifting across the summit, and this remote, high region was no place to get bogged down in a Pyrenean downpour. Moreover, our drivers' lunchtime was fast approaching so that we had to depart after a visit far too brief to have explored as far and as thoroughly as we would have liked to have done. For future reference, the Cruz de Guardia is but some seven kilometres from Bielsa by a forest and mountain track (and about 1000 metres higher). It should be well within a good day's walking range, provided local knowledge is consulted about weather and the state of bridges and rivers en route. We descended from the Cruz, which is over 2000 metres high, by a different road, or rather, route, as there was no road to start with, merely an apparently trackless mountain top, before we reached another narrow, unsurfaced track. We dipped steeply towards the valley below, meeting hairpin after hairpin, many of which necessitated reversing, even in a Landrover. It was in the middle of one such operation, with the front wheel over which I was sitting apparently out in space, that our driver, a charming young Spaniard, managed to convey to us that he had been at a fiesta all night until five o'clock that morning — 'Mucho vino, mucho bueno'! Nevertheless, it should be said that all our drivers were good, and we had no uneasy moments. In between closing our eyes on the hairpins and gazing down to see if the valley bottom was getting any nearer, we did catch a glimpse of one small meadow, uncut and ungrazed, which seemed to be full of *Narcissus poeticus*.

We lunched by the river at Plan, but the forecast afternoon rain prevented any sightseeing in the village, and it was still raining as we returned along the Rio Cinqueta valley towards Salinas. Now, just below Salinas on the Ainsa road, we had previously seen from our coach vivid splashes of blue on the screes behind the roadside hydro-electric station. Encouraged by this memory, and a slackening of the rain, some of our hardier members alighted at Salinas and set off for these screes. As we had suspected, there was *Campanula speciosa*, beautiful plants, up to 60 centimetres high, with their huge canterbury bell flowers at their best, and growing in apparently nothing but steep and very rocky scree. The walk back up the road to Bielsa (traffic during the week was very light), had more to offer. Near Salinas, the bee orchid, *Orchis apifera*, was quite common on the roadside in company with another plant new to us, *Coris monspeliensis*, 15 centimetres high, looking rather like lilac-flowered fir cones. Close to this were large clumps of reed-like leaves topped with bright blue, solitary

flowers, *Aphyllanthes monspelienses*, which we had seen in the Valle de Anisclo. Above Salinas the valley narrows, not nearly to the same extent as in the Valle de Anisclo, but enough for the river to have high, vertical cliffs, the perfect setting for another fine display of *Saxifraga longifolia*, to be admired from afar, and very inaccessible, even photographically. Fortunately, a few rosettes had strayed across to the road side of the river, but even then we found only one near enough for 'close-ups'. Despite being a strictly protected plant in its native environment, one suspects that plants which start their life within reach of visitors all too often disappear long before flowering. In view of the fact that, in addition to the inherent risks in transplantation to a vastly different environment, this plant is monocarpic, whilst the hybrid form 'Tumbling Waters', which readily produces offshoots to perpetuate itself, is available commercially, there seems to be no valid excuse for such collecting. White seemed to be a popular colour on this road. Hardly had we passed the saxifrage before, growing right on the edge of the road, were two large patches of a prostrate, white-flowered snapdragon, probably *Antirrhinum sempervirens*. In the rock face directly above was more *Ramonda*, including a sport with pure white flowers. A little further on, just over the bridge and in the trees grew a large colony of one of the white helleborines, *Cephalanthera longifolia*, together with some of the marsh orchids and *Moneses uniflora*. A little way along the remains of the old road here-abouts was the St. Bernard's lily, *Anthericum liliago*, and round about were three more white, or creamy-white, shrubs, two of them honeysuckles. The Pyrenean honeysuckle, *Lonicera pyrenaica*, is very similar in its flowers to its family relation *Linnaea borealis*, the white flowers being of a similar shape and size, and borne in pairs, but on a shrub up to three metres high. The fly honeysuckle, *Lonicera xylosteum*, also has its whitish flowers in pairs, but with more resemblance in shape to the common garden forms of this plant. Neither plant seemed to have any appreciable fragrance. Larger than either of these two, the false acacia or locust tree, *Robinia pseudacacia*, looks rather like a creamy-white laburnum with its hanging clusters of pea-like flowers.

A short, steep path leads up from Bielsa to the hamlet of Javierre, there to join the main road running 12 kilometres westwards up the Valle de Pineta to the Government Parador at the head. At the foot of the valley, just beyond Javierre, is the local reservoir and hydro-electric station. The water supply for the generators is brought round and through the hillsides from the Parzan area, whilst from the reservoir

here, further canals take a head of water to the generating plant down by Salinas. There does not seem to be a national grid system, and the local supply system manages no more than 125 volts, which means that an early morning 'cuppa', using a beaker immersion heater, takes twice as long as usual. The Pineta valley is fairly broad, straight and level, rising only about 200 metres from the reservoir to the Parador. The valley bottom is a wide flood plain for the river, with large stretches of shingle, covered in many places with thickets of willow. The road runs along the northerly side of the river, the land rising quite steeply up through conifer plantations to the Sierra de Espierba at over 2000 metres. There are a few habitations amongst the woods, and our trusty hotel jeep managed to take some of our party up to the high meadows at the top of the Sierra. On the other side of the river is a narrow, level, wooded strip, with steep, tree-clad screes rising from it to high, near vertical rock faces behind. These cliffs, the Sierra de las Tucas, are much higher, very inaccessible, and rise steadily to nearly 3500 metres at Monte Perdido, the third highest peak in the Pyrenees, opposite the Parador. On the other side of Monte Perdido is the Ordesa National Park. To reach it, however, we would either have had to climb over this massive, and largely trackless range (and back again), or make a road detour of nearly 100 kilometres, with a considerable amount of walking and climbing to reach any alpines when we got there. Not unnaturally, we did neither. One can cross the river either by the reservoir barrage or by a bridge above the reservoir. The roadside up the valley had little to offer, although *Saxifraga longifolia* was visible high on the cliffs in places. Across the river was more interesting. The grassy parts, as usual, were well grazed by both sheep and cows, so that little remained, but along the lower edges of the woods were great stretches of *Moneses uniflora* in flower. Waiting to take its place, *Pyrola rotundifolia* and *P. minor* seemed to be nearly as numerous, with *Vaccinium vitis-idaea* and *Arctostaphylos uva-ursi* filling any gaps. In the occasional grassy clearings were *Ajuga pyramidalis*, *Viola riviniana*, white *Hepatica nobilis*, a little *Antennaria* and both *Globularia punctata* and *G. nudicaulis*. On a slightly higher level, in flower, were a few bushes of *Daphne mezereum* and *D. laureola*, *Rhododendron ferrugineum* and *Berberis vulgaris*. In the shingle beds by the river grew prostrate mats of fine, bright green foliage, covered with tiny, creamy-white flowers — not identified beyond being a crucifer, and probably a *Galium* species. At the bottom of the ravines where mountain torrents poured down the mountainside,

were flat, level beds of scree and shingle with a few small shrubs in places. We noted many orchids growing in these well drained areas, but not far enough advanced for identification. One of the hazards of wandering too far from what track there was in these parts occurred when two of our party pressed on beyond the end of the faint path through the woods. It subsequently transpired that this was a Hunting Reserve, and they found themselves in danger of being snared, instead of the local wild boars for which the traps were intended! The only other natural hazards that we encountered were a few snakes, several being seen at various times, usually departing rapidly. There seemed to be no record of casualties, local or visitors, so far as we heard.

Transport was necessary for us to reach the top end of the valley. The road is good as far as the hamlet of Espierba, and reasonable up to the Parador. The valley head opposite and beyond the Parador was quite good for flowers, despite the usual cows. Somewhere in the depths of a wood thereabouts was a solitary lady's slipper orchid, *Cypripedium calceolus*. One suspects that, like the *Saxifraga longifolia*, these areas are now too accessible to all and sundry for the wellbeing of such rarities. Further over grew large areas of lily of the valley, *Convallaria majalis*, and Solomon's seal, *Polygonatum odoratum*, both rather past their best, with a few *Potentilla rupestris* here and there. Towards the head of the valley came *Viola tricolor* and var. *cornuta*. *Androsace villosa*, covered with tight heads of small, white flowers, was common, and growing with it, a *Paronychia* species with white, papery bracts. Then came the orchids, forms of the early purple orchid *O. majalis*, the white helleborine again, *Cephalanthera longifolia*, and both red and yellow forms of the elder flowered orchid, *Dactylorhiza sambucina*. Several damp hollows in the turf had large populations of another butterwort, *Pinguicula grandiflora*, with large flowers, more rounded petals than those of *Pinguicula longifolia*, and much shorter, very broad leaves. Nearer the river, the rocks held more *Ramonda*, and, looking at first glance very similar, was another plant with crinkly leaves. But these leaves were shiny, and growing from a level grassy pocket, with 30 centimetre spikes of deep, blue-purple flowers — another local plant — *Horminum pyrenaicum*. There were also the odd patches of *Dryas octopetala*, *Anemone narcissiflora*, and *Pulsatilla alpina*. Two of the commonest plants, though, were very much larger than any of these, and both seemed to be fairly immune from the grazing of cattle. One, for which we were much too

early, was an *Iris*, probably *Iris xiphioides*, whose leaves were very widespread both here and in the higher La Larri valley. The second, and larger plant, was *Asphodelus albus*, which was just coming to its best in our second week, dozens of robust clumps, 60 to 70 cm tall, with up to half a dozen flowering stems to a clump. Like the verbascums lower down, one does not get all the flowers open together. The lowest ones are over whilst the middle ones are open, with the top ones still tightly in bud.

The track continuing on beyond the Parador originally crossed the river higher up and doubled back on the other bank, climbing the mountain side behind the Parador to reach the La Larri valley, another hanging valley, similar to, but larger than the Circo de Barrosa. As the bridge disappeared some years ago, we had to scramble across the river and climb up through the woods, largely beech, to rejoin the track, finding more *Polygonatum odoratum* in flower, with *Polygonatum verticillata* and *Lilium martagon* still to come. As in many other places, *Erinus alpinus* was widespread with many good colour forms. The valley of the Rio de la Larri looks even more inviting than the Circo de Barrosa, a shingle-lined river bed running through wide, level, grassy verges, with grassy sides rising smoothly and often steeply to the rockier and sometimes snow-capped heights all round. At the far end, perhaps two kilometres away, the river drops in a series of waterfalls into the valley bottom. And flowers? Well, yes, but again no breathtaking displays. A small candytuft, *Iberis spathulata*, formed neat, flower-covered cushions of white and pink in the river bed shingle, often surprisingly hard to see. Also well camouflaged amongst the multicoloured stones was the occasional patch of *Linaria alpina*. Rather more obvious were the scattered splashes of white and yellow indicating *Hutchinsia alpina* and *Vitaliana primuliflora* respectively. There was a particularly good stretch of *Primula farinosa* in the damp turf close to the river, with more *Pinguicula grandiflora*. On the higher and drier slopes were both *Gentiana verna* and *G. acaulis* together with a small wallflower, *Erysimum decumbens*. *Iris* leaves were again widespread, but no sign of flowers. The biggest display that we saw was in a small side valley where, growing profusely amongst masses of *Iris* leaves was our old friend the cowslip, *Primula veris*. There were reports of a few daffodils up near the waterfalls, but we saw only two, both looking like *Narcissus juncifolius* (=*N. requienii*). One, with a solitary flower, had obviously been washed down the river bed from higher up. The other was in what must have been quite dry turf just

off the top of the path from the valley below. Those members who went up the Sierra de Espierba by jeep, then walked along the ridge and down the far end to come to the foot of the La Larri valley, a walk offering magnificent views, weather permitting, saw little, so far as we heard, in the way of flowers. An alternative path leads down through the beech woods to emerge behind the Parador, which, we were pleased to find, is open for refreshments to non-residents.

Summing up our visit, Bielsa is a pleasant, clean little village with very friendly people and an adequate hotel (Hotel Valle de Pineta). We had eight days of perfect weather, not a cloud in the sky, and then some heavy storms, but no wasted days. The scenery is spectacular with plenty of interesting flowers, especially the endemics, but, at that time of the year, no spectacular displays in the meadows, high or low, except on the Cruz de Guardia. Transport is necessary, both to get there and to get about, although the normal family car would not be able to reach all the places to which our jeeps took us. It would, however, be quite feasible for a group of six to eight people to hire a jeep locally for the more inaccessible outings. Access to Bielsa is now much simpler by road through the new tunnel via, e.g., Lourdes (or Tarbres), Bagnères and Arreau, but, with a late winter, this route might not be open until June. And finally, the Bielsa supermarkets keep a fine range of Spanish wines and liqueurs at more than reasonable prices, but, if we had to put in a word of warning, it would be, for those who wish to emulate Omar Khayyam, bring your bread with you from France!

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The Northern Iberian Mountains

by RONALD J. D. McBEATH

THE northern Iberian Mountains consist of a range of scattered, small mountains, reaching a maximum height of 2313 m at the Sierra del Moncayo, near Soria, in north central Spain. As a group they are not particularly rich in alpine plants, and as they lie well outside the main mountain ranges of Europe, few alpine plant enthusiasts visit this area. Their chief attraction lies in a few endemic species which have evolved

in isolation and withstand the exacting environmental conditions prevailing in this area.

The northern Iberian Mountains are isolated from the botanically rich Pyrenees to the north-east by the hot, dry Ebro plain, and separating the Cantabrian Mountains to the north-west are the arable lands of Burgos. To the south stretch the arid plains of central Spain. The climate is one of extremes, with cold winters and hot arid summers, with the result that only the most resilient species can colonise the more exposed mountain rocks. The geology is also rather discouraging, consisting mostly of well eroded granite, which gives rise to rounded mountain tops with north and east facing corries.

During a short plant hunting expedition in this area I visited two mountains in this range, the Sierra de Urbion, 2228 m and the Sierra del Moncayo.

Approaching the Sierra de Urbion from the north-west via Burgos the arable lands gradually give way to a dry *Cistus* dominated heath, consisting of *Lavendula stoechas, Calluna vulgaris, Erica cinerea,* a few stunted oaks, probably *Quercus pyrenaica, Juniperus communis* and *Helianthemum apenninum* with large white flowers over silver leaves. The white-flowered *Cistus* formed a scrub over 1 m high. Growing from its roots the parasite, *Cytinus hypocistis,* a member of the Rafflesiaceae, produced tight rounded clusters of fleshy yellow flowers some 10 cm high, arising from red bracts. This plant derives all its nourishment from the roots of the *Cistus,* having no green leaves of its own.

At a glance the Sierra de Urbion closely resembles our own Cairngorm mountains, the heath covered ridges are well rounded and the lower slopes are clothed in a forest of Scots Pine. In July the open clearings throughout the lower part of the forest are ablaze with *Genista* and *Cytisus* in many shades of yellow and gold, contrasting with the tree heaths *Erica arborea* and *E. australis* in white and purple respectively. Many of the pine trees are parasitised by mistletoes, *Viscum album* ssp. *austriacum,* a form which is confined to conifers.

Probably the best approach to the higher slopes is to follow the forestry road to the Laguna Negra, a 'green lochan' tucked close into a north-east facing corrie and surrounded by fine old pine trees.

In this forest the plants of interest included the white-flowered *Ranunculus aconitifolius* and *Streptopus amplexifolius,* a member of the Liliaceae, forming small clumps up to 45 cm high, with greenish-white pendant flowers held below the stem-clasping leaves. Preferring more open, moist clearings, *Doronicum carpetanum* opened its golden,

sun-like flowers on stems 45 cm high, whereas in open stony places *Saxifraga continentalis* formed mossy carpets with white flowers on 10 cm high stems. In open grassy clearings the yellowing leaves revealed the whereabouts of *Narcissus bulbocodium* var. *nivalis*, but alas then in seed.

Above the lake and tree line the hillside is dominated by *Calluna*, *Erica tetralix* and *E. cinerea*. In grassy places a few flowers remained on *Tulipa australis*, predominantly yellow and often reddish on the outer three segments. In the wet ground near melting snow patches *Ranunculus amplexicaulis* was frequent with snow-white flowers on 15-30 cm high stems. Amongst the dwarf windswept heather on the exposed ridges, the endemic *Viola montcaunica* was found in some abundance, resembling a compact *Viola cornuta* reduced to 10 cm high, the flowers are a rich violet-purple with a yellow eye, quite large with rounded overlapping petals. In cultivation it maintains its compact stature and appears a good perennial.

In the lee of the high ridges, receiving water from the melting snow cornice, the large and showy *Doronicum grandiflorum* seemed quite out of place, the lush leaves and large golden flowers would be much more in keeping in a herbaceous border rather than in the company of *Chrysanthemum alpinum*, *Saxifraga pentadactylis*, *Armeria splendens* ssp. *bigerrensis* and *Linaria alpina* with which it grew.

The Sierra del Moncayo, although higher than the Sierra de Urbion, covers a much smaller area. A good road leads up the east side through thick forest of oak and beech where *Cypripedium calceolus* is reputed to grow, stopping at El Santuario de Moncayo at the upper limits of the beech forest. Near the Santuario on shaded moist rocks occurs *Saxifraga moncayensis*, an endemic to this mountain; it forms large cushions with many white flowers and is very similar to *Saxifraga pentadactylis*. Above the tree-line of pine the hillside is very steep and covered with unstable scree and boulders reaching up to the snow cornice. In places long thin tongues of *Genista* and *Cytisus* stretched high up the mountain stabilising the scree, seen from below like yellow lines on the hillside. Few plants grow on those slopes as the environmental conditions must be very severe with extremes of heat, cold and drought which few plants can tolerate. Amongst those which we did find included *Saxifraga pentadactylis*, *Viola montcaunica*, *Juniperus communis*, *Cryptogramma crispa*, *Linaria alpina*, *Antennaria* and *Jasione*.

It is reputed that the Pyrenees can be seen from the summit on a clear day, but on this visit the heat haze from the Ebro valley was such that the visibility was reduced to little more than a mile.

Val d'Isere

by DAVID LIVINGSTONE

SOME years ago my wife and I spent the second fortnight of July at Val d'Isère, Savoie, France. We regarded this as a holiday in the mountains seeing and enjoying the "alpine" flowers in their native habitat rather than a plant collecting expedition. Spring had come late to the area and there was a greater variety of flowers to be seen than was usual for mid to late July. As I took no notes, this is an account only of some of the plants I recall most vividly after the passage of the years.

The village of Val d'Isère which is at a height of 1,850 metres is not as pretty as some of the Austrian villages we have visited, being spoilt by rather ugly modern buildings. It is, of course, not really a summer resort but is a famous ski-ing centre which is often to be seen on our television screens. The scenery around is fine even in summer but no doubt the winter snows will transform the whole area to a veritable fairy land and a skier's paradise.

Although dry powdery snow fell on the second day, 16th July, the weather thereafter was mainly dry and sunny but cold enough in the mornings and evenings for woollies. However, there were plenty of flowers around to warm our hearts! About ten minutes walk from the centre of the village and without any serious climbing there was a most amazing display of *Viola calcarata*, the thousands of blooms varying in shades of purple/violet. We were fortunate enough though to find odd plants with cream or white flowers. Not far away was an outcrop of rock, quite considerable in area but only a foot or two in height with many clumps of *Sempervivum arachnoideum* in full flower. The rather pleasing red flowers above the grey or white rosettes made a bright picture. Their neighbour on this site was one of our best finds, *Primula pedemontana*, easily distinguished by the short red hairs on the edges of the younger leaves. Unfortunately we were too late to see its bright pink, white-eyed flowers. A week or two earlier they must have been a glorious sight as was evident from the abundance of seed capsules. In a few cases *S. arachnoideum* was playing host to the *Primula* which was growing out of the clumps of the house-leek. We had seen this association between a *Primula* with another genus at the Gros Glockner some years before. In that instance *P. minima* was growing out of cushions of *Silene acaulis*.

Only a few minutes gentle climb from the main street behind the shops was a grassy area bordered at its upper limit by an extensive rough and unstable scree from which, some months before, an avalanche had claimed the lives of over 40 people in a Youth Hostel. Although this grassy area was comparatively small there was a wealth of flowers. Pride of place I give to two orchids. Growing singly, that is not in clumps, were many *Nigritella nigra*, the black vanilla orchid. Their blackish/red flowers on short stems were at their best. Near at hand were sturdy clumps of the well named fragrant orchid, *Gymnadenia conopsea* with 3 inch long heads of reddish/pink flowers on 12-15 inch stems. A thorough search failed to find any *Nigritella rubra*, an alleged hybrid between these two species. An old favourite was also to be found, *Paradisea liliastrum*, commonly called St. Bruno's Lily, but it is not a bulbous plant. It takes its name from the long lily-like white flowers of which there can be four or five to a stem all facing the same way. It grows quite happily in the rock garden, sets seed in vast quantities, and self sown seedlings can often be found round the parent plants. I was much attracted by large numbers of the bladder gentian, *Gentiana utriculosa*, which has six or seven blue, starry flowers to each short stem. It is, unfortunately, an annual and this may be the reason why I have not seen it in cultivation. *Sempervivum arachnoideum* was again plentiful and here I was struck by the great variation in the size of the rosette, the density of the cobweb, and the colouring of the outer leaves, some of which were very dark indeed. Although the Edelweiss, *Leontopodium alpinum*, was growing quite extensively in gardens in the village, we found only one in the wild and that near to the fragrant orchid.

Elsewhere near the village we found *Saxifraga oppositifolia* with well rounded, purple flowers growing in very stony wet soil on the banks of the river Isère, *Soldanella alpina* where the snow had not long vanished, and *Gagea fistulosa* in wet depressions in pasture land where cattle had grazed. This little bulbous plant, not of great value in the rock garden but certainly interesting, had up to four greenish-yellow flowers to a plant.

From the village a tèléphérique took us to the small Lake Cuilette on the Solaise at a height of 2,515 metres. Unfortunately there were thousands of flies which curtailed our visit there, but I am sure it would have been more rewarding had we been able to put up with the discomfort of the buzzing flies. *Ranunculus pyrenaeus* with white flowers on 6 inch stems and distinctive lance-shaped leaves covered a large

area. There were also a few plants which I think was another white buttercup, *R. seguieri*, a much rarer species which I manage to flower in a pot, but not well. Here it was not in flower, perhaps because it was growing in stony ground much trampled by cattle and human beings. The only other *Ranunculus* it could have been was *R. glacialis* which I had found previously in quantity in sopping wet peat overlying rock at 2,800 metres above Verbier in the Valais region of Switzerland. This one that I thought to be *R. seguieri* was also found at the Col de l'Isèran growing in conditions similar to those obtaining at the Solaise.

A local bus, which ran twice each week, took us up to the Col de l'Isèran at 2,770 metres, a journey of 17 kilometres. On the way there the roadside banks in places were stained with the pinky/red blossoms of *Saponaria ocymoides* which we had last seen in a similar situation near St. Luc in Switzerland. This plant is easy in the rock garden and self sows when happy. At the Col it was bitterly cold in a strong wind and there were still snow walls some 6 metres high where roads had been cut through the ski-ing areas which were being much used. I will mention only three finds in addition to *Ranunculus seguieri* to which I have already referred. There were a few *Petrocallis pyrenaica* covered with pale lilac flowers growing in hard stony ground. I was particularly glad to find this old "friend" because I had come across it only once before in the wild near Cogne, up a valley from Aosta in northern Italy. There, too, there were very few plants. In a shallow rocky depression, running freely in the cracks in the rocks and appearing to subsist on nothing at all, was *Campanula cenisia* with a few starry blue flowers out and many buds yet to open. This was a real thrill as I had never seen this rare species in its native habitat before. When one sees the conditions under which it grows in the wild one can understand why it proves less amenable to cultivation than many other species of this genus. The large-flowered Leopard's Bane, *Doronicum grandiflorum*, carpeted the floor of this shallow depression, brightening a rather dull day with its yellow daisy-like flowers some two to three inches across and carried singly on 6 inch stems.

I can recommend Val d'Isère as a centre for people who wish to see "alpine" plants without any strenuous climbing, and I suggest that July is possibly the best time of the year.

Notes on A Visit to Crete—1980

by DOROTHY ROSE

WE ARRIVED at Agios Nikolaos on 13th March, at the end of a spell of very bad weather, so the spring flowers were late and it was still cold.

The following day we visited the village of Kritsa, 12 kilometres from Agios Nikolaos, from which it is an easy bus ride. It is an attractive village climbing up a steep hillside and noted for its leather work. A walk of about 3½ km takes one to the remote and lovely site of Lato, the remains of which are mostly Hellenistic of the 3rd century BC, but its charm lies in the feeling of stillness and serenity emanating from it. The area of the ruins is small and constricted into a sort of pass which winds round the steep hillside with a view to the sea on the north and bare hills to the south, and when we were there it was warm and windless compared with the valley below. We were lucky as there was no one there and the tumbled stones of the ruins formed enclosed gardens of flowers; most conspicuous were large numbers of the snakes-head iris, *Hermodactylus tuberosus*, its subtle colouring accentuated by numbers of *Anemone coronaria* in shades varying from mauve to purple.

The walk to the site lies up a dusty valley road, just motorable, but very pleasant as a flower-finding meander. We found the only *Cyclamen creticum* in flower in this valley, a large patch of the rather unattractive giant orchid, *Barlia robertiana*, and the irises *cretica* and *sisyrinchium*, the latter now known as *Gynandiris sisyrinchium*. This does not open until the afternoon so that it is possible to pass quantities of it on a morning walk without being aware of its existence as it is a slim-growing plant with narrow foliage. The few *Anemone coronaria* already in flower in the fields were of the scarlet variety, whereas we did not see a single scarlet one a few hundred feet up at the site of Lato.

On our second day we visited the Lassithi plateau and the Dhikti cave, one of the supposed birthplaces of Zeus. After such a wet spring the cave was fairly water-logged at the bottom but it had a strange fascination, appearing suddenly as a black mouth halfway up a very steep hillside. We were there for the flowers and, tantalisingly, they were not out. Bushes of *Daphne sericea* were in bud all the way up the hillside and large numbers of plants of *Cyclamen creticum*, without a flower to be seen. The plateau is a flat bowl of fertile land surrounded by hills, a typical formation found on Crete, where the road climbs

sharply into the hills and suddenly one is looking straight down onto a flat plain. We were lucky to find a bush of *Daphne sericea* in flower on the way back and numerous clumps of *Iris cretica*, but it was a cold and sadly unproductive day compared with its potential under better weather conditions. The plateau is famous for its white-sailed windmills, used to draw water into tanks for irrigation, but these are sadly falling into disuse.

The most successful day of the whole week was an excursion south/west to the ancient site of Phaistos. We left early on a perfect morning of brilliant sunshine and clear skies, going via Heraklion and getting a wonderful view of the Mount Ida range with gleaming snow well down. The road from Heraklion to Phaistos runs nearly due south through lovely rolling country, mostly of vines. The yellow *Oxalis*, an unwelcome importation into Crete, ramps everywhere and there appears no way in which to prevent its spread. In some cases it may be a defence against the erosion which is a feature of an island once covered in forest, but the introduction of weed-killers may be even more disastrous for wild flowers, since these are now being used at Knossos and elsewhere.

Turning due west to join the main highway we saw another great plain below us and, after a rapid descent, spring was suddenly with us while dark clouds were gathering behind over Mount Ida. We wound our way from the main road to the magical site of Phaistos and the world became a different place. The setting is quite beautiful, with the ruins half-encircling a hill and an open view to the plain below and the sea beyond. The ruins have not been restored like those at Knossus and the atmosphere is one of peace and remoteness. There was no time for those of us who had gone for the flowers to enjoy the archaeology as well and I only managed a brief walk round the ruins, along the edges of which were growing quantities of *Chrysanthemum coronarium* var. *discolor*. Even before reaching the gate a mass of the beautiful white *Ranunculus asiaticus* covered the slope, among which appeared an occasional half-pink to pure pink flower. These are endemic to Crete, and at first sight one is inclined to confuse them with *Anemone coronaria*. We had a botanist with us and when a large number of orchids were discovered the excitement mounted. There were *Orchis italica*, *O. papilionacea*, *O. saccata*; *Ophrys bombyliflora*, *O. cretica*, various forms of *O. fusca* and many more. We walked down the road toward the site of Aghia Triada, abandoning all thoughts of archaeology as we came upon the sheets of flowers for which we

had come to Crete; the botanist dived from plant to plant saying "this is what Crete should be in the spring" and the cameras clicked from one orchid to another. It is amazing the way Nature arranges her species in their various colours — *Anemone coronaria* was massed scarlet in one place, mauve to purple in another. The orchids nestled in the shelter of various sub-shrubs which were not yet in flower. *Phlomis fruticosa* was at last bursting into gold patches and thickets of *Ebenus cretica* were about to cover themselves in flower. Fortunately, as our tour was based on flowers, we were allowed to walk on and be picked up at intervals by the coach. The marvels of Aghia Triada passed us by as we were too intent on the vegetation. This is the sort of situation which sends one back again, for it is impossible to see everything unless the day and the place are right.

Exhaustion and excitement made us very ready for a satisfying taverna lunch at Mires. The Cretan habit of displaying great cauldrons of the food on offer for one to choose is a happy one and the chicken and rice or mutton and noodles were delicious, served with the excellent salad produced in all Cretan tavernas and washed down with local wine, sometimes resinated, or beer.

We returned home via Gortyn, where there is a delightful small Roman amphitheatre and the famous carved stone blocks of the Law, or Gortyn Code, inscribed by Dorian Cretans sometime between 500 and 450 B.C. and remarkably preserved. It seemed a sad place as if the destruction of its greatness by the Moors in A.D. 824 had left a permanent sorrow over the whole area. We had had the best of the day, as the clouds over the Ida range were bringing spots of rain and it was restful just to gaze, in a state of botanical satiation, at the lovely countryside seen in reverse on the way home.

A week was all too short and our last long excursion should have been split into two as there was so much to see and enjoy.

Starting early from Agios Nikolaos we drove round the great Bay of Merabello, skirting the coast for several miles and then cutting slightly inland to join the coast again at Sitia, a pleasant little port. From Sitia we followed the coast, leaving the mountainous area well to the south, and the flora consisted of low-lying, heat-resisting plants, many of a prickly nature, and none of them flowering, until we came on patches of *Cistus*. We visited the site of Lower Zacros, which meant descending a steep zig-zag road down to the sea, not an easy drive for a bus and obviously pretty impossible in bad weather when slippery mud would make the return ascent treacherous. Before

descending we came on patches of the yellow *Asphodel* for the first time, and, later, white and mauve *Ranunculus* among the low-growing plants on the rocky slopes. The site was obviously very interesting archaeologically but time was short and we were due to visit Vai after a taverna lunch at Ano, or Upper, Zacros.

Vai is the most tropical-looking part of Crete with a surprising valley of date palms growing beside a river, an astonishing sight with brilliant blue sea and red-gold sand as a background. Unfortunately it has been taken over by hippies who infest parts of Crete and their sordid little camps among the palm trees pollute the area and destroy its serenity. On the slopes above the valley lovely tight, low-growing, bushes of *Cistus incanus* (*villosus*) subspecies *creticus* were just coming into bloom and the view from above of palms and the sea beyond was breathtaking. We returned to Sitia via the monastery of Toplou. This is a strange place, isolated on a bare headland. Founded between the 14th and 15th centuries, it has had an adventurous history and is reputed to be one of the richest monasteries in Greece, owing to its ownership of considerable areas of land. Wealth was in no way obvious and the fine icons within, particularly a series of scenes from the Bible, could hardly be appreciated owing to the dimness of the room in which they were kept. At least it was good for the sale of postcards which could be taken away for examination under a good light!

We called at Gournia on our way back, tired and expecting little, but it was a revelation. This is a site which should be explored on its own, never tagged on to a day of sightseeing. Its setting, straggling up a gentle hillside, overlooking the Bay of Merabello and sheltered by a backdrop of high hills, has a strange tranquility. It lay undiscovered until the beginning of this century and proved to be the most domestic of all the Minoan sites, because it was a small town devoted to manufacture and therefore peopled by artisans living in homely dwellings, rather than kings in palaces. Here the flowers grew in undisturbed abundance — all three colours of the Cretan *Ranunculus* were growing together for the first time, white, yellow and various shades of mauve, plus many more plants which deserved far more time than we were able to spend in identifying them.

Spring Flowers of the Canadian Rockies

by ANNE M. CHAMBERS

IN THIS article I would like to describe some of the early spring flowers found in two locations in the Canadian Rockies, not too far distant from each other, but differing greatly in habitat. Spring comes late to the Rockies and often, after a heavy winter snowfall, deep drifts remain on the lower slopes well into June; to plan a trip as early as this may be something of a gamble but certainly one worth taking. The first species to bloom do not catch the eye with great splashes of colour but are no less beautiful for that. At this time of year the scenery is more dramatic than in July or August since the residual snow gives contrast and form to the mountains which can appear uniformly grey in those succeeding months. As a bonus, the tourist traffic has not yet built up to its summer frenzy!

Parker Ridge, with its typical alpine flora, is a spur of Mount Athabasca extending south-east parallel to the Jasper-Banff highway; access is easy, since at this point the road surmounts the Sunwapta Pass at about 6,500 feet, leaving barely a thousand feet of gentle climbing to the ridge top. As one ascends, the conifers become stunted and die out, to be replaced by dwarf ericaceous scrub, birch and willow which shelter a variety of herbaceous plants. On this shadier side of the ridge, extensive patches of soft snow remained even in late June and we occasionally sank through them into the wet peat below; mats of *Cassiope tetragona* and *Phyllodoce glanduliflora* were coming into flower where the snow cover had gone. The willow scrub, *Salix barrattiana*, is particularly attractive at this time of year—the large male catkins have red stamens which impart a rosy aura to the inflorescence; three genera seem to predominate under the protection of the willows, all of them white-flowered—*Trollius albiflorus*, *Anemone parviflora* and the lovely *Pulsatilla occidentalis*, still with young downy leaves.

Parker Ridge is formed from rock which was originally marine coral, and higher up the slope one can see the fossil evidence for this in the exposed outcrops; it weathers to a gravelly soil which supports the true alpines, some of which are the circumpolar species we find on Scottish hills, such as *Dryas*, *Silene acaulis*, *Saxifraga oppositifolia*

and the prostrate juniper and willows. Others are not so familiar, like the *Pedicularis* species with yellow flowers tipped in brown and chocolate-coloured leaves scarcely distinguishable from the background, and the very attractive *Oxytropis podocarpa* which makes woolly mats of tiny leaflets covered in purplish-pink keeled flowers. Cushions of *Draba* abound on the ridge top, their flowers varying from cream to deep yellow and contrasting well with the intensely orange lichen growing on the summit rocks; the crevices shelter tight rosettes of *Androsace chamaejasme* with almost stemless white flowers. We also found a dwarf *Ranunculus*, probably *eschscholtzii*, and *Potentilla ledebouriana.*

The panorama from the ridge, which includes not only Mount Athabasca and the great icefield behind but also the peaks of Castleguard and Saskatchewan, distracts from the pursuit of flowers, but the area has one more delight not to be missed; on the southern slope grows an abundance of *Erythronium grandiflorum*, the glacier lily, so-called since it occurs on slopes fed by meltwater. These delicate, dancing flowerheads of shiny yellow must be one of the most charming sights of the alpine meadow in spring.

North-west of Mount Athabasca, through the Yellowhead Pass, lies Mount Robson, the highest peak in the Canadian Rockies, and at nearly 13,000 feet a towering mass of rock in an area of dense afforestation. A well-organised trail leaves the main road at the tourist viewpoint and climbs for about twelve miles through the coniferous forest to Berg Lake, a glacier lake lying at the foot of Robson's northern cliffs; I would like to describe some of the typical forest flora along the way.

There is considerable contrast between the paucity of species which can thrive in the densest parts of the forest, and the many that take advantage of the higher light levels where the path widens or along the margins of lakes and rivers. The trail to Berg Lake has both these habitats; in some places the path is so narrow that only dim light filters through the trees, and even the ubiquitous carpeter *Cornus canadensis* disappears from the forest floor. A few species of orchids and wintergreens make it their home, but what species!; *Calypso bulbosa* grows here—this little orchid with its delicate slipper-like head of purplish-pink is quite breathtaking, and both a challenge and frustration to the photographer in that deep shade. Two species of *Corallorhiza*, the coral-root orchids, greenish-yellow and flesh-coloured, also colonise the pine litter, and an unremarkable *Habenaria.* There is a twayblade,

too, much more striking than other *Listera* species. The individual pale green flowers are well-spaced on the stem and larger than usual; their parts are disposed in a curiously angular manner, and the acutely jutting lip has a prominent dark-green stripe down its length. The pink *Pyrola bracteata* and the greenish-white *P. grandiflora* are common, but the loveliest wintergreen in the forest is *Moneses uniflora*; like *Calypso bulbosa*, it is a joy to find and well deserves its plethora of popular names—"Wax Flower", "Single Delight" and "Shy Maiden". And it is equally difficult to photograph—to realise the full beauty of the down-turned flower, often scarcely four inches high, one must lie prostrate in the pine litter; this motionless posture is the opportunity for which the attendant mosquito hordes have been waiting and it becomes increasingly hard to concentrate on holding the camera steady!

The trail emerges from the forest on to the edge of Kinney Lake with the magnificent backdrop of Mount Robson reflected in its blue-green water. In June the scene is framed by the white-flowered *Amelanchier* bushes, the service berry, growing round the shore; later these shrubs carry clusters of blue berries, once used as flavouring by the Indians, mixed with ground dried buffalo meat and hard fat to make pemmican. Robson's cliffs tower for nearly ten thousand feet above the lake and, not surprisingly, the area is subject to rock falls. The path goes through part of the forest blasted by the wind preceding just such an avalanche; jagged tree-stumps, about ten feet high, are all that remain, and in the intervening years young conifer seedlings have had to compete for dominance with shrubs such as the wild rose, buffalo-berry, *Ledum*, *Lonicera* and *Ribes*, quick to take advantage of the new habitat. Under them *Cornus canadensis* comes into its own, and by the side of the path blooms the red and yellow columbine, *Aquilegia formosa* and mats of *Linnaea borealis* covered in little pink twin flowers.

Beyond Kinney Lake, the track crosses then recrosses the Robson River in an area known as the Valley of a Thousand Falls from the number of streams which cascade over the surrounding cliffs after rain. The wide valley bottom, filled with alluvial gravels and silt, is home for yet another association of plants. In the moister situations along the river are colonies of butterworts, the purple-spotted *Orchis rotundifolia* and the white camass, *Zygadenus elegans*; the drier flats are covered extensively in mats of *Dryas*, both *drummondii* and *octopetala*, the former often past flowering and sporting heads of twisted silky styles. We were very excited to come across two beautiful specimens of the

Lady's Slipper Orchid, *Cypripedium calceolus*, near the path, and spent considerable time in photographic homage only to find, a little further on, great clumps of it, growing almost as vulgarly as dandelions! It is certainly a striking plant—the shiny yellow slipper is often spotted with vermilion and set off by the corkscrew twists of the maroon-veined lateral sepals. Another *Cypripedium*, *C. passerinum*, grows in the valley but it is a much less showy plant; the slipper is white, spotted with crimson, smaller than in *C. calceolus*, and said to resemble a sparrow's egg, hence *passerinum*, meaning "of sparrows". The pale green sepals are short and untwisted, with the dorsal one forming a hood which partially conceals the slipper. Both specimens seek some shade under the few deciduous trees there are.

From the valley, the route climbs steeply and again the flora changes. Mossy saxifrages thrive in the cold spray thrown up by the river as it plunges down the hillside in a series of spectacular falls; the conifers thin out and are interspersed with birch. At this higher altitude *Menziesia glabella* is the dominant shrub, a very attractive bush with blue-green leaves and clusters of waxy salmon-pink bells hanging from long pedicels. Two species of *Viola*, one yellow with brown veining, the other purple, grow by the path, and an occasional plant of purplish-blue *Clematis columbiana*. *Thalictrum occidentale* is another woodlander of this locality, curious in that the eye is attracted to it, not by the minute flowers, but by the anthers, quivering in perpetual motion at the end of long thread-like filaments. In more open situations, the characteristic plant is the *Castilleja*, the so-called Indian paintbrush from its bright red bracts, commoner in this area than the yellow form.

Eventually the track levels out for the final mile to Berg Lake over rough treeless, boulder-strewn terrain with little plant life. Up here the air is exceedingly cold and we paused only briefly, before turning back, to photograph the icebergs shed by the glacier into the lake and our final plant, a cushion of dwarf *Potentilla*, flowering profusely in this bleak landscape.

There is considerable concern over the disappearance of plant species resulting from the high tourist density in the Rockies, and indeed some popular areas such as Peyto Lake have been closed to traffic to help regeneration, but I hope I have shown that for anyone willing to leave the car, there are still lots of exciting plants to see—not dig up!

Some Plants from Northern B.C.

by BODIL LEAMY

THE FLORA of British Columbia can best be described as a transitional one, linking the Alaskan and circumboreal plants in the northern part of the Province with the Pacific Coast flora of western U.S.A. in the southern part. In the Peace River region in north-eastern B.C. many prairie plants reach their most westerly distribution.

I had long wanted to go north and this August I finally managed to see one small area in northern B.C. and to drive along the first 400 miles of the Alaska Highway. I flew up to Dawson Creek, 750 miles north-east of Vancouver and home of the famous landmark, the Mile Zero Post of the Alaska Highway. It was raining when I arrived in Dawson Creek, and after picking up my rental car I was immediately introduced to one of the less pleasant aspects of living in the north, namely muddy roads. I drove to Fort St. John, where I stayed overnight, and when I left in the morning it was still raining.

The first 50 miles north of Fort St. John were paved and so presented no problem, but the next 80 miles were not and turned out to be the worst I have ever driven. Due to intensive highway construction and rain, the road was a sea of black gluey mud, deeply rutted by construction equipment and heavy trailer trucks. It was a nightmare of detour routes, flagmen and mud. Afterwards I heard that if it had rained only a few more hours, the highway would have been closed.

The next 50 miles were much better, the gravel surface being firm although still slick. The rain had stopped, only to be replaced by low clouds, so visibility was zero. By this time I was beginning to wonder if I would ever see any of the north, but fortunately, as I was leaving Trutch Mountain to drive the last 100 miles to Fort Nelson, it cleared, the sun came out, and for the rest of the trip the weather was fine, only at times overcast. Between Trutch Mountain and Fort Nelson there were miles of muskeg covered with stunted conifers with a dense ground cover of *Andromeda polifolia, Chamaedaphne calyculata, Ledum groenlandicum* and *Rubus chamaemorus.*

The next day I drove 92 miles northwest to Summit Pass and Summit Lake and mile 392 on the Alaska Highway in Stone Mountain Park. It is a limestone area, and the home of many choice plants. It is also the northern end of the Rocky Mountain Range. From the pass, which is 4250 ft above sea level, a rough, rocky track, requiring a 4-wheel drive

vehicle, winds about 5 miles up Summit Mountain, ending in a long ridge at about 5500 ft and the site of a microwave station.

I spent two days there, all the time I had, before returning the same way I came, only this time I was able to see the scenery and to stop and look at plants along the way.

The Summit Pass area was chosen because, I knew I would find *Potentilla biflora* and *Rhododendron lapponicum* there. I particularly wanted to see the *Potentilla* in the wild, as I had read about it long before I saw live material. Specimens of *P. biflora* have been brought back to Vancouver several times in the last six years, but none has survived in cultivation, as far as I know. *Potentilla biflora* ranges from northern B.C. into Alaska, across Siberia and, according to Sampson Clay, into the Chinese mountains, where it is a tight, choice cushion, far better than its looser north American counterpart. *Potentilla biflora* is a cushion plant with a hard, woody branched caudex, covered with years of persistent, dead foliage. The leaves are small, grey-green and hairy, slashed into 2-5 linear segments. The flowers are clear yellow, about $\frac{2}{3}$ of an inch across on short stems. Most of the plants had finished blooming when I saw them in early August, and the leaves had turned a lovely dark red, with the exception of two cushions that were a clear lime-green colour instead. I have since wondered if the pale green leaves were an indication that these two cushions were albino forms.

The whole ridge was carpeted with *Rhododendron lapponicum* which was in seed. It grew thickly embedded in mosses and lichens or directly on the rocks. Every situation and exposure seemed to suit the *Rhododendron*, whereas *Potentilla biflora* could only be found on the north facing slope. *Arctostaphylos alpina* was another plant that preferred to face north. It was found growing through a carpet of grey-green lichen, against which the translucent red berries and beet-red leaves were really noticeable. The leaves on *Vaccinium caespitosum* were still pale green, although the berries had ripened and were nearly black.

In small hollows *Betula nana* formed miniature forests and both *Campanula lasiocarpa* and *Aconitum delphinifolium* loved to shelter between the stems. I found a plant of *C. lasiocarpa* with an almost deep purple flower, whose corolla was star-shaped and flat, rather than the normal bell-shape. It was very pretty, but the flower was too small and it lacked substance. (See footnote)

There were mats of *Cassiope tetragona* and *Dryas integrifolia* and several species of dwarf *Salix*. *Salix reticulata* was often found growing

together with *Gentiana prostrata.* The gentian is a small annual species only a few inches high with almost square medium-blue flowers. It grew everywhere, from the top of the track by the microwave station right down to the edge of Summit Lake, where a few of the plants even grew submerged under an inch of water.

Right below the microwave station, on the north side, I found some plants of *Chrysanthemum integrifolium* (fig. 56). When I first noticed the *Chrysanthemum* cushions I thought I was looking at a giant version of *Silene acaulis* with leaves twice as long as normal, but with the rosettes arranged in the same pattern and having the same texture as that plant. However, as soon as I saw the flowers there was no doubt. They were large white daisies over an inch wide carried singly on 4 inch stems. Tiny *Tofieldia pusilla* often grew close to the *Chrysanthemum.* With an inch high tuft of leaves topped by a hairfine scape with whitish flowers, the small scale of *Tofieldia pusilla* would make it fit perfectly into a Bonsai landscape.

Other plants seen along the ridge were *Solidago multiradiata* and *Melandrium apetalum,* the last showing off its pink striped inflated calyx. Both of those plants liked growing among fist-sized rocks.

Two plants that preferred the south slope of the ridge were *Potentilla uniflora* with silky-haired leaves close to the ground, and dwarf *Oxytropis nigrescens* with grey foliage and large purple-magenta flowers.

The bare rocky track was a favourite growing place for many species. *Silene acaulis* and *Saxifraga oppositifolia* both formed very large and perfectly even cushions there. *Saxifraga aizoides* and *Saxifraga flagellaris* also favoured the track. Both were in bright yellow bloom and looked as if they ought to belong to the *Sedum* family, rather than the *Saxifraga* one.

To mention a horsetail right after all these beautiful plants is perhaps a bit risky, but I found the large tights mats of *Equisetum scirpoides* (fig. 57) beautiful and unusual. *Equisetum scirpoides* is an evergreen species with short two inch jointed stems. Some of the stems carried small black cones containing spores, and they grew in lovely swirly, circular patterns; another perfectly proportioned plant for a trough or a bonsai garden. Unfortunately *Equisetum scirpoides* increases from underground rhizomes like all the other members of the family, and should therefore be treated with caution and not let loose near choice plants.

Aconitum delphinifolium (fig. 55) grew in every type of situation from the top of the ridge, along the track and right down to the highway.

It is a highly variable species and has therefore been divided into three subspecies, two of which I saw. The tallest form, ssp. *chamissonianum*, has rather coarse foliage and a long spike of flowers and will grow 4-5 ft high. It is a forest-edge species, and I found it growing a few hundred feet above the highway level. On the ridge and along the upper part of the track, the subspecies *delphinifolium* took over. These plants grew only 6-8 inches high and had only a few, deeply cleft, rather delicate leaves on each stem. The two or three large flowers, of the typical helmet shape, were deep, rich blue with no trace of purple in the colour. The whole plant was very slender and erect, and gave the impression of standing at attention. It would be well worth growing in the rock garden, providing the size would remain as dwarf as in the wild.

The third subspecies, *paradoxum*, is the gem of the race. It is an alpine tundra plant and is described as having 1-2 large flowers on tiny plants. Until this summer it had not been recorded from B.C., but Audrey and Geoff Williams found it on Mt. Edziza, which is a volcanic peak about 225 miles west of Stone Mountain Park.

Half a mile down the track I found three species of *Anemone* growing in and among waist-high willows. *Anemone narcissiflora* and *A. parviflora* both preferred to stay above the forest zone, but the third species, *A. richardsonii*, grew over a much wider range. Every time I stopped to look at some plants, I found *A. richardsonii*. Unfortunately it had finished blooming, so I missed seeing the bright yellow flowers. The last place I noticed *Anemone richardsonii* was at Trutch Mt. on my way back to catch the plane in Dawson Creek.

At Trutch Mountain there was a magnificent display of *Vaccinium vitis-idaea* ssp. *minus* and *Cornus canadensis*. Both were in ripe fruit and every *Cornus* was topped with a cluster of bright orange berries. The *Vaccinium* copies it faithfully, only featuring red berries.

I saw many more plants than I have mentioned and I know I missed many more. It would take months, if not years, to botanise thoroughly an area as large as the one I drove through in a few days.

FOOTNOTE

The so-called form of *Campanula lasiocarpa* turned out to be an entirely different species, *C. aurita*. It is described as 4-12" high with several flowers per stem and surprisingly enough, it's closest relative is *C. piperi* from the Olympic Mountains.

A Return to Appleby's Woods

by LAWRENCE JOHNSON

IN THE September number of the *Journal* of 1976 I wrote of the regeneration of wild flowers in an area of Wisconsin I knew as Appleby's Woods. I visited the spot in July of 1979 and my guide was Mr. Richard Joles who called the place to my attention five years before.

It had become a wilderness again, and the riches of plant life were astounding. My guide is an herbalist who took pleasure in pointing out Ginseng (*Panax quinquefolium*) and Golden Seal (*Hydrastis canadensis*) to me. Some years ago he gave me a sod of Golden Seal and not only does it flourish in a shady spot, but so also do *Trillium grandiflorum* and *Adiantum pedatum*, which were "a bonus" with the gift. He showed his concern for the plants by pointing out large patches of Golden Seal he had transplanted to other areas of the woods and, as proof, pointed to his axe blaze marks on nearby trees. Golden Seal is a rather attractive plant, particularly when its red raspberry-like seed clusters are ripe. *Arisaema triphyllum* and *Trillium cernuum* were also present in numbers.

As I remember, the original farm extended to 160 acres, and the corn land is still cultivated, but the other pasture areas are a wilderness of coarse weeds and nettles. A very similar condition exists in former pastures here in Indiana, and near my home, and are jungles of rank weeds, interlaced with Poison Ivy (*Rhus toxicodendron*), dangerous to touch.

This was the season of bloom for our native turk's cap lily (*Lilium michiganense*) and I saw it in breath-taking numbers in that week, from Indiana where I live and through 500 miles to my destination, and in Wisconsin singly and in clumps in almost all suitable places. I saw many on the verges of Interstate 90, and it was heartening to know they survived the gigantic upheaval of the building of the highway more than twenty years ago. These roads, accessible only to vehicles, strangely enough, are a haven of wildflowers and bird life. I saw a Red-tailed Hawk (*Buteo borealis*) snatch a mouse from the grassy strip between the north-south highways. On a trip to Iowa early in the spring, we saw crows nesting in trees, not much more than saplings, that had been planted along the highway, in an otherwise treeless neighbourhood. I spent a week in Wisconsin, and the lilies were in flower in every undisturbed suitable area through which I went.

Australian Alpine Iridaceae and Liliaceae

by KEN GILLANDERS

THE TOTAL alpine areas in Australia are quite small in comparison to the size of the whole continent. A very small area in southern New South Wales and north eastern Victoria comprise the total alpine regions for the mainland. Tasmania, the island state of Australia approximately 200 miles south of Victoria, is quite mountainous and has a large area in the central and western half of the island that is above the tree line and receives frequent snow falls throughout the winter. Six species of Iridaceae that are of interest to gardeners are found in these areas.

Diplarrhena moraea is a very common plant in Tasmania and to a much limited extent in Victoria and New South Wales. It is generally found growing on coastal heathland and damp sandy area, but in Tasmania it ascends to an altitude of 3000-4000 ft. Also, forms can vary, the higher altitude plants often being only half the size of the lowland plants. It prefers acid sandy soils and forms large clumps of stiff evergreen iris-like leaves. The flowers appear in late spring on stiff stems up to 3 ft. and are quite fragile, only lasting a day. However, a succession of flowers keeps the plant in bloom for many weeks. The three outer segments of the lovely scented flowers are white, while the smaller inner segments are flushed yellow or purple.

Diplarrhena latifolia is endemic to Tasmania and is confined to the mountainous areas of the state. Although variable, the most desirable forms have leaves broader and much shorter than *D. moraea.* The flowers are larger and the inner segments are conspicuously veined and flushed with deep purple. The whole plant is more compact and the flowering stems only reach 18 ins. Both diplarrhenas will divide in winter or will raise easily from seed which germinates quickly. In cultivation, they do well in an acid soil and flower freely.

A most beautiful plant but very difficult to cultivate is *Isophysis tasmanica* (syn. *Hewardia tasmanica*), which is endemic to south western Tasmania. It is abundant in this area, forming dense colonies on the higher peaks but descending to sea level in the extreme south west. The 9 in. flowering stems arise from clumps of stiff overlapping

pointed leaves and carry one flower 2 ins. in diameter of a rich maroon-purple, which is often so dark as to appear black from a distance. It grows in a very high rainfall area, up to 120 inches per annum, and in pure peat or very acid sandy soils with a high peat content. *Isophysis* appears to be irregular in its flowering as in some years hardly a flower can be found, while the following season there is an abundance. It is not easy to please in cultivation, it resents disturbance, often sulking for long periods after division. It is not a prolific seed setter, in fact it is very difficult to find seed even in a good flowering season. Seedlings are very slow to develop and could possibly take 7-8 years to reach flowering size. It is essential to plant in an acid peaty soil and water regularly. If a free flowering clone with a more tractable habit could be located and propagated, it would be a wonderful acquisition to the rock garden.

Libertia pulchella is commonly found in rainforest country under *Nothofagus* or near mountain streams. Undoubtedly, it prefers shade, as the plants found above the tree line grow in the protection of large boulders or shrubs. It forms small clumps with 2-3 in. narrow pointed leaves. The flowering stems carry umbels of dainty white flowers. It is found in New South Wales, Victoria and Tasmania. It cultivates very easily from division and seeds will also germinate well. A moist shaded position is most suitable for cultivation.

The genus *Patersonia* has several species but only two of these appear to occur in alpine areas. *Patersonia fragilis* (syn. *P. glauca*) is found in Victoria but only at low altitudes in heath country. In Tasmania it is very common and is found from sea level up to 3000 ft. Like all patersonias, the flowers are very papery and last only for one day. However, each flowering stem holds many buds and a succession of flowers sees the plant in bloom for some time. The flowers are a soft mauve blue and are produced on rather short stems among the stiff narrow foliage.

A showier plant is *Patersonia sericea* which grows in New South Wales and eastern Victoria. The flowers are a deep purple and emerge from floral bracts covered with silky wool. The common name for this species is silky purple flag and in its natural habitat prefers stony ground. Most of its range is confined to coastal flats and low altitudes but it does extend into several high areas in Victoria. Both patersonias grow best in an acid sandy or peaty soil. They can be divided but great care must be taken. Seed will possibly germinate best if treated with hot water first.

Liliaceae has a slightly better representation with seven different genera.

Arthropodium milleflorum is widespread and quite common in several southern states and Tasmania at low altitudes. It does extend up to 6000 ft. on the Bogong High Plains in Victoria and possibly several other mountains there and in southern New South Wales. It has rather slender grass-like foliage and forms clumps. The flowering stems reach up to 18 ins. and bear sprays of dull purple vanilla scented flowers with fringed stamens. It is easy to cultivate but must be guarded against slugs and snails, which find it attractive.

Locally known as pineapple grass, *Astelia alpina* is a plant plentiful in high mountain areas of New South Wales, Victoria and Tasmania. Mainland plants do vary from Tasmanian populations with narrower leaves and several other minor botanical details. The tufted foliage has a dense covering of silvery hairs beneath and forms large mats many feet across. Plants are generally dioecious and the small brownish flowers are produced in dense heads often hidden by the overlapping leaves. The fruit is most attractive, being a bright red oval translucent berry. *Astelia alpina* prefers moist or even boggy conditions in either sun or shade.

Endemic to Tasmania and most common on the island, *Blandfordia punicea* must be the most brilliant of all the plants mentioned in this article. It is commonly called Christmas bells because flowering time coincides with this time of the year. It is most spectacular when seen in large colonies. It forms large clumps of long tapering foliage, often reddish brown on the ends of the leaves. The stiff, erect flower stems carry a many flowered head of pendulous red flowers, tipped yellow, 2 ins. long. It is found growing from sea level up to 4000 ft. or possibly higher in situations from dense rain forest to open heathland or rocky mountain cliffs. The fleshy roots penetrate to a great depth and this should be taken into consideration when cultivating it. Seed germinates easily but plants are slow to reach flowering size. Established plants can be divided in winter.

Dianella tasmanica or flax lily is widespread in Victoria, New South Wales and Tasmania and extends from damp rain forests up to alpine areas. The rather coarse dark green foliage forms large clumps several feet across and in the spring the slender flowering stems carry many starry deep blue flowers with yellow stamens. Those that are fertilised develop into large deep blue berries which persist into early winter. *Dianella* grows very easily in cultivation in any sandy well drained

soil which is acid. The best methods of propagation are by stoloniferous offsets or by seeds.

Drymophila cyanocarpa has the same distribution as *Dianella* and is a lover of cool shaded forest country. It rarely extends above the tree line. Slender 12 in. arching stems rise singly from a creeping root-stock carrying several narrow, almost stalkless leaves in opposite rows. Several white starry flowers are produced singly or sometimes in pairs during spring and early summer. The oval $\frac{3}{8}$ in. long berries, which are produced in autumn, are turquoise-blue and persist into the winter. *Drymophila* is not an easy plant to cultivate or propagate. Seed will germinate but is slow. Division is extremely difficult as the creeping roots tend to grow deeply and develop very little in the way of side roots. It likes a moist peaty acid soil in shade. One of its favourite habitats is in bracken fern.

Herpolirion novae-zelandiae, the alpine sky lily, is so called because of the colour of the flowers. It is widespread in moist positions in alpine areas of 4000 ft. and higher, in New South Wales, Victoria and Tasmania. The firm grass-like foliage is a glaucous green and the general appearance of this plant is a tuft of closely grazed turf. The plant spreads by creeping rhizomatous underground stems and forms patches up to 2 ft. across. The starry funnel-shaped flowers nestle in amongst the leaves and are up to 1 in. in diameter and appear in late spring. This plant will cultivate easily in a pan or a sunny or semi-shaded position in the rock garden. It likes a peaty moist soil and resents dry conditions very quickly. It will divide with ease during winter.

Of the five species of *Milligania*, locally called Tasman lilies, four are found in alpine areas and all are endemic to Tasmania. They all like a deep moist peaty soil and regular watering in dry weather. With the exception of *M. johnstonii*, they do not divide easily. However, seed does germinate quickly if sown on the surface of sieved peat. The most common species is *Milligania densiflora* which is found in highland areas throughout the state. The bright green leathery leaves form a clump not unlike *Astelia* in appearance. In some forms the leaves have a covering of silvery hairs. The strong flowering stems, up to 2 ft., have a covering of fine hairs and the dense heads of cream flowers are produced in panicles. In its habitat it grows in wet boggy areas or rock crevices and amongst low woody plants such as *Richea*.

Milligania stylosa is more limited in its distribution, occurring only in the south east, but locally abundant there. The foliage is very similar

to *M. densiflora* but is a little longer and more lax, covered with a dense coating of whitish hairs on the underside, particularly when young. The white flowers are produced in a similar manner. One distinguishing feature, however, is that the ovaries of the flowers are a bright apple-green. It favours similar habitats but more frequently is seen in rocky areas.

A smaller plant than the previous two, *Milligania lindoniana* can frequently be found growing around tarns or along streams and seepages. The leaves, although arranged in the same manner, are smaller and are densely covered with adpressed silvery hairs on the reverse. The creamy white flowers, which are produced on the branched flowering stems, have a crimson ovary and filaments. The height of the inflorescence can vary from 4 ins. up to 15 ins.

Finally, *Milligania johnstonii*, the baby of the genus is quite rare, as its main habitat was destroyed when submerged in a Hydro-electric development. This little plant is found growing in moist sand near lakes and tarns in the south west of the state. The tightly clasping 2 in. leaves are 1 in. wide and taper to a point. The rosettes nestle into the sand and spread by creeping rhizomes. Held within the rosettes, the white flowers have a perfume similar to that of a hyacinth and 2-5 are produced to each stem. This plant appears to divide quite easily without resentment. It also seems to be regular in its flowering, a quality to which the other species do not always conform. *M. densiflora* and *M. stylosa* both form quite extensive colonies but although a mass of flowers some seasons, they can then miss a season or perhaps two before doing this again. I do not know the reason for this, but most likely seasonal climatic conditions do have some influence.

Three South African Plants for the Alpine House

by JIM HOLMES

THE FLORA of southern Africa contains a great percentage of endemic plants, some of which are confined to a very small geographical area and are therefore at risk of extinction. There are others with a much greater distribution and still more which extend well beyond the southern African region. Some of them reflect botanical affinities with

other regions. For instance species of *Dianthus, Scabiosa, Erica, Romulea, Gladiolus* are found in Europe and also in southern Africa. There are other genera which show biographical links with other areas.

The southern African flora is a very rich one giving considerable value to our gardens and glasshouses. Many of the bulbous plants are much admired. Most of them are grown for their summer flowers and are lifted during the winter months, for they are not hardy. However, some can be grown successfully in the alpine house and a wider range if it is a frost free one. *Freezia, Tigridia, Babiana,* and *Romulea* are perhaps the best known of these bulbs.

Babiana pygmaea (fig. 58) is a rare plant in the wild, being found, as far as is known, in only one locality. This is not an uncommon feature of many of southern Africa's plants. *Babiana pygmaea* grows in deep acid sandy soil on sand flats in an open situation. It is a member of the Iridaceae with an erect spike of two to six pale lilac flowers. The flowers are funnel-shaped and the segments are unequal. It is about 4 ins. high.

Romulea subulosa (fig. 59) is also in the Iridaceae and is one of the showiest of the genus. It is not hardy in Britain but will grow in the alpine house where strict control of watering can be achieved. In nature it grows in hard clay soils in open grassland and is subject to frost during the wintertime. The flowers are bright red with a conspicuous black and yellow centre. It grows about 8 inches tall, with flowers 2 inches across.

In cultivation these bulbs grow best in an open medium of equal parts sharp sand, loam and peat, to which a little bone meal is added. The compost should be well drained and ample water given when the plants are in active growth.

Monsonia speciosa (fig. 60) belongs to the Geraniaceae. It, too, is a native of southern Africa where it grows in open grassland at altitudes from sea level to 4000 feet. It is subject to frequent frosts. It is, however, not hardy in Britain and requires a frost free alpine house. This is a very decorative plant with pale pink flowers, deeper carmine red at the centre. The leaves are finely dissected.

It, too, should be grown in an open compost. Reports indicate that it can be propagated by root cuttings.

Rhododendron lowndesii

By CHARLES GRAHAM

Rhododendron lowndesii, named after the late Colonel D. G. Lowndes, its discoverer, flowered for the first time at the end of May 1956 at the Royal Botanic Garden, Edinburgh. It was raised from seed taken from a herbarium fruiting specimen under No. 3486 collected by Polunin, Sykes and Williams in Nepal in 1952. It is a small, spreading, deciduous shrub and was described by H. H. Davidian in the R.H.S. Rhododendron Year Book, 1957. It also flowered on the peat bank at Wisley in early June of the same year. It is of the Series and Subseries *Lepidotum*, and has pale yellow flowers and greenish-yellow spots at the base of the upper three lobes. The flowers are approximately 2.6 - 2.8 cm across and flat.

The plant got off to a good start. There is an excellent pot plant photographed in the 1964 R.H.S. Rhododendron Year Book and in 1965 Messrs. Cox of Glendoick reported a natural hybrid between *lowndesii* and *lepidotum* with pink flowers. In the December 1972 Bulletin of the A.G.S. there is another well-flowered pot plant and the comment 'proving extremely difficult to maintain—a little perisher'. Alf Evans, in his splendid book—'The Peat Garden'—describes it as difficult.

Eight years ago we were given a small plant and as all our dwarf rhododendrons are grown outside in full sun it went into the peat bed. We garden in north-west Craven. We remembered the description *spreading* and once established it showed this tendency by sending out suckers. We encouraged this with generous top-dressings of fine peat and leaf-mould. This is done annually each autumn after the foliage has died down and so that only the bud tips are visible. If the autumn rains wash the peat down, we renew it. We have found this practice very successful with other species, such as *Rhododendron uniflorum*, *pemakoense* and *imperator*, but *ludlowii* requires a few flat stones and not too much competition. Mr Davidian recommended that we winter *Rh. lowndesii* under a cloche and in our exuberant winds this has to be weighted down with a heavy stone and covered with a sack on nights of severe frost. After division, for distribution, the plant in early June 1980 measures 51 cm × 40 cm and 5 cm high. Normally flowering is in July and thereafter until the autumn growth averages 7.5-10 cm per annum, but the greater the leaf growth the fewer the flowers. Flowering in any year has not been comparable with, say, *Rh. radicans*.

1980 has meant daily attention—a mild winter giving precocious leaf growth, so cloche off during the day; a drought necessitating copious watering with hard tap water; then frosts until the last night of May, so a cloche goes on again and also with sack covering at night to keep thep lant healthy.

It is reported that Colonel D. G. Lowndes found this *Rhododendron* in rock crevices on steep cliff faces at 14,000 ft. Reginald Farrer's painting of a dwarf *Rh. lepidotum*, Farrer 1196, with six pink flowers is also at the base of a rock. It is dated 8/8/1919 so there is time for fertilisation and seed after the monsoon, but very little time for bud ripening before the snow. No doubt reflected heat from the rock will hasten the process and as *Rh. lowndesii* is completely deciduous there will be a build up of humus for vegetative increase and reproduction by seed. Perhaps the reflected heat is what our plant in the peat bed needs or a longer summer in an alpine house. And then you are round the mulberry bush with 'the little perishers'.

The Plants Most Suitable for Plunging and Showing

by JACK CROSLAND

A WIDE range of plants lends itself to cultivation in pots or pans in an alpine house or cold frame so that the potential exhibitor can build up a collection from which to make selections, at times of optimum performance, for the purpose of showing. In the simplest terms, plants more suitable for growing in this manner are those whose roots can be persuaded to accept the limited confines of these containers.

Starting with a two inches diameter pot to accommodate a seedling on its pricking out from the seed pan, potting up to a larger size as dictated by root growth until, over a span of several years, a mature plant may be presented on show in a ten- or twelve-inch pot or pan.

Ideally the alpine house or frame will be equipped with sand-filled beds not less than twelve inches deep, into which pot-grown plants can be plunged to their rims; an arrangement which preserves a more stable balance of temperature and moisture content at root level, which is conducive to good steady growth. The sand bed acts as a reservoir

of moisture, which it releases into the atmosphere according to prevailing temperature, thus creating a degree of humidity within the house.

During the season of active growth, not only will the individual plants be watered, but also the sand-bed to replace moisture given up by transpiration as well as evaporation, and thus to prevent plants suffering dehydration. As daylight shortens and temperatures generally fall, as autumn ripening proceeds, there is less need to water, so this is steadily reduced until, when plants become dormant and winter is at hand, this becomes minimal. Only a prolonged and exceptionally mild winter spell will necessitate wetting of the sand-bed, in which case this should be done during the morning when the atmosphere is buoyant, so that good ventilation will dispel excess humidity before temperature falls with nightfall; even when the surface of the sand is dry a little investigation will usually show the presence of moisture below. Over-watering of plants—or plunge beds during winter months—is a common cause of failure. Excess of humidity when temperatures are low, in still windless weather, or if ventilation is inadequate, results in grey moulds (*Botrytis*), and the inevitable loss of plants. A plant will indicate its need for water, becoming flaccid, a sign which should be acted upon without delay by lifting the pot from the plunge bed immersing it to about a quarter of its depth for two or three minutes, according to season, before returning it to its allotted place in the bed. A very little moisture at the base of the pot will preserve a plant throughout the period of dormancy.

Summer dormant plants such as spring-flowering bulbs, corms and tubers, are normally introduced to fresh compost, re-potting in the autumn, whereas winter dormant species and varieties will be potted up to a larger size as spring growth recommences.

Another common cause of failure is to over-pot, i.e. to put a small plant in a pot which is too big for its root system, surrounding the roots by too much compost which it cannot use. It is good practice to pot up one size only, and not to do so until the plant has filled the pot completely with its roots.

An alpine house is a pleasant place to enjoy spring and early summer flowering bulbs, such as crocus, narcissi, irises, romuleas, etc., after which they can be transferred to a frame to complete the season's leaf growth and summer ripening.

Continuing the display one might select saxifrages in variety, *Lewisia cotyledon* hybrids; *pygmaea*, *tweedyi*; *Claytonia nivalis*; the Aretian

androsaces; *Draba* species; campanulas and other members of the Campanulaceae such as *Phyteuma comosum*; a member of the more difficult primulas such as *Primula parryi, ellisiae, pusilla, cuneifolia,* and the Alaskan *Primula tschuktschorum* of the *Nivales* Section; a few dwarf and slow-growing conifers to balance the scene and provide an evergreen content, such as *Juniperus communis* var. *compressa, Juniperus communis* var. *echiniformis, Cryptomeria, Chamaecyparis, Pinus* species; dwarf shrubs including *Kalmiopsis, Cassiope, Kelseya, Daphne petraea*; *Dianthus* species; *Paraquilegia grandiflora*; the hardy terrestrial orchids, including the Pleiones.

The selection is wide and personal; the enthusiast will seek out many more to reward his endeavours.

Preparation and Presentation

by D. F. MOWLE

WE LIVE in an age in which the art of presentation is highly developed and considered important. Attractive shop window displays are often formed from the most commonplace articles and we have grown used to the high standards reached in the information displays of such bodies as the National Trust and the R.S.P.B. Visitors to our Shows will judge them accordingly, so, having grown a good alpine plant, we must present it to advantage.

Preparation should start two weeks before Show day with a first attempt to decide which of your plants are going to be looking their best on the chosen day. It is too easy to lavish attention on the plants already in flower, and to overlook the one which will open its flowers on the morning of the Show. How easy it is to leave the best plant at home!

Take the likely pots out of your plunge bed or alpine house, remove the top layer of chippings or other dressing and wash the pots thoroughly using a scrubbing brush and cold running water. Obstinate incrustations can be helped off by rubbing with a piece of broken pot. Don't forget the area inside the top of the pot. If you do this job before the flowers open, you are much less likely to cause damage. Next remove any dead or damaged leaves, branchlets, buds or flowers, using a pair of sharp pointed scissors and a pair of tweezers. If the plant is at all large, this work usually reveals small weeds or insects

which can be removed. I wonder why ferns house so many spiders? Top dress again and give a half-strength liquid feed to ensure tip-top condition by Show day.

The selection of this top dressing is worth a little thought. For the usual run of plants, in pots up to seven or eight inches in diameter, chippings between $\frac{1}{8}$ in. and $\frac{1}{4}$ in. (3 mm to 6 mm, nowadays, quarrymen have gone metric!) appeal to most people. In larger pots chippings up to $\frac{1}{2}$ in. in size seem more in balance with the plants as well as giving better air circulation under large cushions. It is worthwhile to wash the few chippings you need for a show plant in a kitchen sieve under the tap. Washing away the dust in this way makes the appearance much brighter. I have never been able to find a local limestone which gives this brightness, so I prefer granites or schists. My own attempts to arrange pieces of stone under a cushion plant have all ended in failure. Just one or two exhibitors spring to mind who can imitate a natural crevice convincingly enough to complement a suitable plant.

Ericaceous and woodland plants look more natural top-dressed with dark peat or fine leafmould. If you leave your plants out in the rain, or top water, this top dressing becomes flattened and its appearance should be freshened up with a new sprinkling of the chosen top-dressing on the morning of the Show.

Try applying this last dressing with a teaspoon to avoid coating the lower leaves and branches.

Water your show plants by immersion on the day before the Show and then let them drain overnight. Show Secretaries will like you much more if your pots don't drip, yet a day in a Show will remove a lot of water from a clay pot.

All is now ready if you are showing in the one pan classes, but if you aspire to the two, three or six pan classes some thought must be given to the appearance of the group. Six identical pots look neat and tidy and three pairs of three sizes can be arranged satisfactorily so long as the taller plants are in the taller pots to go at the back. When a small pot is to be shown among larger ones, either repot it, if this is reasonable, or sink the small pot into a larger one. I usually pack the outer pot with newspaper until the small pot is correctly settled and then top dress to match the inner pot. Although the inner pot can often be completely hidden, this is not essential; if the rim of the inner pot can just be seen it will tell your fellow enthusiasts more about the way the plant is being grown. If the pots and pans to be shown form

a satisfactory group, except that one is too low, try bringing it up to the correct height with an inverted plant saucer or a block of wood. A trial run on the dining room table will ensure that you arrive at the Show with the correct bits and pieces.

Everyone who sees your beautiful plants will want to know their names. Please give them the courtesy of a clear, horizontal label. A bent hairpin and a piece of white card is quite adequate and if you can't write neatly or type, try one of the cheap plastic-label printing machines. If you don't know the name, put on a blank label and one of the judges will fill it in for you. If they can't, you'll get maximum points for rarity!

But when all this is done, remember that the judges are there to assess the condition and interest of the plants you have grown. Good presentation is really for the visitors to our Shows, who should go away remembering only the diminutive beauty of our plants.

What the Judges Look For

by DAVID LIVINGSTONE

THE HONORARY EDITOR has kindly allowed me to read David Mowle's notes on "Preparation and Presentation" in advance of publication. There is much good advice there for those who are about to start exhibiting and, I regret to say, for some who are already exhibitors. Sharp-pointed scissors and a pair of 4- or 5-inch tweezers are essential for the exhibitor and indeed for the proper care and attention of plants in pots or pans throughout the year. Many a plant has been ruined by failure to remove in good time any dead leaves, spent flowers and tiny rosettes on cushion plants affected by mould. The flat edge of the tweezers is also useful for raising gently the leaves lying on the soil to make ease of access when applying top dressing, be it compost, gravel or coarse sand. It is important that, whatever top dressing is used, its colour should not clash with the colour of the foliage or flowers. In recent years I have used coarse sand—in reality it is crushed quartz—which has been washed as suggested by Mr Mowle. I too have used ¼ inch blue whinstone chips, but to achieve best effect this top dressing should be carefully wetted by hand spray just before judging begins. This has the effect of darkening the chips, which sets off particularly well green or grey cushion plants with white or yellow flowers. By the way, it is a wise precaution to take some

spare top dressing to the Show to make good any lost in transit and don't forget to take the scissors and tweezers with you too. There are always the odd flowers that look a bit jaded on the morning of the Show and these are best removed. The judges are looking for plants in good condition and nothing spoils the appearance of the plants more than dead, dying or damaged flowers. Failure to remove spent flowers cost some exhibitors at the recent Glasgow and Edinburgh Shows higher awards than they received. It is true that the Rules for Judges do not specifically allow points for presentation, but a plant that has been carefully but not over "groomed" will attract more points than one showing dead leaves or flowers and flowers which are changing colour in the process of dying. In this connection it should be remembered that 60 points maximum are awarded for condition in most classes and a further 30 points for the skill in cultivation required to obtain the condition that the plant is in. The appearance of a plant and therefore its apparent condition can also be helped by easing flowers carefully with the flat blade of the tweezers into blank spaces and flower stems trapped by leaves and therefore partly hidden can be neatly released to give maximum effect. Having said this, I ought to add that judges will still prefer a plant at its best or one that is approaching its best to one that is obviously going over. The suggestions for "grooming" are made only to ensure that a plant looks as good as it possibly can. The exhibitor owes that to himself and the public who come to the Shows.

Mr Mowle uses a scrubbing brush to clean clay pots intended for the show bench. I too used a brush at one time, but I found out quite by chance that the easiest and least messy way to achieve good results was to use a Scotchbrite scouring pad. It is ready for use by simply dipping in water. I finish off by wiping the pots with an old hand towel. All this may sound tedious, but it is necessary to ensure that your plants, which I assume are of show standard, are given the best chance of catching the judges' eye. In any event showing is great fun and well worth the work involved in preparation.

Having chosen which of your plants are good enough to take to the Show, the next thing is to decide into which classes you should enter them. In making your decision you should read the schedule of classes in conjunction with the table of plant families to ensure that your plants are entered in the correct classes. The first action of judges is to go over the entries in any class to see that all exhibits conform to the requirements of the schedule. It is always with regret that judges write on the back of an exhibitor's card N.A.S., that is "not according

to schedule''. The trickiest class of all is that which calls for one Rock Plant not eligible say for classes 8 to 54. Even judges are known to have scratched their heads at this one! If you are unable to decide in which class a plant should be entered take it to the Show and seek guidance from the Secretary or a member of his Committee. There is always someone around who can help and the Show Secretary will be glad to accept your plant as a late entry.

Discussion Week-end Show Report

IN A SEASON noteworthy for incessant rain, the Show on Saturday and Sunday 20th and 21st September 1980 was of surprisingly high quality. Section I was well represented in all classes, but Section II was regrettably very bare. Perhaps those members eligible to show in Section II should note the number of ''ordinary'' plants in both sections.

Mr. and Mrs. Taylor of Invergowrie won Class 1 and the East Lothian Trophy with fine plants of *Cyclamen hederifolium* 'Album' *Calluna* 'Mrs. Ronald Gray' and *Gentiana* 'Mary Lyle'. Mr. J. R. Johnstone of Ryton showed *Colchicum laetum, Crocus banaticus* and *Cyclamen hederifolium.* Also shown in this class was a large *Petrocosmea kerryi* which brought Mr. F. Tindall of Huddersfield the George Forrest Medal for the most meritorious plant in the Show.

The most interesting plant in Class 2 was Mr. Eric Watson of Newcastle's *Haastia pulvinaris.* First in Class 3, plants raised from seed by the exhibitor, was Mr. Johnstone's *Crocus hadriaticus chrysobelonicus,* followed by the Taylors' rosulate *Viola,* not in flower, from seed collected by Colonel Anderson in the Andes, and the unusual *Primula obliqua,* from Mr. and Mrs. Stone of Fort Augustus.

First in the Scottish native class was Mr. Tindall's *Asplenium viride.* A large pan of *Shortia galacifolia* grown by Mr. and Mrs. Bezzant who live about a mile from the Show, won Class 5.

First for a plant with silver-grey foliage was Mr. Eric Watson's *Raoulia bryoides,* followed by Mr. Tindall's *Senecio leucophyllus.*

Dr. D. Stead won the dwarf shrub class with *Sorbus reducta,* followed by Mrs. B. Craig's *Gaultheria cuneata* and Mr. W. L. Morton's *Pernettya prostrata pentlandii.*

The best cushion plant was Mr. J. Crosland's *Haastia pulvinaris,* awarded a Certificate of Merit; second was a 10 in. diameter cushion of *Gypsophila aretioides* from Mrs. J. Stead.

Mr. Tindall won the two pan class for dwarf conifers with *Picea abies* 'Gregoryana' and *Cedrus brevifolia* 'Compacta', while in the

single pan class Mr. R. Brown showed a 7 in. high, 16 in, wide *Chamaecyparis obtusa* 'Nana', which received a Certificate of Merit. This, the true plant, is quite distinct in habit from *Chamaecyparis obtusa* 'Gracilis', which often does service for it.

In Class 12 some interesting ferns were shown including Mr. B. Russ's *Asplenium trichomanes* 'Incisum', *Asplenium scolopendrium* 'Laceratum' from Mr. and Mrs. Taylor, and a *Ceterach* collected in Cyprus from Mr. Johnstone.

Some interesting colchicums were shown in Class 14, including *C. troodii*, a very neat white one from Mr. Johnstone, *C. speciosum* ex Turkey from Mr. H. Esslemont, and Mr. Leven's *C. speciosum* 'Album'.

In Classes 15 and 16 some good heathers were shown. Mr. and Mrs. Bezzant showed *Calluna* 'Kinlochruel', a fine double white raised by the late Brigadier E. J. Montgomery of Colintraive, which received an Award of Merit.

A magnificent *Cyclamen graecum* brought Mr. A. J. Holman of Milnthorpe the first in Class 17 and a Certificate of Merit. Also shown were the rare *C. rohlfsianum* and *C. purpurascens.*

The Peel Trophy for three pans of gentians was won by Mr. and Mrs. V. Chambers of Killearn with *G.* 'Kidbrooke Seedling', x *macaulayi* and 'Kingfisher'. Others shown were *G.* 'Susan Jane', 'Devonhall', 'Blue Heaven', *ornata* and *tubiflora.*

In Class 21 Mr. Leven of Dunblane took first prize with *Sedum middendorffianum* and in the following class Mr. Russ with *Sedum kamtschaticum.*

Large pans of *Sempervivum* and *S. arachnoideum* were shown by Mr. Russ in Class 23 and again *S. arachnoideum* by Mr. Tindall in Class 24. Mr. Tindall also took first in Class 25 with *Campanula petrophila* and *Eriogonum ovalifolium.*

Class 26 produced a number of interesting plants, namely, *Pyrola asarifolium, Campanula barbata* and *Oxalis speciosa,* shown respectively by Mr. and Mrs. Taylor, Mr. Leven and Dr. Stead.

Miniature rock gardens in Class 27 were provided by Mr. and Mrs. Taylor (Logan Home Trophy), Mr. Russ of Ormskirk and Mr. R. Brown.

Finally, for Section I, Mrs. A. Spensley of Richmond, Yorkshire, won the Wellstanlaw Cup for an arrangement of flowers, fruit and foilage.

Quantity wise, Section II was poorly represented, but some good plants were shown. Mrs. J. Thomlinson had three firsts with *Leucogenes leontopodium, Calluna* 'Sister Anne' and *Gentiana* 'Kingfisher'. Mrs. A. Brown took the East Lothian Cup for the best plant in Section

II with *Picea abies* 'Gregoryana'. Congratulations are especially due to the younger members of the Wyllie family of Dunblane — Stuart, Karen and Susan — who each took a first or second in this section.

The Mary Bowe Trophy for the most points in Section I was won by Mr. F. Tindall, closely followed by Mr. A. Leven.

Adjoining the show were three further displays. Mr. and Mrs. Taylor showed a range of the smaller aciphyllas; Mrs. I. Simpson showed the entries for the Twice Yearly Competition for paintings, drawings and photographs, in this case relating to celmisias, and Dr. B. Knight gave a display of heather seedlings from his garden by example and by photograph.

The Book Sale, run by Dr. Stead, showed a wide range of books and Society publications and good business was done.

The Plant Sale organized by Mr. and Mrs. Bremner and the plant auction did excellent business due to the generosity of the many members who brought their spare plants, excellent in both quality and quantity, for sale. Very many thanks are due to the contributors and buyers and also to the many members who helped in innumerable ways to make this Discussion Weekend the undoubted success it was.

CHARLES SIMPSON

Liverwort and its (?) Control

by DON STEAD

WHEN a question about the control of Liverwort was asked at a recent Discussion Weekend very considerable interest was aroused. It was clear that the problem of Liverwort is by no means confined to the damper areas of the country and that it is a widespread—even cosmopolitan—nuisance.

The term Liverwort covers a large group of flowerless plants and whilst one hesitates to further depress its victims, it must be reported that there are around 200 species in Britain alone. The species most commonly encountered in gardens are *Marchantia polymorpha* and *Lunularia cruciata*. What follows on treatment is based entirely on experience with *M. polymorpha*, but it is possibly applicable to *L. cruciata* too. Those who from the following brief differentiation feel that they have the latter must carry out their own investigations. The writer declines absolutely to become involved!

Marchantia polymorpha shows a fairly well marked midrib on its creeping flat structures, whilst *Lunularia cruciata* does not. Both reproduce in two ways. Small cups form on the surface of both and in these cups small embryos called *gemmae* are formed. The *M. polymorpha* cups are round, complete and have a serrated edge, whereas *L. cruciata* cups are smoother edged and are often incomplete or crescent shaped. The second method of reproduction gives a clearer distinction. *M. polymorpha* grows male reproductive systems like small, thin-stemmed toad-stools and female systems like small parasol frames. Both occur very frequently. *L. cruciata*, on the other hand, very rarely grows the long thin stems surmounted by the cross-shaped reproductive structures which gives it its specific name.

The point to be noted sadly by gardeners is that wind, rain and the watering can are ideal adjuvants to reproduction.

One looks in vain in the two volumes of the Weed Control Handbook for any reference to Liverwort and it is, indeed, not a weed of frequently cultivated ground but a weed of undisturbed surfaces such as seed pans, plunge beds of peat or sand, or any dampish corner. *M. polymorpha* and *L. cruciata* have no roots but send down countless silky *rhizoids*—anchoring hairs—which in quite a short time bind the top ½-¾ in. depth of soil into a coherent mass.

We come now to some of the methods which have been suggested to deal with *Marchantia polymorpha*:—

1. *Mechanical removal with tweezers.* Effective if used at an early stage and if the seed pan has been covered with an adequate layer of grit or chips so that no compost is lifted by the anchoring rhizoids under the Liverwort. If compost is lifted it may well carry seeds with it and one risks throwing out the baby with the bath-water.

2. *Mechanical damage.* A well-known nurseryman once recommended stroking or scratching the liverwort with a label. Our western liverwort seemed to take this as a demonstration of affection and continued to thrive. With light infestations in drier areas it could be more effective.

3. *Potassium permanganate.* Watering with a very dilute solution of potassium permanganate is reputed to inhibit the growth of liverwort. This may well be so and it is not difficult to dissolve a few crystals—just enough to give a purple colouration—in every can of water. Probably a good method for the orderly systematic group of gardeners for which, alas, we have never qualified.

4. *Thiram.* This is the material recommended by two members at the Discussion Weekend, but in formulations not easily accessible to the amateur gardener. It is, however, the active ingredient in I.C.I.'s General Garden Fungicide which is widely available at garden centres and which is in the form of a thick white cream.

If the General Garden Fungicide is diluted with an equal volume of water and the resulting thin cream brushed (a child's paint brush is convenient) on liverwort in seed pans the liverwort is killed. No adverse effect has been noted on seedlings, but there is no point in coating seedlings with a white deposit which could reduce photosynthesis. The liverwort goes brown and ceases to grow or reproduce, but neither its surface structure nor its rhizoids disappear for quite some time. Moss is similarly killed.

Since writing the above the Weed Research Organisation has drawn our attention to an article by a member of its staff in the *Gardener's Chronicle* of 21/3/75. This deals with the use of Thiram for controlling Liverwort (*Marchantia* and *Lunularia*) in the container plant industry.

The author, Mr. R. H. Webster, indicates that Thiram will kill Liverwort without damaging even the softest growth of most plants (ferns excepted). His recommendations for concentration are lower than those given above and correspond to General Garden Fungicide diluted 1 to 8, sprayed on at a rate (expressed in litres/hectares) corresponding to 0.5 ml per 3 in. pot.

At this lower concentration the Thiram is more inclined to settle out and must be kept well agitated. Whether applied by spray or by brush the essential points are that the Liverwort should be completely covered and then protected from rain. We would recommend 24 to 48 hours protection.

5. *Ferrous sulphate.* A correspondent reports that a solution of 0.5 to 1.0% ferrous sulphate (which is the active ingredient of some products sold as moss killers for lawns) will kill liverwort. At this concentration it seems unlikely to have any undesirable side effects.

6. *Paraquat/Diquat—Weedol.* NOT FOR USE ON SEED POTS, since germinating seeds just below the surface could be destroyed. Weedol is not claimed by its makers to kill liverwort but it does so if used at about three times the normal weed killing concentration.

7. *Simazine—Weedex.* NOT FOR USE ON SEED POTS, since Simazine inhibits germination, but useful for treating a sand plunge (all plants removed!) after a liverwort infestation has been removed. Watering the sand surface with Weedex at normal weed prevention concentration will prevent regrowth for about 10 months.

8. *Tar Oil Winter Wash.* NOT FOR USE ON SEED POTS. Will kill liverwort but is also toxic to other plant material, so could rarely be used.

A commercial preparation called Bray's Emulsion is claimed to kill liverwort but may well, for our purposes, have the same disadvantage.

It will be noted that several of the products mentioned are toxic to other groups of flowerless plants, viz. fungi and mosses, and it could well be worthwhile testing any available fungicide or mosskiller. In all cases, read carefully the instructions given with the product used and experiment with caution.

Members who know of or discover other remedies or who can add to the above information are invited to send their comments to the Editor.

Chinese Gardens

by ZHOU CHUAN

CHINESE literature abounds in descriptions of beautiful gardens, showing a continuous development for over 3000 years that closely parallels landscape painting. Garden landscaping was imported into Japan and some other Oriental countries before the Tang dynasty, but it was not until the middle of the eighteenth century that Chinese gardening was discussed and copied in Western Europe.

Generally, Chinese gardens were classified into two categories, imperial gardens and private gardens. The best of the imperial gardens now in existence are found at the Summer Palace outside the city of Beijing and at the Imperial Mountain Resort at Chengde, some 250 kilometres north-east of the capital. The Summer Palace covers an area of about 290 hectares, of which three-fourths are lakes. The Chengde mountain resort, 560 hectares in area, took 87 years to be built by emperors of the Qing dynasty.

The builders of both imperial gardens cleverly used the hills, flatlands and lakes to lay out pleasure grounds in exquisite taste and variety, while retaining the natural beauty already there. Most of the palaces, halls, studies, pavilions, pagodas and terraces are masterpieces of architecture.

Private gardens are mainly found south of the Changjiang (Yangtze River). The most notable ones in existence are in Suzhou, an ancient city of 2400 years. A poet once wrote that the private gardens of the South "are unequalled in the world, while those of Suzhou are unequalled in the South".

Different from the large-scale imperial gardens in the North, the gardens of Suzhou are attached to the houses. Because the designers of these gardens were generally noted artists of that time, they integrated the beauty of painting, poetry, sculpture and calligraphy in their designs.

In a Suzhou garden there is always a principal landscape area which includes hills, water, buildings and open space. Rocks, trees, flowers, ponds, bridges, corridors and windows are arranged in such a way that there is variety everywhere while still preserving their harmony as a whole. In this way each garden has its own characteristics.

The key to Chinese gardening lies in its layout. The designer is a three-dimensional landscape painter using rocks, water, trees, buildings and plants instead of brush, ink and colour. No principles are formulated for the art other than those of avoiding monotony and making full use of natural conditions, using one's own sense of beauty as the guide.

Water to the traditional Chinese garden is like blood to the human body, and if it is not provided by nature, it must be supplied artificially.

Hills, too, are part of the basic structure of Suzhou gardens. Very often the hills are made entirely of rocks, chosen and arranged so as to give the impression of mountain ranges in miniature.

Fantasy is lavished on the houses and pavilions placed here and there—the first usually at the water's edge with spacious open verandas.

Halls were not thought of primarily as comfortable residences, but as places from which to command delightful views. Pavilions are set on hill-tops or rocky promontories—or in the middle of bridges, casting their reflections in the water below.

Elaborate lattice-work decorates all windows, each patterned uniquely. Doorways are "moon-shaped" (circular), polygonal or in the form of a vase, giving tempting glimpses of the scene on the other side. Bridges, walks and buildings all have their poetic titles that intensify their charm.

Many writings on Chinese garden-making have appeared in the past centuries. One of the most renowned in existence is "Yuan Ye (Gardenmaking)" by Ji Cheng, who was himself an artist. Written in 1634, the book not only deals with the principles of the art of making gardens, but describes the techniques in detail. It is still exerting influence on Chinese garden-making.

Letter to the Editor

Wrexham

Dear Sir,

It was with great interest that I read the short article on *Scoliopus* by Alf Evans, in the last issue of the *Journal*. *Scoliopus hallii* was in fact the first of the species I grew. The original plant came here in 1973 from a friend in Pennsylvania and he in turn received it from a lady in Oregon who knew the plant well. The plant was soon a clump and it was offered in our 1976-77 catalogue for the first time. Since then we have managed a few offsets each year and recently seed has been set in good quantities. The seed pods seem to stay green for a very long time but eventually the edges turn red-brown and at this stage the pods are opened and the seed washed. We sow at once in a compost composed largely of old fir-needles. Germination is in the spring following sowing and the seed leaves look surprisingly like Lilies. By this method we now have stocks of one and two year old plants and I would think that with another year of growth the latter will flower in 1982. As an incidental comment may I add that despite the smell apparent on *S. bigelowii* which we also grow I have not been able to detect the same scent on *S. hallii*; of course this may not be characteristic of the genus as a whole.

Yours faithfully,

PAUL CHRISTIAN

Book Reviews

Dwarf Shrubs by H. E. Bawden. 120 pp. 1980. An Alpine Garden Society Publication.

Here is another title to add to the ever growing list of A.G.S. Guides. They are all good value for money and this is no exception.

Harold Bawden has been a member of the A.G.S. since 1931 and has a great deal of experience in the cultivation of plants, having made eight gardens and written authoritatively about the plants in them. Here he concentrates on those plants which are ligneous, plants which rock gardeners use to form a background, for shelter, as foils or simply for their own decorative value.

Some shrubs in his list may appear to be on the large side for the smaller rock garden while others could probably be described more accurately as being sub-shrubby; however, the author has not set out to list and specify only those shrubs which are suitable for confined spaces. His catalogue includes species and varieties of value to a non-rock gardener who is simply seeking advice on dwarf shrubs.

It is inevitable that rare and less easily grown shrubs will find a place in a volume like this, and while there may be some frustration engendered because of the inability of the reader to procure some of the plants mentioned, nevertheless these challenging species will dispel again any complacency among the experts. The work is well illustrated, even including some coloured plates, and is well worth a place on the rock gardener's bookshelf.

A. Evans

A Guide to the Naming of Plants by David McClintock. Obtainable from the Heather Society, 27 Valentine Road, Leicester LE5 2GH.

This 37 page, soft covered guide, contains a great deal more information than the title would suggest.

The first chapter covers in a clear and concise manner how a plant name is composed, with definitions of many terms, such as species, cultivar, taxon, etc., along with the history and rules governing the naming of plants.

The second chapter deals with the history of naming hardy heaths. Here it is interesting to note that the winter flowering heath, *Erica carnea*, retains this well known name, in preference to the use of *E. herbacea*, as in Flora Europaea.

A third chapter lists recommended cultivar names of heaths where there is confusion with synonyms and spelling. Although a little expensive at £2.50, anyone who labels their plants or writes about them, should read this book, whether beginner or nurseryman, as it will certainly clarify the correct layout for a plant name.

R. J. D. McBeath

Hooker's Icones Plantarum. Vol. XXXIX, Parts I and II. Studies in the Genus Fritillaria (Liliaceae). W. B. Turrill and J. Robert Sealy. Drawings by Stella Ross-Craig. Edited for Bentham Moxon Trustees by P. S. Green. 1980. 280 pp. £18 post paid.

The double number of this famous old periodical is devoted to the horticulturally desirable genus *Fritillaria*. There are 50 excellent line drawings by Stella Ross-Craig, giving accurate botanical details. The text is based on the papers and manuscripts of the late Dr. Turrill, with additional notes provided by Robert Sealy.

Dr. Turrill's interest in *Fritillaria* extended over a long period; his first paper on the genus was an account of *F. pontica* in 1920 in Curtis's Botanical Magazine, and his last an English translation, in the R.H.S. Lily Yearbook 1962, of the key to the genus from the Flora of the U.S.S.R. A list of his articles on *Fritillaria* is printed.

At the time of his death, Turrill was preparing a monograph on the genus and it is therefore from his manuscripts that Robert Sealy has carefully and painstakingly collated the text, adding Latin descriptions where Turrill had not completed them and a postscript containing further notes on *Fritillaria japonica* and *F. amabilis* but without line drawings.

In all 51 species are described with notes on authorities, synonymy with extensive references, geographical distribution and full Latin descriptions based on herbarium and cultivated material. Botanical affinities are discussed when there is doubt about the validity of the name. Alas there is no key.

Nevertheless for the *Fritillaria* enthusiast this is a very worthy volume. Its presentation is clear and there is a wealth of most valuable material — material which the "Frit freak" is always endeavouring to find. It will certainly lead to a greater understanding of the species it covers and I for one would welcome this volume on my bookshelf as a reference book. The price of £18 may appear to be expensive in comparison with some of the current books, but rarely is there so much information provided. The opportunity to acquire a volume of *Icones Plantarum* out of its series is rare and we must thank the Editor, P. S. Green, for his forethought in having additional copies printed for the enthusiastic plantsman and *Fritillaria* grower.

The Bentham Moxon Trustees must be satisfied with this publication. Copies may be obtained from the Secretary of the Bentham Moxon Trust, Royal Botanic Gardens, Kew, Richmond, Surrey, for £18 post paid, or £17 when purchased at Kew's Orangery Bookstall.

R.J.M.

Obituary

Mrs. ELLISON CLARK

IT IS WITH deep regret we record the death of Mrs. Ellison Clark on 11th January 1981.

Mrs. Clark was the convener of the Kirkcudbrightshire Branch for the last ten years, but a year ago became too ill to continue and Mr. William Main took over as acting Group Convener.

It was always hoped Mrs. Clark would recover and carry on. However, in mid 1980 she officially retired.

During her time of office she worked extremely hard to build up a thriving and enthusiastic Group. At first, to put the Branch on a firm financial basis, she organised countless coffee mornings and Bring and Buy Sales at her home, eventually building up one of the most successful County Groups.

She was a superb plantswoman; an enthusiastic exhibitor gaining three Forrest Medals among her other successes; and was a regular attender at the Discussion Weekends. She also served as a member of Council.

She was especially interested in the flora of New Zealand. She regularly visited that country, knew many of the alpine gardeners there, and of course grew, most successfully, New Zealand alpines in her own garden.

Her many friends will always remember her for her unfailing generosity, not only with her help and advice, but with the sharing of her plants.

The Club has lost not only an outstanding Convener but a very good friend.

ESTHER KING

The American Rock Garden Society

Probably most members are aware of the existence in the U.S.A. of a Society comparable with our own. Some members may have wished to join this Society, but have been deterred by the apparent difficulty of transmitting their subscription. We understand that this difficulty is not insuperable. In practice it would probably be best to consult one's Bank, which could supply advice and the appropriate forms.

The annual subscription is 8 dollars, and the Secretary, who will send further particulars, is

Donald M. Peach,
Rt 1. Box 282,
Mena,
Arkansas 71953, U.S.A.

In addition to its *Quarterly Bulletin*, the American Society has a Seed Exchange scheme in operation.

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ALPINE AND OTHER HOLIDAYS
SUMMER 1981

PONTRESINA IN THE SWISS ENGADINE—15 June to 7 July
Led by Dennis Woodland, this is an ideal holiday for the alpine gardener and, owing to the cableways and chairlifts which serve areas with high altitude paths (some almost level) is equally suitable to the less energetic and the hardy walker. The variety of alpines is immense and the village, at 6,000 ft., is sheltered and peaceful. *Price £417*

PLAN DE GRALBA IN THE DOLOMITES—11 to 23 July
The highest village in the Val Gardena, Plan, at slightly over 6,000 ft. in the Dolomitic limestone region, is within walking distance of the Rodella range of volcanic origin and provides a fine variety of flora. It is also ideally placed for excursions to Corvara and Colfosco, the Sella Pass and beyond, and Ortisei, giving access to the Seiser Alp and the Valle Lungo. The tour is led by David Paton. *Price £349*

THE KASHMIR HIMALAYAS—26 July to 12 August
The itinerary of this holiday in India begins and ends with a stay in traditional houseboats on the beautiful Dal Lake at Srinagar and includes a ten-day trek on pony-back from Thajiwas, near Pahalgham, to Lake Gangabal under the Kolahai Glacier, at over 12,000 ft. Nights are spent under canvas, with two days each at the lakes of Veshensar, Gadsar and Rasbal for fishing, walking, bird-watching and plant-hunting: indeed, the whole trek is leisurely and very comfortably arranged by experts. It is accompanied by Humphrey Bowen, botanist and ornithologist, as well as by a team of porters with their sirdar; and all personal belongings are carried for you. A full description is sent with the itinerary. *One of the chief joys of this holiday, now in its 13th season, is the profusion of rare alpines to be found at the higher altitudes, including the blue poppy. Price on application.*

LADAKH—INDIA'S LITTLE TIBET—26 July to 12 August and 31 August to 17 September
Beginning and ending with a few nights in houseboats on the Dal Lake, this unusually interesting holiday, pioneered by us in 1976, takes you in a small coach through the green forests of Sonnamarg and over dramatic passes into the austere countryside of the Himalayan world, along the Old Silk Road to Leh, Ladakh's capital. Two nights are spent under canvas in each direction and at Leh itself, where four days are spent, we visit the fascinating temples and palaces of the ancient kings of Ladakh. The Tour Leaders are E. R. D. French and Terry Underhill respectively, and each tour is restricted to a maximum of 20 participants. *Price on application.*

OTHER SUMMER HOLIDAYS include a delightful river holiday crossing SWEDEN from east to west in NORWAY in August: a very special tour for botanists, ornithologists and wilf-life enthusiasts, expertly conducted to ZIMBABWE: and many others including ROMANIA, East and Southern TURKEY in August/September as well as a tour to see the Spring Flowers of the Cape Province of SOUTH AFRICA in September.

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Alpines for Your Garden: A. Bloom. £6.20 post paid. An extremely well-illustrated beginners' text.

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Buying books this way benefits the Club as well as you and prices are even lower for books collected at Shows, Discussion Weekends.

Petiolarid Primulas: Dr. J. Richards. 70p post paid. This booklet brings you up to date with this fascinating section of the genus.

From Dr. D. M. Stead, Esk Hause, Bishop's Park, Thorntonhall, Glasgow G74 5AF.