The JOURNAL of THE SCOTTISH ROCK GARDEN CLUB

VOLUME XVI Part 1
No. 62

APRIL 1978

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

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Secretary's Page

DATES FOR YOUR DIARY

Please refer to your Show Schedule for exact time and place of Shows.

Perth: 22 April 1978 at Kinnoull Church Hall, Perth.

Aberdeen: 29 April 1978 at the Music Hall, Union Street, Aberdeen.

Glasgow: 13 May 1978 at Knightswood Community Centre, Glasgow.

St. Andrews Discussion Weekend: 30 September to 1 October 1978. The booking details are on page 5 of this *Journal*. Members may enter plants for the Show and for a Joint Rock Garden Plant Award even though they do not attend the Weekend.

Chelsea Flower Show: 23 to 26 May 1978.

Do you ever go to London? Would you like to go to Wisley, Chelsea or R.H.S. fortnightly Shows?—singly or in a party? All these privileges are offered to S.R.G.C. members. Read page 7 of the *Year Book* and if you are interested write to the Hon. Secretary for more information. If applying to go to Chelsea this year please give alternative dates; and please enclose a stamped and addressed envelope for your reply.

Mr. Evans's Chelsea Trip: We regret this is now fully subscribed.

Thank You: to the Edinburgh Group which has made a donation of £100 towards the Publication Fund and a contribution to the Library Fund.

to the member who has been organising sales of the Club tie; the profits are helping Club funds.

to those members who provided very attractive dried-flower pictures and paintings for sale at the Discussion Weekend.

New Groups: After several years in abeyance the Group in North-West England has been reformed and is to be known as the North Cumbria Rock Garden Group. An excellent programme has been arranged and we wish them every success. The West Fife Group has re-started with meetings in conjunction with the Dalgety Bay Horticultural Society, and we send them our best wishes.

Dumfries Group: Dr. Waite is trying to start this Group once more. Any offers of help from existing members, both in running the Group and increasing the membership, would be most welcome.

Two Exciting News Flashes: which could gain many new Scottish members, AND help to keep the subscription stable:—

(i) The Publicity Manager is running an Alpine Seed Discount Scheme in the April issue of *The Gardener*. Readers will be able to buy seeds at low cost. Please encourage your friends to buy *The Gardener* and take advantage of this Golden Opportunity.

(ii) The Publicity Manager is author of an article on the S.R.G.C. in the April issue of *The Garden* (published by the R.H.S.). Look out for this, tell your friends about it and so encourage them to join our Club.

Travelling Lecturer: We are very pleased that Mr. Joe Elliott, well-known to many members as the owner of the Broadwell Nursery in Gloucestershire, has agreed to visit Groups in the early autumn this year.

Twice-Yearly Competition: The entries for the first competition were shown at the Discussion Weekend in Edinburgh. We were pleased to get six good entries, but would welcome many more. Congratulations to the winners who were, in the photographic section, Mr. Henry Taylor; and, in the drawing section, Mr. David Herkes.

There is still time to enter for the "Crocus" competition. Entries should be in by 30 April and will be judged at the Glasgow Show on 13 May.
The *next competition* will be of the *Genus Roscoea.* The plant can be in the wild, in the garden, or in a pot. You are invited to submit a black-and-white photograph and/or a line drawing. There will be a One Pound prize in each section. The Editor reserves the right to reproduce any entry in the *Journal.* Entries, with a plain white mount, should be sent to the Hon. Secretary by 25 September or may be submitted at the Discussion Weekend where the judging will take place.

The Club's Shop Window—the Shows: This is an invitation to members from the Chairman of the Show Secretaries' Committee for more support at the Shows. By the time you read this our Show season will have started again. Regular exhibitors will have compared Show dates against their other commitments such as holidays, visits to and from relations, etc., and have wondered how on earth it can all be fitted in. It is a busy time and in spite of this year's bad weather (every year is a funny year) the old faithfuls will turn up on Show days and stage plants, meet friends, talk, swop plants, cuttings and seeds, express opinions, judge the Judges, criticise, ask so-and-so how he or she manages to grow a particular plant, threaten to murder that little brat if he doesn't keep his fingers off that plant and, almost without knowing it, it is time to clear the benches and pack the plants back into the car. When you are driving home and the rush is over you remember you had forgotten to ask about some little problem, you handn't a chance to speak to old Tom or Jack, and you wonder about Mr. and Mrs. ——, were they there? You are tired and look forward to a cup of tea (or something stronger). If you don't exhibit you are missing all this. Come along and join us. I am sure you will have a good day.

Due Date for Payment of Subscriptions: The Club Subscriptions are due on 15 October each year and are as follows: Ordinary Members £2.50 (U.S. $5.00); Family and Junior Members 50p (U.S. $1.25). Payment by cheque in favour of the Club is preferred; but foreign currency or sterling notes are accepted. Any over payment will be shown as a credit on the back of the member's card. Members can pay a sum in advance if they wish and so save bank charges.

For Sale: (i) *A.G.S. Bulletins*, volumes 24-28 (1956-1960) and volumes 30-35 (1962-1967) have been donated by a member to help Club funds and are now on sale for £18 the lot or £2 each, all post free, from the Hon. Publication Manager. (ii) *My Garden.* 69 of the last 72 issues of the high quality monthly magazine *My Garden*, edited by Theo Stevens (1946-1951). Any offer over £5.50 accepted. Apply as above.

Wanted: Celmisia philocremna, Haastia pulvinaris, Primula aureata, Pygmaea myosotoides, P. thomsoni, Raoulia bryoides, R. buchananii, R. loganii. Please write to: R. A. Hodgson, 77 Roseberry Avenue, Stokesley, North Yorkshire.

Requests and Enquiries: When writing to Club officials please remember to enclose a stamped and addressed envelope or, in the case of overseas members, a postal coupon.

Botanical Terms, Descriptive, in Translation: A four-page pamphlet of over 200 Latin and Greek terms, designed for quick identification of plant varieties. 15p per copy, plus 7p postage; *or* 6 copies for £1, inclusive of postage. Orders to Mrs. Dainty, 5 Dundas Avenue, North Berwick, East Lothian, EH39 4PS.

Contributions to the next Secretary's Page: should be in the hands of the Hon. Secretary not later than 29th July 1978.

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Contents

NOTICE

The ANNUAL GENERAL MEETING will be held at the British Medical Association House, 7 Drumsheugh Gardens, Edinburgh, on **Saturday 11th November 1978, at 2.15 p.m.**

Members are notified that nominations are required for President and other Office-bearers, and for three Vice-Presidents and for five Ordinary Members to serve on the Council. Nominations *in writing, seconded by another Club member or members*, must be sent to the Honorary Secretary not later than 20th August 1978, the nominator having ascertained that the nominee is willing to serve if nominated.

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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Dr. M. O'Gorman
A. C. Small, Esq.
Michael A. Stone, Esq.
Henry Taylor, Esq.

Honorary Secretary,
Mrs. I. J. Simpson,
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Discussion Week-End 1978

THE UNIVERSITY OF ST. ANDREWS
ST. SALVATOR'S HALL, THE SCORES
ST. ANDREWS KY16 9AR
SATURDAY and SUNDAY, 30th SEPTEMBER and 1st OCTOBER 1978

PROGRAMME

Saturday:

12.30 p.m.	Lunch
2.15 p.m.	Address of Welcome
2.30 p.m.	The W. C. Buchanan Memorial Lecture "Cultivation of Alpines in Pots" Eric Watson
4.00 p.m.	Tea
4.30 p.m.	"Liliaceae in the South" Mrs. K. Dryden
6.00-7.30 p.m.	Dinner
7.45 p.m.	"A Tale of Two Gardens" Joan and Don Stead

Sunday:

8.30 a.m.	Breakfast
10.00 a.m.	The Esslemont Lecture "Plant Hunting in Turkey 1977" John Watson
11.15 a.m.	Morning Coffee
11.45 a.m.	"Hardy Orchids" Stewart Annand
1.00 p.m.	Lunch
2.30 p.m.	"Plant Hunting in Alaska" Mrs. Sheila Maule
4.00 p.m.	Close of Proceedings
4.15 p.m.	Tea and Disperse

ST. SALVATOR'S HALL is situated between The Scores and North Street in the older part of the town. St. Andrews is one of the most historic and interesting towns in Britain. It is easily reached by road, but please note that the trains only stop at Leuchars, some four miles away, and bus connections are difficult. Anyone in difficulty please write to R. J. Mitchell.

Free Car Parking is available in North Street and The Scores. Both areas are adjacent to the Hall of Residence.

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

CHARGES, INCLUDING V.A.T. AND CONFERENCE FEE:

Full board from Friday dinner till Monday breakfast ..	£26.00
Full board from Friday dinner till Sunday tea ..	20.00
Full board from Saturday lunch till Sunday tea ..	14.50

Day Charges:

Saturday: Lunch, Tea, Dinner	6.50
Sunday: Coffee, Lunch, Tea	4.50

Application should be sent initially to the Registration Secretary, Mr. R. J. Mitchell, University Botanic Garden, St. Andrews, enclosing the appropriate remittance, before Saturday 19th August 1978. Documentation will be issued at the Conference.

An interesting and instructive programme has been arranged. There will be opportunities to visit various gardens during the Saturday morning, and on the Friday and Sunday evenings additional talks are planned. Discussion sessions will be possible in the large lounge of St. Salvator's Hall in the evenings. Donations of plants will be welcome for the "Bring and Buy" stall.

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

FOR SALE: Two Xerox copies of *Journals* 3 and 6. Each copy, which only needs stapling, folding and trimming to give a tolerable imitation of the real thing, costs £2.75, post free from the Hon. Publications Manager.

BINDING CASES FOR JOURNALS are being investigated. Members who think they would be interested at a price between £1.25 and £1.50 (post free) are invited to let the Hon. Publications Manager know the likely extent of their interest. If the demand justifies a bulk purchase, an invitation to order will appear in due course. Each binding case will hold four journals.

Gentians

by Dr. NOEL PRITCHARD

TO THE non-specialist gardener the image of the Gentian is clear; it is a small, compact plant, often of rosette form. The flowers are large, sometimes incongruously so, and of a dazzling, almost apocryphal blue. It is a plant for the specialist alpine gardener, whose culture is laden with horticultural mystique; even if the ordinary gardener can grow it, it fails to flower. But as in so much in gardening, such ideas come from a mixture of misinformation and mythology. Those who have suffered the often painful ministrations of "Gentian Violet" or enjoyed the pleasures of "Gentian Brandy" (or even "Bitters"—gentian extract is a chief constituent), will have a wider view. And indeed, in a botanical sense, the group of gentians is really quite varied. Without indulging in too much taxonomic debate, we may say that the genus *Gentiana*, as Linnaeus and other 18th and 19th century botanists understood it, constitutes a most natural group of plants. This means that all the plants which we call gentians, although they may differ among themselves in a series of respects, nevertheless show a high degree of relationship, and may be presumed to have evolved from a common ancestor. We may write a description for the genus which both defines the group and cuts it off from other similar groups. In recent years it has become the practice to separate the annual or biennial plants usually called field gentians and felworts into a separate botanical genus, *Gentianella*; this includes the British natives *Gentianella campestris* and *G. amarella*, as well as the widespread continental *G. ciliata*. The botanical reasons for the separation are good, and the new genus and the new *Gentiana*, as reconstituted by exclusion, are consistent groupings. But they still, of course, have much in common; we shall refer to them collectively as gentians. (Many people, following hallowed gardening practice, still grow and delight in the "Gentianella"—*Gentiana acaulis* of gardens and its allies. But this plant has little to do with the botanical *Gentianella*, and remains firmly within the Linnaean genus of *Gentiana*. It is an unfortunate example of the not infrequent conflict between gardeners and botanists!)

So what is a Gentian? Fig. 1 is a drawing of a gentian flower, cut to show the internal structure. As in most flowering plants, the genus

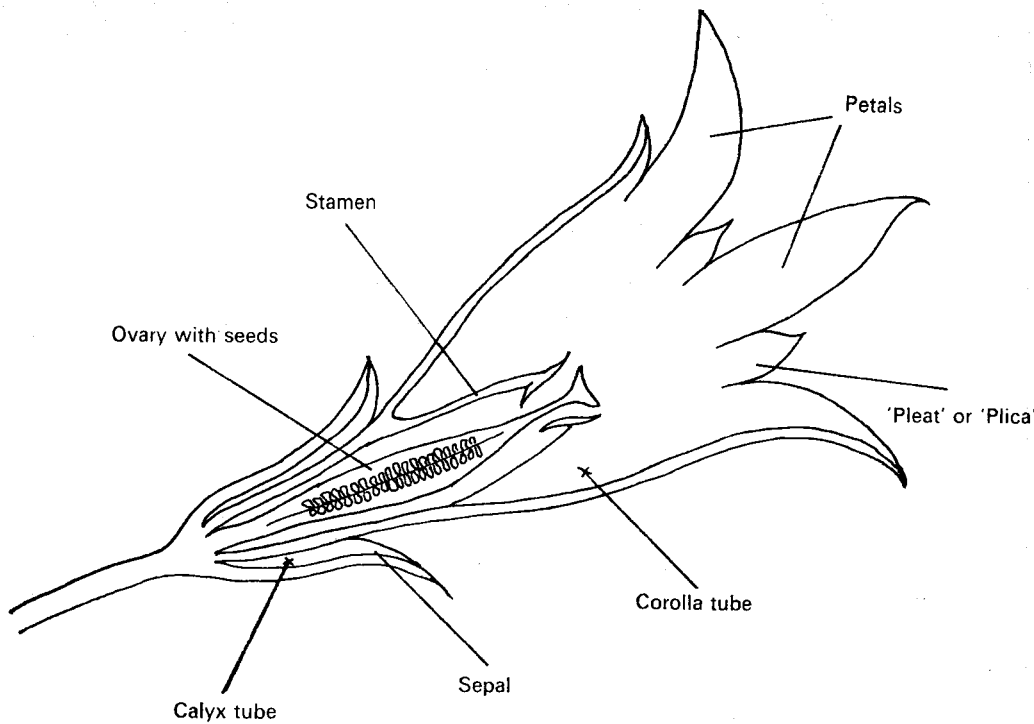

Fig. 1: Longitudinal section of a Gentian flower

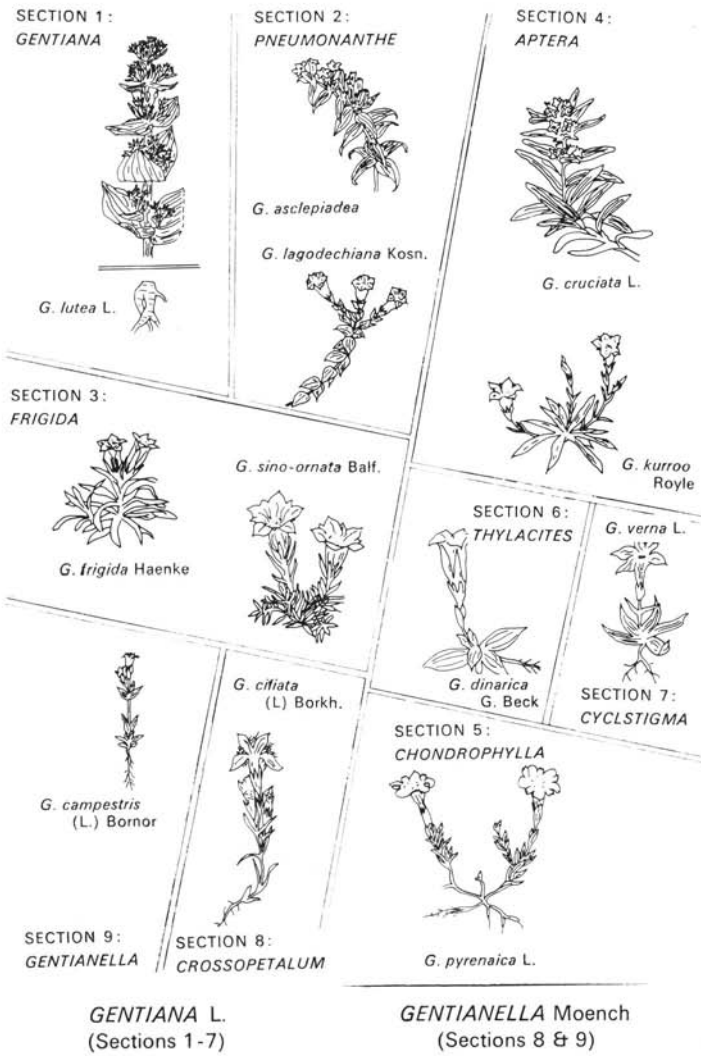

Fig. 2: The Sections of *Gentiana* L. and *Gentianella* Moench

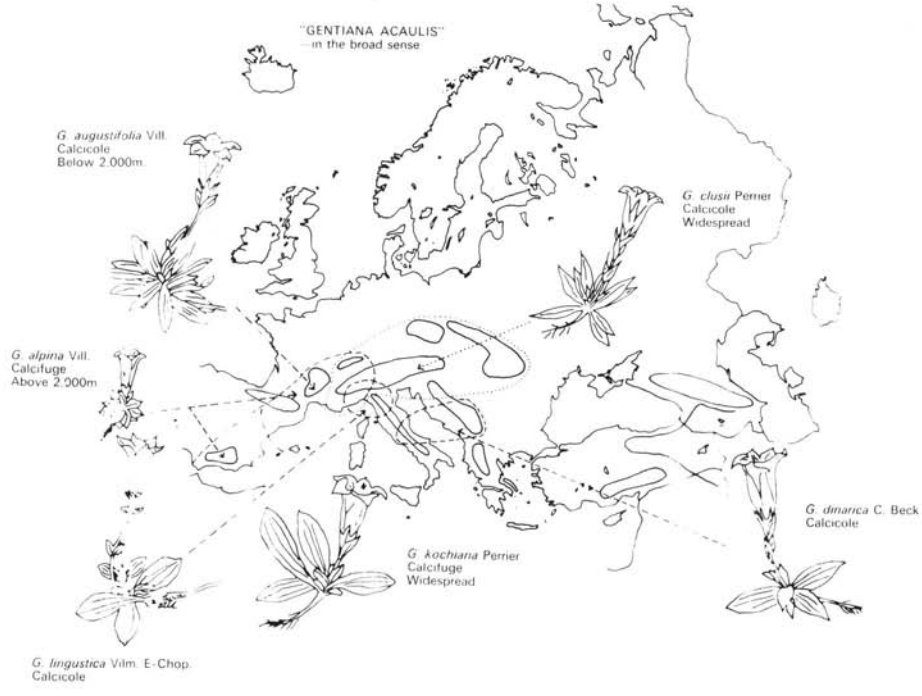

Fig. 3: The distribution of the species within the *Gentiana acaulis* complex in Europe

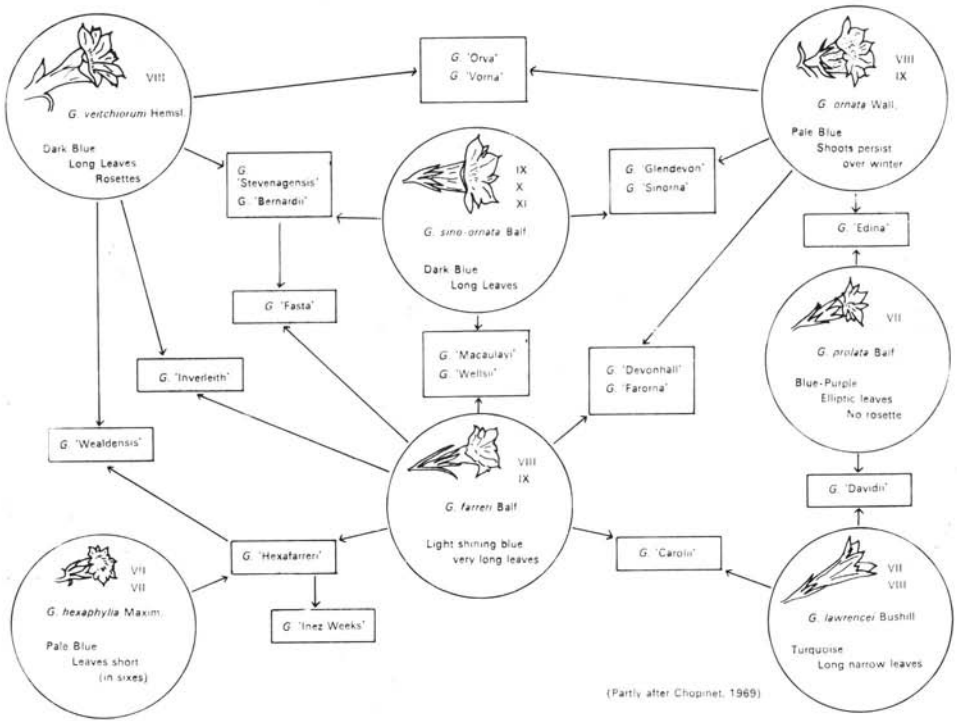

Fig. 4: The species and hybrids within the *Gentiana ornata* complex

Fig. 5—*Primula aureata* Photo—A. Evans

Fig. 6—*Lilium duchartrei*, Rock Garden, R. B. G., Edinburgh
Photo—A. Evans

is defined chiefly on floral characteristics. The conspicuous petals, usually showy and in shades of blue, purple, white or yellow, are usually 4 or 5 in number, and fused below to form a tube, though the exact shape may vary. *G. lutea* has a short tube, with spreading petals forming more than half the corolla, as the petals are collectively called. *G. verna* has a longer tube, with spreading petals, while in *G. acaulis* or *G. sino-ornata* we see a bell-shaped corolla. In *Gentiana* there are nearly always more or less conspicuous smaller lobes ('pleats' or 'plicae') between the main petals; these are absent in *Gentianella*, but here the edges or the faces of the petals usually bear a conspicuous fringe. The sepals, together forming the calyx, likewise form a tube, just as varied, from a short funnel with spreading lobes in *G. amarella* to an almost campion-like bladder in *G. utriculosa*. The stamens are equal in number to the petals and sepals, and are fused to the corolla tube. The ovary, at the centre of the flower, most often forms a long narrow capsule; inside it are two rows of numerous small seeds. The ovary is surmounted by the stigmas, conspicuous and most often two in number, but the varied form of the stigma is a useful character in classification. At the base of the flower are nectaries. The arrangement of the flowers is varied, and often gives a pointer towards the relationships of the different species.

The habit, size and leaves of gentians are enormously variable—plants may be 1 in. or 5 ft. tall—but they often have a characteristic smooth and stiff appearance, so that with practice the genus is easy to recognise. The leaves are most often smooth and hairless, and usually with conspicuous veins. Even at a conservative estimate there are probably more than 500 species in the genus. Of these, many if not most would probably be good garden plants if they were not, for one reason or another, difficult to grow. Luckily, however, many species are not difficult, and the present paper hopes to give some idea of the wealth that is available to the moderate gentian grower. I shall take two approaches. First, we shall look at the whole genus *Gentiana* as it was understood by Linnaeus, and by picking out examples survey its variety. Then we shall examine two problem groups within the genus—those centred on the European *G. acaulis* and the Asiatic *G. sino-ornata*.

The Genus *Gentiana* L. and its Sections

From the gardener's point of view, the species of *Gentiana* available for growing fall into a number of fairly easily separated groups.

We may start with the tall herbaceous perennials, usually anything but "Gentian Violet" in colour. Species such as *G. purpurea* and the big yellow gentian, *G. lutea*, are true herbaceous perennials in the nurseryman's sense, with annual flowering shoots (up to 5 ft. in *G. lutea*) arising from a perennial rootstock which is often more or less fleshy and resentful of disturbance. These are linked, via *G. asclepiadea* (the Willow Gentian), another 'herbaceous' but of gentler habit, to the *G. septemfida* group. These are floppy, though often robust, plants with annual shoots from a perennial stock, but still with no basal rosette. The flowers are relatively much larger than in the earlier groups, and often borne in conspicuous heads. This group also includes the British Marsh Gentian, *G. pneumonanthe*. From the *septemfida* group it is only a short step to the 'Asiatics'—plants with long leafy stems which usually end in the solitary large flowers, such as *G. sino-ornata* and *G. farreri*. Some have fairly well-defined rosettes, and this habit (the perennial rosette with leafy flowering branches) becomes more fixed in the next group, including *G. cruciata* and even more obviously *G. olivieri* and *G. kurroo*. In these, the rosette becomes larger and more permanent, while the leaves on the flowering stems diminish in both size and number. From these, we move on to the real European 'alpines', with rosettes of leaves and proportionately very big flowers. Those with truly funnel-shaped flowers form the *G. acaulis* group, with the unusual and difficult *G. pyrenaica* out on a limb, while the tubular-flowered group, with spreading petals, are another distinct set of species which include *G. verna* and *G. nivalis*.

All these so far have plicae between the corolla lobes, more or less conspicuous (in *G. pyrenaica* they are so large as to give the impression of ten petals, while in *G. lutea* they are so tiny as to be almost wanting.) The rest (now the genus *Gentianella* Moench) do not. They include the alpine *G. tenella*, not unlike *G. nivalis* at first sight; the felwort, (*G. amarella*) and its allies, of which species like the widespread *G. germanica* would be most desirable and distinguished garden plants if their seeds were not so slow and difficult to germinate, and the European and North American crossworts related to *G. ciliata*.

When we examine this gardeners' classification, we see a number of clear morphological trends. In the order in which I have described the groups, we can summarise these trends thus:

(1) Tall herbaceous perennials with ± fleshy rootstocks to leafy prostrate forms to rosette plants to annuals.

(2) Relatively small flowers, numerous and borne in leaf axils to solitary very large flowers at the ends of short stems.
(3) Lowland or meadow plants to high alpines.

These trends are closely correlated, and it turns out that this natural arrangement of groups within the gentians, as we might see it used by a gardener or a naturalist, is close to the botanical division into sections. These sections are illustrated in Fig. 2; here we may note the main botanical characteristics which are used to separate the sections.

(1) As we have seen, the major division between the sections comprising *Gentiana* and those in *Gentianella* is the presence or absence of plicae; this difference is, with very few exceptions, correlated with the distinction between perennial and annual/biennial habit.
(2) Big perennials with deeply cut flowers and tiny plicae constitute the section *Gentiana.*
(3) The styles and stigmas are fused into an enlarged disc in section *Cyclostigma,* separating it from the rest, with section *Thylacites* ± intermediate.
(4) Absence of basal rosettes separates sections *Gentiana* and *Pneumonanthe* from the others, with section *Frigida* somewhat intermediate.
(5) Very big plicae, and a fairly distinctive habit, distinguish section *Chondrophylla.*
(6) Winged or unwinged seeds separate the otherwise parallel series *Frigida* and *Aptera,* though in most cases the former do not have the well marked distinction between rosette leaves and stem leaves which is typical of *Aptera.*
(7) Corolla shape separates *Cyclostigma* and *Thylacites.*
(8) Within *Gentianella,* the position of the corolla fringe separates section *Gentianella* (fringe in throat) from section *Crossopetalum* (fringed margins to petals.)

The combination of these major differences (and they are only a selection) serves to separate the main sections of the genus. Table I lists some of the commonly cultivated plants within this botanical framework. It may be a help towards identification; one of the problems of the two most readily available books on Gentians (Wilkie 1950, and Bartlett 1975) is that neither makes it very easy to compare related species, or indeed to find out to what an unknown plant is related.

In the second part of this paper I want to draw attention to two particular botanical problems within *Gentiana*. These involve what are perhaps the most commonly cultivated of all gentians, and they also serve to illustrate some of the difficulties facing the botanical taxonomist.

PROBLEMS WITHIN *Gentiana:* (a) THE *Gentiana acaulis* GROUP

Perhaps no alpine plants are more celebrated, none more coveted—and none more the subject of gardeners' folk-lore—than the European stemless gentians. It is clear to anyone who has grown them that they vary greatly. All are desirable, but some are easy, some are difficult; how often do we hear it said that a gentian, virtually a substitute for lawn grass just down the road, turns into a Peerie Wullie when transported to our own garden? What is clear is that some are bigger than others; some thrive on limestone and some languish upon it; some are pure blue, while others are tinged pale or purple, or spattered with green spots. Like so many old and prized garden plants, the stemless gentians have doubtless been introduced to cultivation times beyond number. This can only add to the richness of our gardens, but in the absence of perfect record-keeping (and what gardener places the record before the plant?) it can only add to the confusion of both botanist and gardener. So let us go back, and look at the plants in the wild.

They are all small to very small, consisting of one or more rosettes from which arise one or more relatively huge flowers, of a fairly uniform bell shape. But apart from this, we can see, first, that all the differences I have mentioned may be found in different wild populations, and secondly that the plants occur over a very wide geographical and topographical range, and in many different ecological habitats. The group is restricted to Europe, but within that continent it extends from the Sierra Nevada to Macedonia and the Tatra, from altitudes of 500 m to over 3500 m; from damp ledges and woods to dry exposed rocks, on limestone and on granite. It can scarcely be wondered that there are so many different forms of the stemless gentian, and yet Linnaeus, who doubtless saw the differences, called them all '*Gentiana acaulis—G. corolla quinquefida campanulata caulem excedente.*' (The Gentian with a five-lobed bell-shaped corolla bigger than the stem.) (Linnaeus 1753).

The European map in Fig. 3 is largely self-explanatory, but these are the main points to note from it. The main mountain massifs are the Alps in Central Europe, of which we may perhaps regard the Jura as an outlier; the Ligurian Alps, together with the Apennines; the

Eastern Alps and the Dinaric Alps; the Carpathians, together with the Tatra; the Pyrenees, and last of all the isolated Sierra Nevada of southern Spain. An investigation of the distributions of the fairly well-marked forms of *G. acaulis sensu lato* reveals two features:

(a) There are several well-marked morphological differences; while these are not necessarily closely correlated in all cases, particular *combinations* of overlapping characters do occur which can be reliably recognised.

(b) These morphological types often have clearly defined geographical distributions.

Let us now look at some of these distinct groups, as they are for the most part recognised by modern taxonomic treatments (Tutin (1972), Chopinet (1969). As a rule, six main species are recognised within the group. Four of these are of rather restricted distribution:

(1) *G. alpina* Vill. is a very small high alpine of the W & SW Alps, the Jura, the Pyrenees and the Sierra Nevada. It occurs from 2200 m upwards, always on siliceous rocks. It is an easily recognised plant, with rosette leaves short and wide, sometimes almost circular in outline.

(2) *G. angustifolia* Vill. has a very similar distribution (except for the Sierra Nevada), but it is a calcareous plant usually found from 1000 m up to 2000 m (so that it is separated by altitude and soil type from *G. alpina.*) It is recognised by its very elongated and more or less parallel-sided leaves and much coarser habit. Both these species have green spots within the throat of the corolla.

(3) *G. dinarica* G. Beck and

(4) *G. ligustica* R. de Vilmorin & Chopinet are two rather local calcareous species of restricted distribution, the former in the Balkans (South Carpathians, Bosnia), and the Apennines (Abruzzi), and the latter in the Maritime Alps and Northern Apennines. They are rather alike, though isolated geographically, and differ in the green spots (present in *G. ligustica*, absent in *G. dinarica*) and in the sepals, shorter in *ligustica* than in *dinarica.*

In general these species present few difficulties to the botanist, but the other two,

(5) *G. clusii* Perr. & Song. and

(6) *G. kochiana* Perr. & Song., together perhaps with *G. ligustica* where it overlaps them, are probably the source of most of the troubles of gardener and botanist alike. They have much the

same range in altitude and in geography, both occurring more or less throughout the whole of Europe, except that *G. clusii* does not occur in the Pyrenees, where it is perhaps replaced by *G. angustifolia*. They must be separated by the use of several characters. *G. kochiana* has green spots, *G. clusii* few or none (but *G. ligustica*, which occurs near to *G. kochiana*, also has spots.) *G. clusii* has wide calyx teeth, while the other two have narrow teeth, narrowed further at the base; in *clusii* they come to a short point, while in the others again they are tapered. *G. clusii* (and *G. ligustica*) are calcicole, but *G. kochiana* is exclusively a lime-hater (though this may be an expensive difference if we have to rely on it!)

So we have a complex pattern; two wide-ranging species, of which one is calcicole and the other calcifuge, and four local species, differentiated by soil type, altitude and geographical distribution. In nature these external barriers are enough, with rare exceptions, to keep the species separate. But is it surprising that in the long history of European gardening the boundaries have become a little blurred? *G. acaulis* hort. ('Hort.'=Hortorum, meaning of gardens) has many similar forms, introduced at many times and from many sources. Many of our garden plants (nonetheless to be treasured if you have a good form) are probably hybrids. Most possible hybrids have been reported from the wild—usually without experimental proof!—but some almost certainly occur, such as *G. excisa* Presl. Is this a *G. clusii* × *kochiana* hybrid, which in cultivation has given rise to many and divers offspring? Such a history could certainly account for our stories of odd garden behaviour—coupled perhaps with the aforementioned lack of precision in recording! But what I think we clearly have is an undocumented and largely man-made confusion; a situation contrasting interestingly with our other detailed example.

PROBLEMS WITHIN *Gentiana*; (*b*) THE *Gentiana sino-ornata* GROUP

In this group of Himalayan gentians we again see a pattern of geographical (and probably ecological) differentiation in the wild. And again there is a complex story of hybridisation, but this time deliberate and well recorded; the hybrids have been produced to combine the various horticulturally valuable characteristics of the parent species. Historically the group has presented other problems to the taxonomist; let us look briefly at that history.

In 1820/1 Wallich collected, from Gossain Than in Nepal, a plant

which he listed in his catalogue as *Gentiana ornata*. Although this plant was subsequently described by George Don in 1838 (as *Pneumonanthe ornata*) and by Grisebach in 1839 (*G. ornata*) in clear terms, it (or at least its name) has been the cause of a remarkable series of nomenclatural muddles. (A comprehensive account of the group is given by Bayley Balfour (1918), and I shall only summarise the main points here.)

After Wallich's collection (of which there are many available specimens in the national herbaria) nothing much happened for about eighty years, when the great surge of collecting by such celebrated explorers as Forrest, Wilson and Farrer began. The *Botanical Magazine* for 1880 (t. 6514) did in fact feature a plant as *G. ornata*; it is a curious plant, of unknown original source (Bayley Balfour suggests that it came to Edinburgh as seed from Calcutta Botanic Garden) and it plays no further part in our account. It may be near to *G. nipponica* Maxim. At about the same time C. B. Clarke (1883) included, in his account for Hooker's 'Flora of British India', a varied collection of plants under *G. ornata*, including t. 6514. But the main character of Wallich's plant, its rosette leaves at the time of flowering, is rejected by Clarke; whatever Clarke had in mind, it was not *G. ornata* Wallich! Also in 1883 there appeared in the *Gardeners' Chronicle* (vol. xx, fig. 60) another '*G. ornata*'; it subsequently turns out to be the plant now known as *G. prolata* Balf. f. In 1896 Franchet described, as varieties of *G. ornata* Wallich, several Chinese collections. None is *G. ornata*, which is probably restricted to Nepal, but it is probable that at least one of these (Franchet's var. *obtusifolia*) is the distinct plant we now call *G. veitchiorum* Hemsley, originally collected from Szechwan by Wilson. It was exhibited in 1909 and received the R.H.S. Award of Merit—but as *G. ornata*! Meantime two other plants had been discovered. In 1905 Leichtlin introduced (from seed collected by Bocherel near Lake Baikal) the plant we now know as *G. lawrencei* Burkill; this plant appeared in the *Botanical Magazine* for 1907 (t. 8140)—as *G. ornata*. But also in 1907 Forrest published an account of late-flowering dark blue plants from Yunnan—as *G. ornata*, needless to say. They are in fact what we now call *G. sino-ornata* Balf. f., probably the best known plant in the group. (The final twist is that in 1915 the R.H.S. gave *another* Award of Merit to *G. ornata*; this time it was Forrest's plant, *G. sino-ornata*.)

So, before the more recent hybrid complications even begin, we have Wallich's original *G. ornata*, most probably only recently reintroduced

to cultivation from Nepal, confused with at least four other and distinct species:

(1) *G. prolata* Balf. f. from Sikkim—narrow, erect, purplish flowers, with persistent leafy overwintering stolons, flowering in their second year.

(2) *G. veitchiorum* Hemsley from Szechwan—rather stiff habit with basal rosette, dark blue tubular flowers.

(3) *G. lawrencei* Burkill from Mongolia—slender, with narrow leaves, and with pale blue, narrow flowers.

(4) *G. sino-ornata* Balf f. from Yunnan—vigorous, late-flowering with wide bell-shaped flowers—the common Himalayan gentian of gardens.

It will be noticed that here we have a series of plants of which the geographical distributions are quite distinct. Much of the early confusion described above probably stemmed from different and broader attitudes to the importance of locality and isolation in delimiting species, coupled no doubt with a certain difficulty of communication.

To this collection of species, we must add two more of great gardening importance (as well as the true *G. ornata*, of course.) Fig. 8. They are:

(5) *G. farreri* Balf. f. from Kansu—robust habit, long flowering period and above all shining copper sulphate blue flowers.

(6) *G. hexaphylla* Maxim from Tibet—with shorter and broader flowers of pale blue, and somewhat different habit, with the leaves whorled (often in sixes) at each node (they are in opposite pairs in all the other species.)

Most of the possible hybrids between these seven Himalayan species have, in the past fifty years, been artificially produced. Fig. 4, partly after Chopinet (1969), illustrates the ways in which the desirable characteristics of the several species (such as colour, hardiness, flower shape and ease of propagation) have been combined. Indeed, many of these hybrids are now much better known than their parents, combining as they do the robustness and vigour of *G. farreri* and *G. sino-ornata* with features of the perhaps less easily grown other species.

But already the boundaries here too are becoming blurred. The progeny of first-cross hybrids (which are themselves uniform) are exceedingly variable, and we see selected forms of these later generation hybrid types receiving names and being distributed. In general, though, the records of hybrid making survive; we have the *G. acaulis* picture again, but looked at from a historically nearer viewpoint. The patterns are similar; closely related groups of species, geographically but not

genetically isolated, from which man mixes and distils for the garden's delectation—as he has since flower growing began.

Table 1: Commonly cultivated species of Gentians in their sections

Species	*Section*	*Origin*
acaulis	Thylacites	Europe
algida	Frigida	Asia
alpina	Thylacites	Europe
amarella	Gentianella	Eurasia
andrewsii	Pneumonanthe	America
angulosa	(=verna)	
angustifolia	Thylacites	Europe
asclepiadea	Pneumonanthe	Eurasia
bavarica	Cyclostigma	Europe
bellidifolia		New Zealand
brachyphylla	Cyclostigma	Eurasia
burseri	Gentiana	Europe
cachemirica	Pneumonanthe	Asia
campestris	Gentianella	Eurasia
ciliata	Crossopetalum	Eurasia
clusii	Thylacites	Europe
corymbifera		New Zealand
cruciata	Aptera	Eurasia
dahurica	Aptera	Asia
decumbens	Aptera	Asia
depressa	Frigida	Asia
dinarica	Thylacites	Europe
farreri	Frigida	Asia
favratii	(=brachyphylla)	
freyniana	(=septemfida)	
frigida	Frigida	Europe
froelichii	Frigida	Europe
gelida	Pneumonanthe	Asia
germanica	Gentianella	Europe
gilvostriata	Frigida	Asia
gracilipes	Aptera	Asia
hexaphylla	Frigida	Asia
kochiana	(=acaulis)	
kurroo	Aptera	Asia
lagodechiana	(=septemfida)	
lawrencei	Frigida	Asia
ligustica	Thylacites	Europe
lutea	Gentiana	Eurasia
macrophylla	Aptera	Asia
nivalis	Cyclostigma	Eurasia
nubigena	Frigida	Asia
ochroleuca	Pneumonanthe	America
olivieri	Aptera	Asia
ornata	Frigida	Asia
pannonica	Gentiana	Europe
phlogifolia	(=cruciata)	
pneumonanthe	Pneumonanthe	Eurasia
prolata	Frigida	Asia
przewalskii	Frigida	Asia
punctata	Gentiana	Europe
purpurea	Gentiana	Europe
pyrenaica	Chondrophylla	Eurasia
saponaria	Pneumonanthe	America
saxosa		New Zealand

TABLE I *(Continued)*

scabra	Pneumonanthe	America
schistocalyx	(=asclepiadea)	
septemfida	Pneumonanthe	Asia
sino-ornata	Frigida	Asia
stragulata	Frigida	Asia
tenella	Comastoma	Europe
tergestina	(=verna)	
terglouensis	Cyclostigma	Europe
utriculosa	Cyclostigma	Europe
veitchiorum	Frigida	Asia
verna	Cyclostigma	Eurasia
waltonii	Aptera	Asia

Where a species name is followed by an = sign in brackets, this does not mean that the plant is not distinct, but that it is regarded botanically as a subspecies or variety of the species in brackets.
The three species *bellidifolia, corymbifera* and *saxosa* are the best known representatives of a group of botanically and horticulturally distinct species from New Zealand. Other very different plants, not in cultivation, come from South America.

REFERENCES

Bartlett, M. (1975). Gentians. Blandford Press 1975.
Bayley Balfour (1918). Some Late-Flowering Gentians; Trans. Bot. Soc. Edin. 27, pp. 246-272.
Chopinet, R. (1969-70). Les Gentianes; Revue Horticole 2287-2295, pp. 1700-1705, 1738-1745, 1758-1761, 1793-1799, 1860-1863, 1896-1897.
Clarke, C. B. (1883). In Hooker, Flora of British India 4, p. 116.
Don, G. (1838). Gardener's Dictionary 4, p. 194.
Forrest, G. (1907). Notes R.B.G. Edin. 4, p. 71.
Franchet, M. A. (1896). Bull. Soc. Bot. Fr., 43, p. 493.
Grisebach, A. H. R. (1839). Genera et Species Gentianearum. Stuttgart.
Linnaeus, C. (1753). Species Plantarum, ed. 1. Stockholm.
Tutin, T. G. (1972). Gentiana in Flora Europaea, 3, pp. 59-63.
Wilkie, D. (1950). Gentians. London.

Some Favourite Rampers

by ISA HALL

ONE MAN'S meat is another man's poison, and plants which flourish in one situation will languish in another. With these truisms in mind, it will be understood that the following applies to plants in our garden, plants which do well for us and which we like. Our one acre garden is on a steep slope, facing south, and offers very little shade. Basically, its soil is a stiff clay which gapes in great cracks in dry weather (and this is often as our rainfall averages a mere 22 ins. a year). In the main it is neutral or slightly acid.

On a flat bed just outside the living room window is a two sq. yd. patch of *Gentiana acaulis*. It is at present (early May) carrying hundreds

of deep blue trumpets. The 35 to 40 clumps into which the transplanted pieces of four years ago have spread range from 5 ins. to 12 ins. in diameter and carry anything from 5 to 75 blooms. Next year they will have merged into a solid carpet. This gentian came to Coquet Vale a dozen years ago as one small plant. It proved a vigorous grower in the broken glass and rubble of a builder's dump on part of the bank-side where it was planted. It has been divided and transplanted many times in screes, heavy clay, ex rose beds and the river silt at the bottom of the garden. It has even seeded itself in a bed of heavy clay, though at the time of writing this plant has not yet reached flowering size. Everywhere else it is lavish in its Spring display, gives a reasonable second flush in the Autumn, and we are never without at least a few flowers throughout the year.

Next to it, on the terrace bed, is a patch, not quite so large but even more floriferous, of a form of *Primula marginata.* Smaller flowered than most, it smothers itself with lilac-coloured blossoms in Spring. Its neat, cream-edged rosettes build up into clumps almost as mathematically domed (on their own scale) as *Dionysia.* It does not sprawl like most forms of *P. marginata.* It, too, started life as one small plant on our broken glass and builder's rubble bankside and has since been transplanted to even more parts of the garden than the *Gentiana acaulis* and is equally happy whether in stiff clay, scree, rich loam or poor soil. When the stems lengthen they sometimes rot and break off at ground level, but the cushion usually speedily repairs itself by budding at ground level where stems are exposed to the light. The broken-off pieces, trimmed and pushed into the ground or into a rock crevice, rapidly recover, root and make a neat new plant. Such an obliging creature is not to be wasted and its lilac blossoms billow from all the shelves of our terraced slope or peep from the chinks between their stones.

Two more of our favourites which grow and propagate themselves lavishly in this garden are *Fritillaria meleagris* and *Daphne mezereum.* The *Fritillaria* has its home in the sandy soil at the base of our huge and ancient Ash tree, where the earth is dust dry in summer and very often in winter too. There it grows and increases in a way that seems to belie its alleged preference for moist meadows. The seedlings carpet the ground like blades of grass and make weeding almost impossible. It has gained a foothold in other parts of the garden: a couple have even poked up in a patch of *Calluna* 'Barnett Anley' and a small colony is sharing a patch of moist sand down by the river that a *Potentilla fruticosa* had marked for its own. The *Daphne*, with the help of

the bird population, is even more widespread. Small, flowering, two- and three-year-old shrubs just now delight us wherever we are weeding —in every part of the garden.

But not less kind to us is its cousin, *Daphne blagayana*. Beginning life here as an unrooted cutting, it has spread into a patch a yard or more in diameter and has furnished rooted layers that have formed the nucleus of other patches here and there—one establishing itself slowly in scree, one romping in fatter soil, one fighting it out with *Polygonum affine* 'Donald Lowndes' (another of our rampers) at the top of the *Rhododendron* bed, two more doing what they can with the rather sour soil where the overflow from the pond struggles down a slope of water resistant stony clay—a situation that is, perhaps, better suited to the brash gold of *Caltha palustris* 'flore pleno' and, later, the bog primulas—more of our rampers which delight us in their season.

Not least of our favourites of this prolific type is one of the hybrid autumn gentians—an Inverleith seedling 'Christine Jean'. Acquired from Colonel Stitt as a bundle of thongs in 1969, 'Christine Jean' is now all over the lower part of the garden. A more lax grower than *G. sino-ornata*, she roots at every node along her trailing flower stems. She half fills one of our raised beds at the bottom of the garden, transforming it in September and October into a pool of blue. Elsewhere, we use her as ground cover: she carpets the ground among the rhododendrons and the moist sand at the foot of the bog garden where the overflow from the pool finally peters out. She wreathes herself around the meconopses and primulas, the ferns and the de Caen anemones that seed themselves everywhere in the garden. In the shrub bed around the Ash tree she is doing her best to swamp a large *Genista pilosa* and to overflow, via the peat-block edging into the grass of the paths, thus reversing the trend of *Veronica filiformis* (an un-favourite ramper) which, having colonised the grass, is always trying to swamp the beds. Besides these outrageously healthy and vigorous creatures, we grow some 800 other species and hybrids, many of which are quiet and well behaved, staying where they are put and increasing in moderation. Many of these are favourites, too. One thing all our plants have in common. Once planted, they must look after themselves. We have neither the time nor the inclination to coddle them. We don't think it is good for the plants in any case. If they don't like life here we have three hungry compost bins. We find that most of our plants do their best, having in mind the only alternative.

Soldanella minima (Hoppe)

by J. R. JOHNSTONE

SOLDANELLAS, or Snowbells, are the daintiest members of the Primulaceae, a family of plants which has a great deal to offer the alpine enthusiast.

They can be seen growing by the thousand in the wet turf of the European Alps, watered by the thawing snows of winter, their delicate flowers nodding their heads in the lightest of breezes. Occasionally they can be seen melting their way up through the edges of snow patches.

The genus *Soldanella* is divided into two sections: *Craterifiores* which includes *Ss. alpina, carpatica, dimoniei, montana, villosa, hungarica* and *pindicola*; and *Tubiflores*, consisting of *Ss. pusilla, minima* and *austriaca.*

The main differences between these sections are that the *Craterifiores* have funnel-shaped flowers, usually several per stem; the corollas are more deeply fringed with scales in the throat, and anthers are long acuminate. The seed capsule splits open with 10 teeth round the mouth and the leaves are larger, more than 10 mm diameter. *Tubiflores* have tubular or bell-shaped flowers, usually solitary on the stem; corollas are less deeply fringed with no scales in the throat; the anthers do not have a sharp point; 5 teeth are to be found on the seed capsule and the leaves are less than 10 mm in diameter.

In the *Tubiflores*, *S. minima* differs from *S. pusilla* mainly by its thickish leaves without prominent veining, anther shape (less pointed in *S. minima*) and its paler flowers.

Closer to *S. minima* is *S. austriaca*, until recently regarded as a subspecies; this plant has fewer glandular hairs on the stalks. The leaves are thinner with stomata present on both upper and lower surfaces. The corolla is less deeply fringed. Its range is to the north and east of *S. minima*: exclusively in Austria in the limestone hills of upper and lower Austria and Steiermark.

Soleanella minima has round leathery leaves usually about 6 mm in diameter but slightly longer than broad with edges that are slightly rolled under. The veins are not prominent on the upper side and glandular pits can be seen on the underside. The young leaf and flower stalks have a covering of glandular hairs which vanish on the

petiole as the leaf ages. The flowering period is from May to July, depending on altitude. Usually one flower (occasionally two) is borne on a 40 to 90 mm stem. These flowers are very delicate, crystalline in appearance, pale lilac with violet stripes on the inside. The corolla is fringed for $\frac{1}{4}$ to $\frac{1}{3}$ its length, no scales are present in the throat. The anthers are 2mm long with rounded lobes and a bluntish tip. The seed capsule is held erect and is 8-15 mm long, splitting into 5 teeth at the tip when ripe.

S. minima grows on damp calcareous soils rich in humus, moist stony rubble and snowy ground at altitudes of 1500 to 2500 metres in the limestone mountains of Austria, Germany, Italy and Jugoslavia (the eastern south-eastern Alps and Apennines). The sub-species *samnitica* occurs in the Abruzzi Mountains.

In cultivation, *S. minima* likes a moist cool soil with humus and lime. I put them in a mixture of 2 parts leaf mould, 1 part grit, some crushed chalk and John Innes Base Fertiliser at the rate of 1 oz per bushel.

My plants are kept dryish from late autumn through to springtime, then given plenty of water during the flowering season. The plants are not allowed to dry out in the summer, during which time they are kept plunged in a frame, open to the weather but shaded from the sun. They are potted on whenever the roots grow through the holes in the pot.

After a couple of years the plant begins to degenerate and is better washed free of soil, have the rhizomes split up, and be repotted into fresh soil.

Seed will germinate readily if sown fresh. If the seed is old it is beneficial to be exposed to frosts to assist germination.

Soldanellas should be carefully examined at regular intervals for aphids which hide on the underside of leaves and on the stalks in the centre of the plant. These can cause distortion of the leaves and flowers in quite a short time if undetected. Watering with a systemic insecticide is probably the best method of eradicating aphids; this also protects the plant against woodlice, earwigs and caterpillars. These, along with the main enemy, slugs, may eat the embryonic flower buds which form in the autumn. Slug bait gives an alternative menu for the slugs through the autumn and winter and will ensure that the embryonic buds develop into those delightful little bells that silently ring in the springtime.

To the North of Kathmandu

by ANNE and VIV CHAMBERS

"There's a one-eyed yellow idol to the north of Kathmandu . . ."
J. Milton Hayes

BETWEEN Kathmandu and Nepal's northern border with China lie the districts of Gosainkund and Langtang. We were first attracted there, not by the one-eyed yellow idol, but by the proximity of Kathmandu, the relative accessibility of the area, and because visitors are less frequent there than on the well-trodden tracks around Annapurna and Everest. The flora of the Langtang has been well-documented in papers by Polunin[1] and Schilling.[2] Oleg Polunin published a comprehensive report of an expedition to the district in 1949, before Nepal opened her frontiers to the tourist. The second paper is an account of a visit in 1968 by Anthony Schilling. Though separated only by ten miles, the rainfalls of the two regions are quite different, and this we hoped to see reflected in the flora. An excellent description of the climatic and vegetative divisions of the country is given in J. D. A. Stainton's "*Forests of Nepal*", now unfortunately out of print. Briefly, much of the moisture in the monsoon winds from the south-west is dissipated as rain around Gosainkund and on the mountain ridge which forms the southern flank of the Langtang Valley. As a result, the upper Langtang has a much lower rainfall and a drier atmosphere than Gosainkund. Both Polunin and Schilling visited the Langtang in the summer months during the monsoon rains, when the Nepalese flora is at its best. Unlike Switzerland, Nepal does not have the sudden emergence of alpine flowers as the snows recede, since most plants wait for the arrival of the monsoon before blooming. By electing to go in April and May, we realised that we would see little of this summer spectacular but hoped to be compensated by a better view of the mountains, unhampered by the monsoon rainclouds. This article, then, can only try to give a glimpse of the flora in an earlier season.

For a couple of days we explored Kathmandu, that fascinating city with its lovely jacaranda trees and brilliant bougainvilleas, while our trekking permits were obtained and the dokas, the split cane baskets used for carrying, were loaded. Since food was difficult to procure on

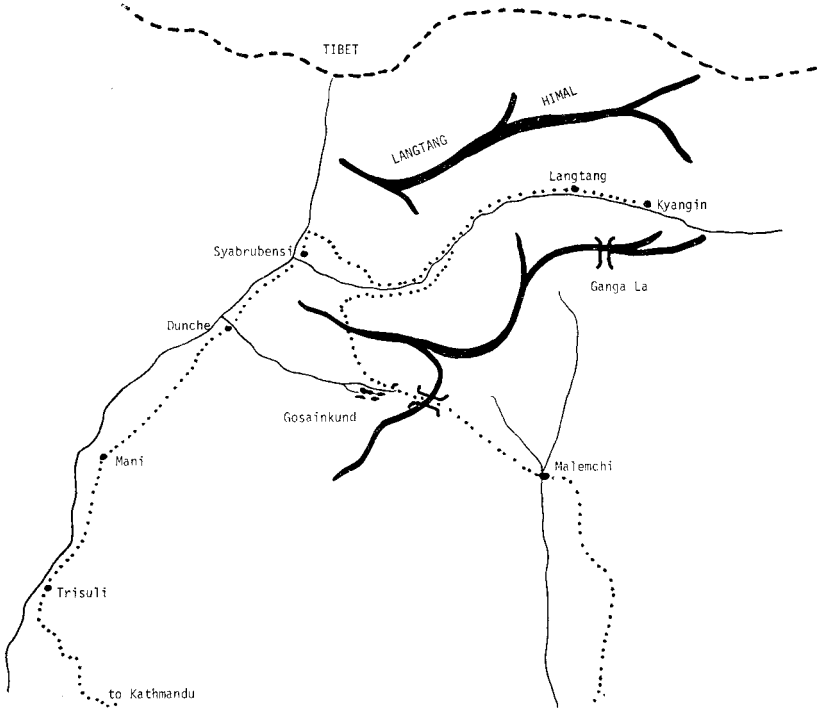

Fig. 7: Map of Langtang Valley and surrounding area

the way, we required five porters to carry it and the equipment, as well as the services of a sirdar, Ang Purbha, and a cook, Ang Dorje, making nine of us in all. The first part of the journey was by local bus over the foothills to Trisuli, where the road ends, forty-six miles from Kathmandu. From Trisuli, a track leads north up the right bank of the Trisuli river. We were to follow the river to its junction with the Langtang Khola, turn east through the Langtang Valley, then return, via the holy lakes at Gosainkund, in a wide circle to Kathmandu.

Trisuli is only two thousand feet above sea level, and we were soon suffering from the oppressive heat as our small party wound up through the evergreen sal forest past Betrawati and Mani, picturesque villages of thatched mud-walled houses, each with its few banana trees. The soil, formed from the friable, micaceous rocks, appeared deep and very fertile in most of the areas through which we travelled. There is very little level ground, even beside the fast-flowing rivers, but the hillsides are spectacularly terraced, often to a considerable height, and support two crops a year. In early May, the first crops of wheat and barley were already ripening at 8,000 feet, while at lower altitudes, in the terraces which had been planted for a second time, the rice was a foot high. Beyond Dunche, the track negotiated a steep-sided tributary and continued some way along the open hillside before losing height again and dropping to the gorge which the Trisuli had carved out. We had not been surprised on the way to see a packhorse stagger then drop with heat exhaustion in front of us. We were near to dropping ourselves, but, in the far distance, the snow-covered spire of Langtang Lirung, the highest peak in the Langtang Himal, drew us on! In the gorge, where large lizards basked in the sun and a snake slithered away into the undergrowth at our approach, the vegetation was of the moisture-conserving type, but, on the hillsides, was mixed woodland interspersed with *Rhododendron arboreum.* Wild strawberries and violets grew in abundance; these humble plants occurred throughout the trek at every altitude. In this area, the government has sponsored the planting of fruit trees to support the local population, and attempted to curb felling of the natural woodland for fuel. Notices stated, in Nepali and English, that the forests are Nepal's heritage and that it is a "heinous crime" to cut wood. The Langtang Valley itself has recently been declared a national park and at one of the checkpoints, we were given a questionnaire which asked, among other things, whether we would be willing to contribute to the cost of providing kerosene as an alternative fuel. However, kerosene was not available

so we were obliged to continue in crime. I admit to more than a little qualm when Ang Dorje, wielding the ice-axe, brought down a thick branch of *Rhododendron* wreathed in *Clematis*. At the same time I hoped we would never have occasion to rely on the strength of the ice-axe shaft!

After three days' walking, we reached Syabrubensi where a bridge crosses the Langtang Khola and, after our attempt to camp by the river had been frustrated by fleas, spent a comfortable night in a hotel run by a Tibetan refugee. Language was no barrier to a jolly evening in his company, with local music and dances, helped, no doubt, by a little chang and arak. The area at the mouth of the Langtang is prone to landslips and to avoid it we continued past the village a few miles toward the Tibetan border before turning east up a steep hillside. As we gained height, the crops gave way to natural vegetation of *Rhododendron arboreum* and pine. The pine was *Pinus wallichiana*, also known as the "Bhutan Pine", a very graceful tree with long, slender blue-green needles. Another plant we grow in our gardens was here in splendid magnificence—*Pieris formosa*. The huge specimens, often over eight feet tall, carried many panicles of creamy flowers, and the young growth, while not as brilliantly red as that of the newer hybrids, was striking enough. A delicate white-flowered *Clematis* climbed over some of the thickets of wild roses and in the undergrowth, beside brown fronds of last year's bracken, shoots of *Euphorbia wallichii* were springing up. The bracts of this *Euphorbia* are bright yellow, making a very attractive plant of about fifteen inches height. By the path, with the ubiquitous wild strawberry and violet, grew a dwarf *Aster*, mauve with an orange centre, and a tiny gentian-like flower. The latter, barely a half-inch in diameter and a pale washed-out blue colour, we were unable to identify. Clouds had come over, and as we approached the shoulder of the hill, rain came with a chilling wind—just like Scotland, but when we told the Sherpas this, they laughed and shook their heads in disbelief. We were glad to reach the hamlet of Sharpugaon, a few wooden houses clinging to the precipitous hillside. In front of one of the houses was a tiny apron of flat ground, overhanging the deep gorge many hundreds of feet below. On this the tents were erected, with the doors facing in towards the hillside to prevent sleep-walking accidents! Next morning the weather had cleared, and from our airy position the view across the gorge to the distant Gosainkund ridge was very fine. From here, the track dropped down in exposed stages to the lichen-covered forest of the valley floor, where

the thundering roar of the confined waters was never far away. The forest was the home of many epiphytic ferns and some *Arisaema* species with their curiously hooded flowers, but only in the clearings did the rhododendrons succeed in flowering well. *R. barbatum* carried glowing red trusses and *R. arboreum* subsp. *cinnamomeum* larger trusses of spotted white or pink flowers. In the sudden transition from the steep-sided gorge of the lower valley to the U-shape of the glaciated upper Langtang, the dank forest gave way to more open woodland. Ahead rose Langtang Lirung, 23,771 feet and as yet unclimbed, only a few miles away now. The hillside opposite was a patchwork of colour with the spring foliage of larches, maples and oaks. Along the valley floor were thickets of *R. campanulatum* and *R. lepidotum*, about four feet tall and with just a little colour in the buds. *Pieris formosa* was there, too, in plenty, and the *Euphorbia*. Many of the *Pieris* had been cut, almost to ground level, but always appeared capable of regenerating from the woody stumps. As we neared the outskirts of Langtang village, a little shrine had been built across one of the mountain streams so that the force of the water continuously turned a prayer wheel mounted inside. Crowns of *Meconopsis* leaves grew close to the walls.

Langtang is a substantial village of stone-walled houses and enclosures at about 12,000 feet, overlooked by the towering cliffs of the Langtang Himal, and populated by a people very Tibetan in aspect. Snow fell that night, but by morning it had gone. The atmosphere was noticeably drier here; biscuits in an opened packet remained crisp and fresh. Around the village, the multitude of blooms of *Iris kumaonensis* were entrancing. The close-cropped turf along the track was studded with these squat, orange-crested flowers in every shade from pale lilac-grey to a rich royal purple. After flowering the leaves elongate considerably, but at this time of year the whole plant was only four inches tall. The walk from Langtang to Kyangin, at the head of the valley, was very pleasant. At this altitude, 12,000 to 13,000 feet, the sun was not excessively hot and, across the wide valley floor, the going was easy. A feature of the way was the stretches of prayer walls in the middle of the track, which you are required to keep on your right, as a mark of respect. We passed villagers grazing their sheep, noisy with tinkling bells, and ploughing the stony ground in small enclosed fields with hybrid yaks. Further from habitation, low-growing scrub of dwarf juniper, *Berberis*, *Cotoneaster* and *Astragalus* flourished and, on the mounds of glacier moraine and continuing up the snow-covered

hillsides, dwarf rhododendrons grew. Only the *Astragalus* was in full bloom, its yellow pea-shaped flowers and soft grey-green pinnate foliage well-protected by an array of spines. The congested branches of *Cotoneaster microphyllus*, hugging the boulders, were covered in pink buds which later, at a lower altitude, we saw opened to white flowers. Under the dwarf shrubs many species found protection—*Meconopsis*, little rosettes of *Androsace* and *Primula denticulata*, but so dwarfed in character that we hardly recognised it. It was in full bloom, the flower being the familiar lilac colour and form, but no more than three inches high, with the leaves scaled down correspondingly.

Kyangin is set in magnificent surroundings. Behind it, Langtang Lirung, Tsangbu Ri and Dragpoche Ri rise ten thousand feet above the valley, forming an immense cwm with awe-inspiring ice-cliffs. Glaciers descend into the cwm, and from their melt-water the milky-green Langtang Khola originates. To the east, the valley is blocked by the mass of Gang Chenpo, and to the south, by the walls of the Ganga La range. We had planned to leave the valley via the Ganga La, a high pass at nearly 18,000 feet, following the route taken by Polunin in 1949. However, on the way up the Langtang, whenever we met men from the villages on their way to trade in Kathmandu, our Sherpas had questioned them about conditions on the pass. Though we could not understand the words, the gist of the conversations was clear enough. Any mention of the Ganga La was always accompanied by much negative head-shaking—it was impassable, and so it proved to be. From our camp at Kyangin, even without the aid of binoculars, it was obvious that several severe winters in succession and the cold spring we were apparently experiencing had resulted in an accumulation of snow on the pass deep enough to frustrate any attempt to reach the Gosainkund lakes by that route. To reach the lakes from the west, we had to retrace our steps almost to the mouth of the valley.

We crossed to the south bank of the Langtang Khola a few miles from its confluence with the Trisuli and made our way down through hot, steamy forest to about 5,500 feet where sub-tropical evergreens predominated, and bamboo and chrysanthemum formed the undergrowth. Here, during a short rest, we met our only leech, that species which, a few weeks later in the year, makes travellers' lives a misery. We turned it away to seek a meal elsewhere, but the encounter encouraged us to press on upwards out of that humid, breathless heat. In the late afternoon we reached the village of Shabru, a picturesque and memorable place.

Shabru is situated at 8,000 feet on the crest of a terraced ridge so narrow that its houses are built in a single line, gable to gable, extending upwards for about 300 feet. At the top of the village is the monastery which serves the people from a considerable area and, beside it, a small patch of level ground upon which we camped, to our discomfort. There had recently been a death, Ang Purbha explained, as we watched people converging from miles around on the monastery. What followed was the Buddhist equivalent of an Irish wake. All night long the chanting rose and fell, the cymbals, horns and drums continued to frighten off any evil spirits foolish enough to venture near. As we lay, sleepless, we could hear, in the other tent, the Sherpas muttering imprecations against their fellow-countrymen!

At first light we rose and set off, grumpily, up the hillside above the still carousing village, but the beauty of the scene below soon dispelled tiredness. The straggling houses of Shabru were framed between the blue-needled pines, and magnificent specimens of *Pieris* and *Rh. arboreum* grew all around. We were making for the disused monastery of Sing Gompa, at 11,500 feet, and the track climbed steadily through stands of tall conifers with a species of saprophytic orchid growing in their dense shade. As we reached the crest of the ridge, the rain, which had been threatening all morning, became a downpour. Lightning flashed and thunder rolled round the hillsides, the wind gusted and whipped sheets of water into our faces. The stretch of track between Shabru and Sing Gompa had recently been widened and improved by the Peace Corps, but unfortunately the surface had not yet consolidated, and we were soon squelching ankle-deep in the clinging mud as we struggled to keep up with the Sherpas' cracking pace. The shelter of Sing Gompa was welcome indeed, and within minutes we were steaming before a roaring fire in the middle of the floor. A few more minutes and the prospect of a hot meal was restoring equanimity! The storm did not last, and in the calm of the afternoon I walked back along the track to look again at the flowers we had passed with such unappreciative haste.

Where the conifers grew less densely, *Rh. arboreum* and *Rh. barbatum* formed the canopy. The smooth reddish-plum bark of the latter was particularly beautiful as it hung in peeling strips, catching the filtered sunlight. Under the rhododendrons grew thickets of *Daphne bholua*, with clusters of pink flowers on its leafless branches. In the open meadow surrounding the forest, the turf was studded with *Primula denticulata*, that we had seen at Langtang, but here it was a deeper

colour and, in this area of higher rainfall, did not seek the shady, damp places. The tiny pale gentian was here too, the *Androsace* as well as the wild strawberries and violets, nestling under the *Berberis* bushes. But the most spectacular and numerous plants were blue and white forms of *Anemone obtusiloba*, with its characteristic flat rosette of leaves from which radiate stems carrying the buttercup-like flowers. The forest behind Sing Gompa had suffered a recent fire, and the hillside had been colonised by an opportunist legume, bright yellow in contrast with the black of the burned tree-trunks. Beyond the monastery, *Rhododendron campanulatum* predominated, growing to a height of about six feet. As we climbed upwards on the last 3,000 feet of ascent to the lakes, the meadow flowers of the previous day were joined by yellow spikes of a *Corydalis* and the downy stems of a plant which was immediately recognisable, from its description in the paper by Polunin, as *Thermopsis barbata*. It was an unexpected bonus to find this unusual member of the *Leguminosae* so early in the year. The plant had grown only to six inches and the leaves were still close to the stem, but already the dark damson-purple flowers with their characteristic keel were emerging from the woolly inflorescence.

We halted in mid-morning, our customary lunch-time, on the edge of the snow-line. At this height, about 13,500 feet, the vegetation was dwarf *Rhododendron* scrub, well-budded and little more than a foot tall. As we looked down, the effect was reminiscent of the sea of brown heather stems on a Scottish hillside in winter. Before leaving Sing Gompa, Ang Dorje had reminded us to fill our water bottles, and impressed upon us that he would be unable to provide any lunch since water was not available en route. Any slight tinge of deprivation we felt at the time was dispelled by the memory of the real hardships described by George Forrest, and by the good breakfast we had just finished! However, mid-morning, the dokas were opened, and we were surprised when bread, cheese and a delicious smoked sausage were offered. This was not "lunch", of course, since "lunch" to Ang Dorje meant a cooked meal with three courses.

The track surmounted the shoulder of the hillside then traversed gradually downwards towards the cluster of lakes in the basin below. The porters, with the heavy dokas on their backs and only sandshoes on their feet, experienced considerable difficulty in negotiating the snow. They carried staves to help keep their balance across the awesome drops, and it was with a sense of relief that we finally reached the huts where we were to spend the night. In spite of our preoccupa-

tion, however, such plants as were showing through the snow had not gone unnoticed. In several sheltered crevices, we had seen *Meconopsis* leaves, and under a snow cornice, south-facing at about 14,500 feet, a petiolarid *Primula* was in bloom. In the centre of a crown of dark green leaves was a single perfect flower. The corolla was about an inch in diameter, the petals irregularly toothed, a pale lilac-pink shading to white around an indistinct yellow eye. This plant was quite new to us and was identified later as *P. deuteronana*, rare and difficult in cultivation.

Every July, in the monsoon rains, Hindus pilgrimage to Gosainkund to worship at the lake where the god Siva sleeps. Three well-built stone huts overlook the largest lake, and we were grateful for the protection they afforded from the intense cold. Ever resourceful, the Sherpas pitched our tent inside the hut, tying the guy ropes to the overhead beams wherever the stone and earth floor proved impervious to pegs. Our boots were the only items of clothing removed that night!

The following day, May 1st, was both the most rewarding and the most frustrating of the trek. The early morning was grey with lowering cloud and little flurries of snow across the lake. By the time we set off, the flurries had consolidated into a steady snowfall. We hurried on, huddled deep in our anoraks, along the lakeside till we were arrested in our tracks by a breathtaking sight. Round the base of a boulder where the snow had not penetrated was arranged a display of *Primula aureata*, plant crowded upon plant, the pale yellow orange-eyed flowers nestling in the meal-covered leaves. This form of *P. aureata*, found in the Gosainkund region, is the subspecies known as *fimbricata*, from its finely cut petals. It was the briefest of stops, however, since the porters were increasingly anxious, as the blizzard worsened, to get across the pass, over 15,000 feet, through the encircling mountains. Once over the pass, while the snow continued to fall steadily, the wind eased, making conditions slightly more bearable for the thinly-clad Sherpas whose only protection from the weather was a sheet of polythene covering the doka and gathered round the head and shoulders. In every gully we passed and under every overhanging rock, petiolarid primulas grew in glorious profusion, making cushions of colour in the black and white landscape. *P. aureata* and *P. petiolaris** predominated, the latter ranging in shade from pale to deep pink, the mass of flowers often totally obscuring the leaves. *P. deuteronana* was also there, though in less abundance, and never with more than a few flowers to each plant. Another *Primula*, almost submerged in the snow, we

identified as *P. strumosa*, also of the *Petiolares* group. It had upright, lanceolate leaves rolled towards the midrib, and a stem carrying ten yellow flowers, in an umbel, clear of the leaves; stem, calyces and leaves were densely farinose. Little tips of whipcord branches were all that remained visible of an expanse of *Cassiope* bushes. The mountainside, without its snow mantle, must indeed have presented a spectacular picture. Our progress in these treacherous conditions was painfully slow, and light was failing when we eventually reached, at 12,000 feet, the summer pastures of Thare Pati. With nightfall the skies cleared, and a full moon lit up the Gosainkund ridge and the snow-capped Himalayan chain stretching across the horizon. Directly to the north was Langtang Lirung, and further north still, over the border in Tibet, Gosainthan, 26,291 feet. When we had our fill of that memorable scene, we took our boots off and settled down to a second bitterly cold night.

It was an area we would have wished to explore further, but since the extensive snow covering precluded this, regretfully we had to agree to Ang Purbha's suggestion that we drop down to the village of Malemchi, nearly 4000 feet below, to have a rest day. The descent to the valley was very steep, and we slipped and slithered downwards, often showered with snow as we pushed past encroaching branches of *Rhododendron* and *Juniperus*. The air temperature was rising rapidly as we passed 10,000 feet, the snow-caps on the red trusses of *Rh. arboreum* fast retreating in the hot sun. In the moss on the forest floor grew masses of yet another petiolarid *Primula*. All the plants appeared well past flowering and seed capsules were much in evidence. However, we continued to search and were rewarded—one plant had two flower heads remaining. The flower, pink with notched petals and a well-defined cream eye, was new to us yet seemed not wholly unfamiliar. It was later identified as a pink form, found in the eastern Himalayas, of the well-known *Primula edgeworthii*. Another woodlander, growing happily in the leaf litter, was *P. geraniifolia*. It was in full flower at this time, its petals a bright reddish-pink which intensified towards the centre. Soon we were down in Malemchi, catching up on neglected personal hygiene, then doing nothing more strenuous than watch the crops grow!

The final part of our journey followed the Malemchi and Indrawati rivers. We crossed to the east bank of the Malemchi Khola, then climbed steeply to the village of Tarke Gyang. From there, it was a leisurely walk along the ridge, down through the now familiar pattern

of vegetation zones, alternately soaked by the unseasonable rainstorms and dried by the hot sun. Between 8,000 and 9,000 feet, the epiphytic orchid *Coelogyne cristata* clung to the mossy gnarled branches of the rhododendrons. Sprays of flowers overhung the path, allowing us to appreciate the waxy beauty of their white petals with prominent brown and yellow markings on the lip. Here we made a last exciting find—in the thick felted moss on a nearby boulder bloomed a single specimen of the terrestrial orchid, *Pleione hookeri*. The flower, about two inches across, was pale pink shading to white at the base of the petals, and the labellum spotted with yellow and tan. After a few more days walking through the maize patches and rice paddies bordering the Indrawati, we reached the end of the track at Panchkhal, where the bus stops on its way back to Kathmandu.

Grateful thanks are due to Dr. A. J. Richards of Newcastle University and Mr. Alfred Evans of the Royal Botanic Garden, Edinburgh, for help with plant identification.

[1]Polunin, O. Journal of the Royal Horticultural Society, Vol. LXXV, Part 8, 302-315, August 1950.

[2]Schilling, A. D. Journal of the Royal Horticultural Society, Vol. XCIV, Part 5, 222-232, May 1969.

*From the evidence available, Dr. Richards was unable to decide whether this was *P. petiolaris* or *P. gracilipes*.

Petiolarid Primulas: A Gardener's Views

by DAVID LIVINGSTONE

THE CLUB'S *Journal* No. 60 published in April 1977 contained "An Account of Primula Section Petiolares in Cultivation" by Dr. John Richards of Newcastle University. This appraisal of these beautiful primulas involved Dr. Richards in much research, including examination of extensive herbarium material, many of the clones in cultivation, and field photographs, observation on seed-set and microscopic examination of pollen fertility and chromosome number. He says that his conclusions differ in some cases from those of Smith and Fletcher in their account of this section in their monumental monograph "The Genus Primula", but he goes much further than to change the status of a few species. When he discusses the members of this section in

cultivation Dr. Richards states that hybrids now predominate among cultivated strains and that many clones exist at present with species names or with cultivar names which are garden hybrids. He supports his conclusions with persuasive argument and by the results of his scientific study, but where does this leave the mere gardener like myself with no scientific background who has only his observations and his memory to support his view as to the identity of what he grows? I have read and re-read Dr. Richards' article and I confess I am confused as to what names I should have on the seventeen kinds of Petiolarids in my alpine house. I am not alone in my confusion as other experienced growers have expressed their bewilderment too. Perhaps it is sheer conservatism, a reluctance to accept change, which causes confusion in our minds. I am in no doubt about some species which I have—*Pp. aureata*, (Fig. 5) *boothii*, *calderiana* and *edgeworthii* and its white form, nor am I in doubt about some well-known hybrids which I grow—x *scapeosa*, 'Pandora', and *griffithii* x *calderiana*. But I am all at sea when it comes, for instance, to *P. gracilipes* which label covers four different kinds. One seems very nearly to answer Dr. Richards' description of the species, while two others come close to that one but differ slightly from each other. One of these two bears the number L & S 2862. The fourth plant differs from the previous three. It has no farina on its leaves at any stage of growth and its buds and flower stems are reddish-purple. In general appearance it appears to be near to L & S 19856, of which there is a photograph in the A.G.S. Bulletin No. 82 issued in December 1950. Dr. Fletcher said of L & S 19856 that it bore a striking resemblance to *gracilipes* but that it was clearly not that species. I do not know that it was ever named. What have I? Is it a hybrid and is my plant also a hybrid? One other instance of doubt will suffice for now. A plant I have simply labelled "species" is close to *irregularis* as described by Dr. Richards, having a pink flower, dentate sepals, broad tube and very large coarse leaves, but it differs in having no farina, an orange eye and no white border to the eye. This so called species does not fit his description of the *irregularis* hybrids he mentions.

I am led to wonder whether Dr. Richards has placed too much emphasis on variations in leaves, seed-set and pollen fertility in stating that so many plants we grow as species are in fact hybrids. Is there not a possibility, no more, that some he regards as hybrids are indeed only geographical or altitudinal variants? In any event we seem to have reached the stage when growers of petiolarid primulas who wish

to add to their collection should try, if possible, to see any new prospective purchase in flower before paying over their hard-earned pennies!

Dr. Richards refers to *hookeri* (including *vernicosa*) as being no longer in cultivation and suggests that it may be ungrowable. He will be glad to know, as I am, that Mr. R. S. Masterton, Aberfeldy, and Mr. M. A. Stone, Fort Augustus, succeeded in raising plants from seed brought back from Nepal in 1975 by the late Len Beer, whose death earlier this year came as a great shock to those of us who knew him personally. Mr. Masterton has succeeded too in flowering his plants and he has raised seedlings from the seed set. Now that he has a second generation perhaps this very small species will continue in cultivation. It has small white flowers nestling among the leaves. Ludlow and Sherriff found it growing at high altitudes at the melting snow and even through the snow after the fashion of *Soldanella alpina.*

I now quote two instances where my observations differ from Dr. Richards. *P. bracteosa* and its hybrid x *scapeosa* do throw vegetative buds at the end of the flowering scape when no seed is set. Of course I agree that not all flowering scapes on these two primulas do produce vegetative buds, but this failure does not appear to be connected with seed set. An extreme example of this reproductive mechanism occurred with me this year. A small rosette of x *scapeosa* threw a scape with but a solitary flower which did not set seed. As the scape elongated to about eight inches it produced a vegetative bud which, when it had four or five leaves, was pinned down to the soil. Roots appeared in about three weeks and after a few more weeks the plantlet was severed from the scape and left to carry on as a new plant. The hybrid 'Pandora' (*scapigera* x *edgeworthii*), which more closely resembles *scapigera*, does not have farina on its foliage, not even on the young leaves, but there is a trace on the flower buds and stems. Dr. Richards recorded that Alex Duguid had managed to track down a plant of 'Pandora' which had been thought to be lost to cultivation. As soon as he had propagated it, Alex very kindly sent me a young plant and I now have three plants in five-inch pots—the largest size of pot I use for these primulas —and I have given two others to a good home. As Dr. Richards suggested, the stock appears to be infected by virus, but that does not seem to affect the vigour of its growth. A single crown has, at the moment, twenty-eight buds which are beginning to show colour. Another plant with three crowns has a total of thirty-four buds. Virus-affected stock faces the grower with a problem. Does he isolate the affected plants, burn them, or keep them in his collection and hope

that the frequent use of systemic insecticide will prevent the spread of the virus? I have opted for the latter course, but in passing on to friends plants that I know to have virus I tell them so and let them decide whether they wish to have the plants. Whether or not the insecticide is the reason, it is many years since I last saw that scourge of primulas and other plants, root aphis, and of course it also helps to keep down the population of caterpillars which can be a nuisance but not really deadly.

For a long time now there has been a friendly difference of opinion amongst growers of petiolarid primulas as to the best time to repot or replant. Some, amongst them myself, have opted to do this immediately after flowering, while others have plumped for the end of July or August. The argument in favour of this former time has been that root activity was at its height in late spring. The supporters of the later date argue that, if there is a hot, dry spell soon after late spring potting or planting, as there could be, the plants will not be well enough established to stand these conditions. This will be particularly true of plants in the open ground where control of temperature, watering and heavy shading could present a greater problem than it would with plants in pots plunged to their rims in sand in the most suitable part of the garden. Many years ago I wrote that I had renewed root activity in petiolarid primulas in August, a month when normally the temperature is beginning to drop and rainfall can be fairly substantial. I therefore recommended that a top dressing of a suitable compost should be given during that month. This year I decided to experiment a little by repotting some after flowering—my plants are all in pots—and others in August. In the end the results were about the same, but then we did not have the prolonged hot dry weather that we had in 1976 when there were losses whatever steps were taken to combat the conditions. Unexpectedly I was given a chance to make some observations on even later potting. A few kind friends gave me a goodly number of plants in late September and early October, all of which, with one exception, had been lifted from the open ground, some with little soil attached to the roots and others with a good "ball" of soil. I was amazed to see how quickly they established, noting with great interest much new root activity from the axils of the bottom leaves. Indeed, one plant which answers to nearly all the criteria for *Primula irregularis* had new roots popping up at the sides of a four-inch pot in a matter of a few weeks. Some of those late potted plants already had flower buds visible and these were not retarded by the move. Others

since potting had made buds by late November as they would have done had they been left in the ground. I have looked up the weather returns for the Edinburgh area for October and I found that sunshine and temperature were only slightly above average. This seems to suggest that, in a normal autumn, these primulas could be moved with reasonable safety up to mid-October. Perhaps as a matter of interest I should add: (1) the kinds involved were *Pp. bracteosa* (?), *gracilipes*, *irregularis* (?), *petiolaris*, *vernicosa* and *edgeworthii*; (2) all plants were afforded complete shade from the sun under the bench in my alpine house; and (3) the roof ventilators were fully open day and night. There they remained for ten days or more according to the time taken for the plants to make a visible response, that is, for young fresh leaves to appear or the old leaves to stiffen up.

The compost for petiolarid primulas should contain a high proportion of humus to hold moisture and coarse sand to provide drainage of surplus water. I have used over the years composts which have differed in some degree and I advise others to experiment to find out what produces the best results for them. At the moment the compost I use with reasonable success is: 3 parts light loam, 2 parts Fisons peat, 1 part well strawed old cow manure which I crumble down by hand (sometimes I have to use scissors to chop the straw) and 1 part coarse sand which is, I believe, crushed quartz from a quarry near Strathblane. This coarse sand I wash and then sift out the finer particles with a domestic flour sifter—my own, not one borrowed from the kitchen! I do not feed during the growing season, not that I know anything against doing so.

My plants are plunged in sand in a sheltered corner of the garden which gets a good deal of sun in summer, but it is the best I can do in a very small garden. A framework of wooden slats is placed above them and in very sunny weather an old lace curtain is thrown over the framework to afford extra shading. In sunny weather, too, a fine spray of water twice a day is beneficial. These plants at all times should not be allowed to dry out. The plants remain out of doors from May to October, when they are moved into the alpine house which has no artificial heat. I still water from the top in winter but I try to water only just inside the rim of the pot and to keep water off the leaves. A close watch should be kept for decaying leaves, especially in winter, and they should be removed immediately with a pair of forceps as soon as spotted. In doing so get right down to where the leaf joins the crown.

Plant Notes

PRIMULA SCOTICA

WHILST primulas can be planted in many places in a garden, there are only a few suited to the small rock garden. One of these, especially appropriate to members of this Club, is *Primula scotica*. The rarest of the five native species, it is endemic, being found nowhere else outside Scotland. Even within the country it is to be found in only one or two locations on the north coasts of Sutherland and Caithness and in Orkney.

The plant forms small rosettes of short spoon-shaped leaves about an inch in length, the outer ones lying flat on the ground. Covered thickly beneath with a whitish or cream powder-like farina, there is only a sprinkling on top, especially on young leaves. Most of these leaves die back in late autumn and the plant overwinters as a resting bud where the growing point is protected by tiny overlapping leaves to expose their powdery undersides. From the centre of each rosette a short stem, rarely exceeding an inch in height, arises covered with farina, like the flower buds. Flowers are deep lilac or purple and carried four or five in a terminal umbel. Flowering occurs erratically throughout the summer from late spring until early autumn.

Unlike all other British species of *Primula* this plant is, and always has been, rare in cultivation, although it is recorded as being in cultivation as early as 1797 by Miller in 'The Gardener's Dictionary'. Although growing naturally in pasture, it is not of strong constitution and can in a garden be quickly swamped by vigorous neighbours. Several plants can be used to make up a small pocket on the shady side of the rock garden in a light acid or neutral soil which does not dry out. It may be preferable to grow several plants in a pan which can be kept in a shady frame, being transferred to an alpine house when in flower. Never long-lived in cultivation, new plants are best raised annually from home collected seed which sets fairly freely. This germinates readily if sown fresh on a well-drained peaty compost and resulting seedlings should be potted singly into small pots.

This plant is only rarely offered for sale and anyone lucky enough to have it cherishes it. On no account should *Primula scotica* be collected from the wild to bring into cultivation. It is protected, so leave it for future generations to enjoy.

Kew — BRIAN HALLIWELL

RHODODENDRON NAKAHARAI

This creeping *Rhododendron,* native to Taiwan and botanically placed in the series *Azalea,* subseries *Obtusum,* was first introduced by G. Nakahara, a Japanese collector.

It has been grown in Japan for many years and has been hybridised there; no doubt some of the forms in cultivation are the result of these crosses.

The original species is a prostrate plant which increases slowly and has the outstanding merit of flowering in late June and July when few dwarf rhododendrons are in bloom. The colour of the flowers is a dark brick-red, which makes it a little difficult to place in the rock garden, and one has the feeling that if it were a more attractive shade it would be a great deal more popular than it is. The leaves are dark green, two-thirds of an inch long by one-fifth of an inch broad, elliptic or elliptic-obovate, according to the R.H.S. Rhododendron Handbook; the flowers are up to one inch long and grow in clusters of two or three.

This description fits the form which we have grown for a number of years and which is a useful ground cover, but on account of the colour it has never been given a particularly prominent position in the garden.

What appears to be a better form was introduced by the Hydon Nurseries, Godalming, and was given an Award of Merit at the R.H.S. Show in July 1970 under the name 'Mariko'. This plant seems to have all the advantages of the type species as well as flowers of a brighter salmon tint and considerably larger. The form 'Mariko' is now available in specialist nurseries in Scotland.

Our interest in this little *Rhododendron* was aroused when, in a consignment of seed from a collector in Japan, we found a packet of *R. nakaharai* seed.

This seed, sown in 1970, duly germinated and flowered during the third spring after sowing. Somewhat to our surprise the flowers, according to notes made at the time, were 'bright coral with no hint of purple' and were much larger than the flowers of the species growing nearby; the leaves, too, were larger and lighter in colour. As far as habit is concerned the plant quickly showed that it was going to demand plenty of space to spread (fig. 9).

This was followed by another large-flowered plant which had more pink in the petal; this made it a softer colour than the first, though both have their attractions. Yet another plant has hose-in-hose flowers of good size and colour.

Hardiness has yet to be tested but the impression has been gained that while the plants are tough the flowers may appreciate a little shade if they are to retain their full beauty.

These forms seem to correspond with plants being grown by Mrs. Hill in Massachusetts under the name of 'North Tisbury Hybrids', which are the result of many years experience in the use of *R. nakaharai* as a parent plant. An interesting point in her article is that a recent seed introduction direct from Taiwan, collected at 800 metres on Seven Star Mountain, has produced finer flowers than any she has yet seen. Although so far we have assumed that our plants were hybrids made in Japan, this note by Mrs. Hill raises the possibility that they are nearer the species than we have so far assumed.

REFERENCES

The Rhododendron Handbook, 1963. Part 1, p. 122
Ingram, Collingwood. 1969 R.H.S. Rhododendron Yearbook, p. 34
Jour. Roy. Hort. Soc., 1970, p. 431
Patrick, J. J. R. & Chien Chang Hsu, 1971 R.H.S. Rhododendron Yearbook, p. 25
R.H.S. Rhododendron Yearbook, 1971, A.M. Reports, p. 184
George, A. 1973, Rhododendrons, R.H.S., Publication, p. 34
Hill, Mrs. Julian W. 1974 Amer. Rhodo. Soc. Bull., Vol. 28, No. 2, p. 106

EDINBURGH I. SIMSON HALL

"Will the real Pernettya macrostigma please stand up"

M. A. and P. J. STONE

ONE OF the signs of an enthusiast's rock garden or alpine house is the neat and careful labelling of plants. Unfortunately for such tidy-minded individuals, nature does not always put her plants into the neat boxes which we call species. In the animal kingdom, there are usually sterility barriers to prevent interbreeding between separate species; in fact the word 'mule' is also used in horticulture to describe an infertile hybrid like the rose 'Nevada'. Among plant populations in the wild, similar sterility barriers to delineate species also occur. There are, however, two important areas where these restraints do not apply. The first really only concerns the gardener: the bringing together in the garden of plants from geographically separated areas. Candelabra primulas, which do not meet in their natural habitats, are

Fig. 8—*Gentiana ornata* Photo—The late L. Beer

Fig. 9—*Rhododendron nakaharai* Photo—Dr. I. Simson Hall

thoroughly immoral in our gardens. The other example of interbreeding occurs where a natural population is rapidly evolving after, say, a period of tectonic activity or the retreat of an ice sheet. In the rapid, geologically speaking, colonisation of the new environment thus presented, polymorphism and hybridism are common. Simply, there has been no time for the population to stabilise and for the genetic sterility barriers to be built up.

The two genera *Gaultheria* and *Pernettya* are quite closely related; the main difference from the gardener's point of view being the nature of the fruit. That of most ericaceous plants is a dry capsule; *Gaultheria* frequently surrounds this with a fleshy swollen calyx to encourage dispersal by fauna, while *Pernettya* has taken it a stage further and evolved a true berry, sometimes retaining the swollen calyx. It is not surprising, therefore, that examples of both classes of hybrid have occurred within these two genera. The first category is represented by the well-known x *Gaulnettya* 'Wisleyensis'. *Gaultheria shallon* from western North America and *Pernettya mucronata* from south Chile have obviously no need of a genetic barrier, having such widely separated distributions.

Natural bigeneric hybrids occur in several areas where *Gaultheria* and *Pernettya* overlap: in Mexico, Tasmania and, finally getting to the point of these notes, New Zealand. Of the three New Zealand *Pernettyas*, *Pp. alpina* and *nana* are apparently fairly distinct and stable species. We say 'apparently' because we have never seen *P. alpina* in cultivation, and have only a pan of young seedlings of *P. nana*, which do, however, closely match the illustrations we have available. Evidence for the confusion surrounding the third species, *P. macrostigma*, is given by the variety of synonyms it has had in the past: *Gaultheria antipoda microphylla*, *G. depressa microphylla* and *G. perplexa*. The last name may have arisen because of the range of habits and/or leaf shapes occurring in many wild populations. These are now thought to have arisen from crosses with the *Gaultheria* species, including the two mentioned above under whose orbits *Pernettya macrostigma* was once placed.

Many problems of nomenclature are resolved by the importation of fresh material from the wild. Unfortunately this has not been our experience in this case. From the 1974-5 S.R.G.C. seed list we raised two batches of seedlings. One, nominally *P. macrostigma*, was found to be a uniform crop of *G. depressa*! However, the second batch of seedlings under the name *Gaultheria* x *Pernettya* (collected Westland)

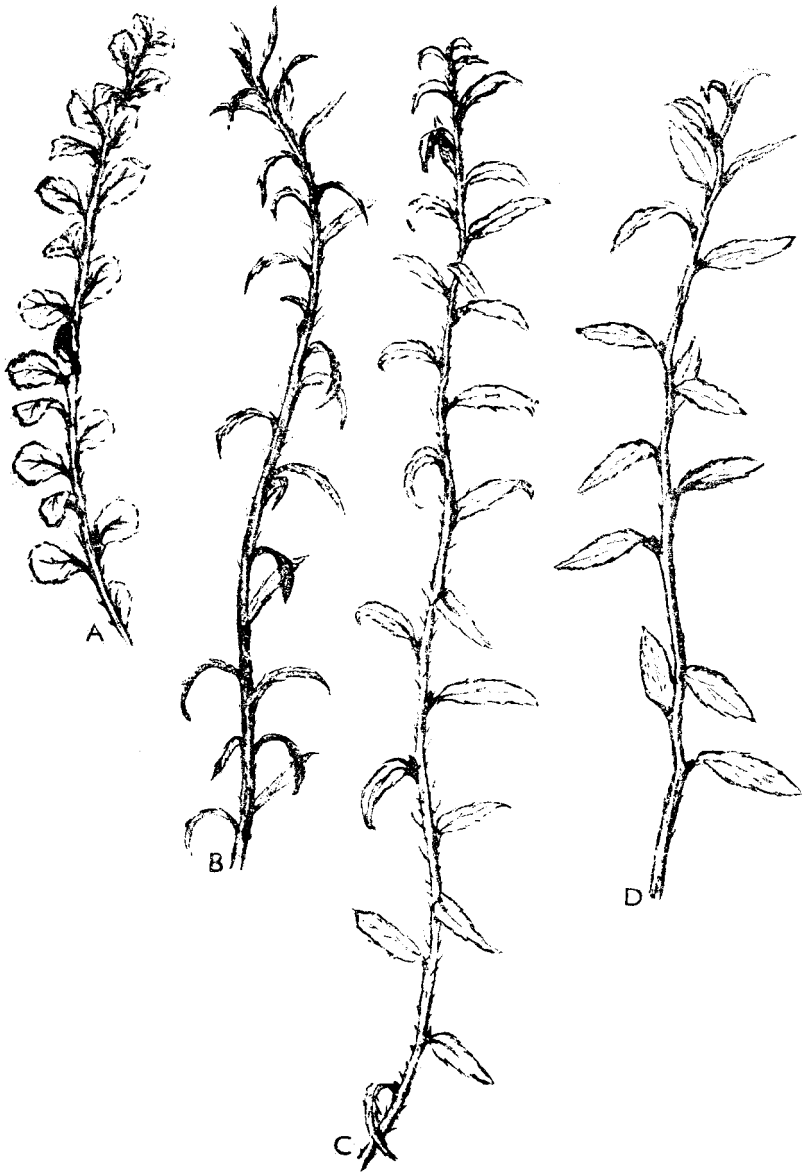

Fig. 10 (A) *Gaultheria depressa*?
(B) *Pernettya* '*macrostigma*' (from a friend)
(C) Intermediate Seedling (D) Real *Pernettya macrostigma*?

were far more interesting. Of the three dozen or so plants, all but four formed a uniform group, having prostrate interlacing wiry stems, sparsely furnished with very distinctive leaves. These are 12 mm long but only 1 to 1.5 mm wide and of a most unusual black-green colour. Of the remaining four, three have bright green almost round leaves and we have tentatively identified them as *G. depressa*. The single remaining plant appears to be an intermediate, with rather wider (3-4 mm) leaves than the majority and of a completely different reddish-bronze colour. All three variations are illustrated in the drawings together with a plant we had been given by a friend as *P. macrostigma*. This latter has rather similar red-bronze leaves to the "intermediate" but is of a rather more upright habit. According to Bean, hybrids of *P. macrostigma* and *Gaultheria* often do have a more upright habit than the true species. The more reddish tints to the foliage could also have come from a *Gaultheria*; several of our plants of *G. depressa* show this tendency. (See fig. 10.)

In an attempt to clarify the situation, we again raised *P. macrostigma* from the 1975-6 S.R.G.C. exchange. Although still too small for us to be sure, we appear to have a *Gaultheria* species yet again! In spite of the label under which they came, we feel that the prostrate black-leaved plant is the closest thing we have to real *P. macrostigma*. An F_1 hybrid with a round-leaved *Gaultheria* should surely widen the foliage, not narrow it; and the possibility that they represent an F_2 is not borne out by the uniformity of the great majority of the seedlings. Perhaps one of our New Zealand members can shed some more light on the problem.

The Editor, Dear Sir, *22nd September 1977*

CROCUS AND PASSER DOMESTICUS

Re the article, under the above heading, by Mr. Barnes, I have a theory which could account for the fact that some years sparrows attack yellow-flowered crocus and other years leave them alone. Depending on the weather crocus bloom at slightly different times of the year and I think it is when sparrows are nesting that they have an urge to get something from the crocus. What that something is I leave to the ornithologists, but if the nesting season does not coincide with the blossoming the flowers are left intact. In my garden each year a few yellow crocus appear in January and are untouched.

Yours faithfully, ANGUS C. SMALL

A Day in East Washington

by DON STEAD

THE STATE of Washington, on the west coast of the U.S.A., is divided from north to south by the Cascade Mountain. From Seattle, on a clear day, their snow-clad peaks, from the 14,000 ft. Mt. Rainier, 60 miles to the south, to the Baker Forest area in the north, seem to almost encircle the city. The climate of Washington west of the Cascades includes a rainfall not unlike that of west Scotland. The west faces of the Cascades themselves are well wooded and have a fairly lush vegetation. The east faces, however, receive a minor share of the precipitation induced by the mountains from the moist winds coming in from the Pacific and the dissected plateau ground of east Washington is even more obviously in the rain-shadow of the Cascades. Annual rainfall amounts to only about 10 ins.

One of the pre-conference tours associated with the Seattle/Vancouver Interim International Rock Garden Plant Conference was a bus trip to Mt. Baker, then over the North Cascades on Washington Pass (5477 ft.) to Winthrop in east Washington and back again through the Wenatchee Hills (part of the Cascades) and Stevens Pass to Seattle. The vegetation in an alpine meadow near Washington Pass was of the type described by Bruce Barritt (*Journal* 58, p. 5) but on the other side of the Cascades the impression was of increasing aridity.

Our overnight stay in east Washington was at Winthrop, the appearance of the main street of which must be familiar to anyone who has seen a "Western" film. Winthrop's facade has been kept almost entirely as it was in the pioneering days, all of 80 years ago! The out of town motel was fortunately not of this genre. The late afternoon sun was blisteringly hot and the existence of air-conditioning in the rooms a great relief. Despite having been caught for speeding on the way, we were just in time to change for a barbecue dinner in Winthrop.

An evening run up a nearby hill, Sky Mountain, gave a chance to see something of the local plants. The general impression—third week in July—was that the vegetation was largely dying down for the year. Masses of dead foliage of *Balsamorrhyza sagittata*, a large-leaved yellow composite, contributed particularly to this impression. A closer look showed that there were still in flower several species of eriogonums,

the leathery-leaved "Buckwheats" which seem so well adapted to life under dry conditions. We had no *Eriogonum* expert with us and can only report that *Eriogonum umbellatum*, probably *E. compositum* and two other species were present. By the roadside *Tragopogon porrifolius* was in seed, magnificent dandelion-like clocks, and we met for the first time *Artemisia tridentata*, the ubiquitous Sagebrush of the dry lands of the U.S.A. A small *Erigeron*, *E. compositus* ?, michaelmas daisy size, had blue flowers on 10 in. stems but not much left by way of leaves. Real joy was provided by a few plants of *Calochortus macrocarpus*, holding their beautiful pale lilac flowers erect on 8 in. stems, a delightful contrast with the surrounding rather scorched vegetation.

Opposite the motel next morning, *Clematis ligusticifolia* was found scrambling up a roadside bush, starry white flowers in profusion.

A rear tyre blowout about 10 a.m. gave an opportunity to see an Eastern Kingbird in a roadside tree and to speculate about raptors circling above the distant hillside. We went slowly along the Methow River valley to Pateros in search of a new tyre. This was a fruit growing valley and in this somewhat elevated clear sky area, aero propellors were used in orchards to keep air moving against frost dangers. A tyre change was finally obtained at Brewster and we then left the Columbia River valley and climbed up over 50 miles of plateau en route for Grand Coulée Dam, at another bend in the river. The land became very brown and arid, with an extremely sparse dwarf vegetation.

Grand Coulée Dam, one of Roosevelt's 'New Deal' projects, was impressive even without the stream of statistics from our driver. It impounds the Columbia River, which runs from far over the Canadian border and makes the Franklin D. Roosevelt Lake about 100 miles long. A vast amount of the impounded water is used to transform otherwise near-desert parts of east Washington into very productive cereal and fruit growing areas.

The heat was really fierce. The roadside bank near the dam looked like pure sand. It was loose enough to plunge one's hand 4-5 ins. down, revealing a temperature of 45-50° C. at the lowest point. In this unpromising environment there was *Oenothera pallida*, about 2 ft. high, some grass, *Medicago sativa* (Alfalfa) and a *Melilotus* all managing to survive. One wondered how long the roots must be to reach moisture in such a situation and conditions.

The route from Grand Coulée ran past Banks Lake, with the eroded basaltic plateau of Thimble Rock behind. In the sparse vegetation beside the roadside slope away from the lake there were a few new

plants. *Monardella odoratissima*, a member of the Mint family, is reputed to be used for making "tea". Having once tasted tea in Seattle, this did not stretch credulity very far. A starry, almost white flower was identified for us as *Lygodesmia juncea*, a most unlikely looking member of the Compositae, there was another *Eriogonum* and the first *Penstemon* we had seen in east Washington, *Penstemon richardsonii*. Banks Lake looked as though it would be as sterile as much of the surrounding country, but quite large fish were clearly visible.

The volcanic country continued to Dry Falls, where a deep river bed, empty for the last million or so years, wound through a basaltic plateau. There were one or two trees here and in one a Western Kingbird provided a new species. There were dire warnings that this was rattlesnake country, but though some of us searched eagerly we failed to find one. We did find Sagebrush, an *Eriogonum* which *could* be identified, *E. thymeoides*, an *Allium* in seed, but we were too late to find *Lewisia rediviva*, of which this is one of the native haunts. *Talinum spinosum* was there, but we did not see *T. okanoganense*, though we were not far outside Okanogan County from which it derives its name.

In this dry, mainly flat, country it was quite common to see "Dust Devils", vertical whirlpools of soil rising high into the sky, but then we entered an elevated plateau of loess-type soil, transformed by irrigation into a very productive cereal-growing area. As we came down to the river again near Wenatchee we entered a fruit growing district and one of our driver's happiest thoughts was to pull up at a wayside orchard store. We sat below the apple trees, careless of the whirling irrigation sprays, and gorged on peaches, apricots and cherries.

Wenatchee is in the eastern foothills of the Cascades Range and we were on our way to Stevens Pass, leading us back over to Seattle. Our last plant hunting was in a steep gorge in the Wenatchee Forest Park, where we pulled in at a small clearing in the conifer forest and scrambled up the really steep hillside in search of *Lewisia tweedii*. There it was, on a steep scree slope, tucked in on the downhill side of a rock, root presumably underneath. Not in flower, of course, but a few seeds were collectable. *Erythronium montanum*, just in flower on the west side of the Cascades, was in seed here, as was *Fritillaria pudica*. A few flowers remained of a bluish *Allium acuminatum* (?), *Eriogonum umbellatum* flourished and was indeed one of the most common plants. There were many dwarf *Heuchera spp.*, *H. glabella* and *H. ovalifolia* (?) and two ferns of the *Pellaea* genus, attractive in form but with their short fronds almost embrittled at this time.

Alas, we went up this seed-rich hillside without seed packets. Back at Haggett Hall in Seattle, we had to pay for this oversight with some hours of patient sorting out of the interesting mixture our trouser pockets yielded. We now live in hope . . .

Crete and Rhodes

by J. R. JOHNSTONE

PART I—CRETE

ON 27 MAY 1976 my wife and I stepped down from the 'plane at Heraklion Airport on the island of Crete for the start of a two centre holiday, staying one week at Aghios Nikolaos in eastern Crete and one week at Faliraki on the island of Rhodes. The smell of the herbs of Crete greeted us as we walked over the tarmac to the terminal building. Before entering we had a look at our first plant, *Carpobrotus edulis*, the Hottentot Fig. This member of the Mesembryanthemum family has been introduced from South Africa and is a common sight in parks, public areas and hotel gardens where it is used as a ground cover, its thick succulent leaves rooting from the nodes as it grows. The flowers are pale lilac, yellow or orange and open out fully in sunshine. The fruit is fleshy and edible.

Aghios Nikolaos, a small harbour town of 5000 inhabitants, lies on the west side of the Gulf of Mirabello (and was the location for the BBC series "The Lotus Eaters"). Lake Voulismeni, the inner harbour, is 60 metres in diameter and is said to be bottomless. Despite this reputation, however, local sceptics claim that the water becomes quite solid 64 metres down! Legend also has it that there is an underwater passageway connecting it to the island of Santorini or Thera 160 kilometres to the north.

The sea at Aghios Nikolaos is quite clear and from the sea front path which runs to the north of the town, the marine life can easily be seen. Countless numbers of sea urchins crowd the rocks and leave

scarcely any space for a swimmer to stand; for this reason sea bathers are advised to bathe from beaches to avoid involuntary acupuncture.

Three kilometres north of the town is the Hotel Mirabello, standing at the landward side of a rocky headland. This headland was the object of our first field excursion. On the seaward side, the cliffs rose at a steep angle to a height of some 30 metres and sloped gradually down to a small sandy bay on the landward side. On the cliffs, splashes of colour were identified as *Campanula rupestris*, a short-lived perennial, growing in tight crevices in the rocks. The silky grey leaves grew out from a central rootstock and were pressed flat against the rock, giving the plant the appearance of a starfish. The large blue upturned bells of the flowers are ranged individually on short stalks along the stems which radiate from the basal rosette. On the top of the cliffs we noticed a number of leaves of bulbous plants. Besides the ubiquitous *Urginea maritima* and *Asphodelus microcarpus*, both plants of waste areas, there grew a *Muscari*, an *Ornithogalum*, *Scilla autumnalis*, and a tiny bulb with the typical projecting foot of a *Colchicum*. This was *Colchicum cupanii*, a tiny species flowering in October with 2 cm long rose-like flowers with pointed petals; the two or three leaves are small and grass-like, only 2-6 cm broad.

Close to the colchicums we found the Cretan form of *Crocus laevigatus*, sometimes known as *C. cretensis*. This has creamy white flowers with a yellow throat, orange stigmas and cream anthers. The three outer petals are each feathered with three purple stripes.

To the east of Aghios Nikolaos, a large rock projected from a hillside and lured me to walk the 5 kilometres to see what plant life it might offer. I walked in a straight line to the rock from the hotel, which meant battling and tearing my way through the Phrygana, the Greek term for the scrubland which consists of spiny horrors such as *Calycotome villosa*, *Coridothymus capitatus*, *Euphorbia acanthothamnos*, *Berberis cretica* and herbs, predominantly *Phlomis fruticosa*, the Jerusalem Sage. I eventually arrived at the rock, torn, bleeding, hot and dusty, only to discover upon looking down from this vantage point that the main road from Aghios Nikolaos to Heraklion ran right at its base!

There was little of interest at the rock apart from the smell of rotting flesh which upon investigation turned out to be *Dracunculus vulgaris*. This plant generally grows in shady places in uncultivated and waste areas. The flower spathe can be up to 35 cm long on a 65 cm stem and is a deep chocolate-purple. These plants were the Cretan form with

well marked leaves and attractive purple blotched stem. After pollination by flies, the spathe dies off and leaves a cluster of berries typical of an arum.

At the base of the rock, a scrubby ravine marked the course of a dried-up stream. The sides of the ravine were covered with shrubs such as Kermes Oak (*Quercus coccifera*), *Berberis cretica*, *Crataegus* and Judas Tree (*Cercis siliquastrum*) with some Carob trees (*Ceratonia siliqua*). Exploration of the ravine revealed the leaves of *Cyclamen creticum* beneath an overhanging stone. Further up, more were discovered growing under shrubs and boulders. They grew about 10 to 15 cm deep in a leafy, stony, silty soil and always in very deep shade where the soil was slightly moist. At this time of the year the leaves were starting to turn yellow and the seed pods had not quite matured.

Cyclamen creticum was for a while regarded as a white form of *C. repandum* until it was discovered to have 22 chromosomes as against *C. repandum*'s 20. The graceful flowers are white with a delicate fragrance, the leaves are a dark greyish-green with a lighter zone in the centre, sometimes with a silvery-grey splashing. The undersides are generally crimson. *C. creticum* is an endemic plant and is one of Crete's 131 endemics out of a total of about 1500 species which grow on the island. I returned to Aghios Nikolaos via the road and found it much easier than the 'overland' route, although less interesting botanically.

Kritsa, the largest village on Crete, clings to the side of a hill at an altitude of about 600 metres, 12 kilometres south-west of Aghios Nikolaos. It is easily reached by bus from Aghios Nikolaos. The village is a maze of narrow lanes enclosed by whitewashed houses, a vine or a *Bougainvillea* the only colour against the white background. It is popular for such handicrafts as knitted and crochet work, dresses and leather goods and has several interesting Byzantine chapels. This is an olive growing area and some of Crete's 13 million olive trees are to be found here, the groves underplanted with cereals.

Climbing up out of the village, we came to the base of a sheer cliff, draped with another plant endemic to Crete, *Ebenus cretica*. This plant is usually to be found on inland cliffs and rocky places where the plant can hang in festoons to show off its large long pink clover-like flowers.

As we followed the base of the cliff we found little of interest apart from pink-flowered *Rosularia serrata* which grew on bare rocks, fully exposed to sun. The small rosettes are grey-green with serrated

leaf-margins and give the appearance of tiny echeverias, commonly seen in park bedding schemes.

The cliff ended above a gorge, the sides of which were steep but terraced, each terrace a few metres wide, growing a small number of olive trees underplanted with oats. Each level had a drop of 1 to 1½ metres to the next terrace, making a descent into the gorge fairly difficult.

While having a 'breather' half way down, we discovered a *Cyclamen creticum* with ripe seed between two boulders. Cyclamen were also present in the bottom of the gorge. Nearer to Kritsa, the gorge widens out and leads into a rolling landscape. We followed a track which runs 5 hot and dusty kilometres to Lato, a ruined settlement dating from 7th Century B.C. which is built on the sides of two hills, from the summit of which Aghios Nikolaos can be seen in the distance. Dried leaves and seed pods poked out from under almost every stone, marking the presence of *Hermodactylus tuberosus*, a member of the iris family, which from March to April has fragrant yellowish-green flowers with purple reflexed petals on 20 cm stems.

On top of the hill we found *Ebenus cretica* in a more accessible position, an abundance of *Scilla autumnalis*, *Ornithogalum*, *Muscari commutatum*, *Allium subhirsutum* and *Gynandriris sisyrinchium*. Among the ruins, seedheads of various orchid species were plentiful.

On the way back to Kritsa an attractive *Ornithogalum* was found, only 15 cm high. The flowers had a very broad central green stripe down each petal and the flower had a silvery sheen.

As we drew nearer to the village we heard the sound of a drum and once we were in the streets we were puzzled to see everyone eating portions of bread and cheese. Apparently a funeral had passed through the village and the relations of the deceased had handed out the food to all the passers by.

A coach journey to the Cave of Zeus on Mount Dikte took us up into the Lassithi Mountains, passing across the Lassithi Plain on the way. This plain is the bed of a dried up lake from 8 to 10 kilometres long and from 4 to 7 kilometres wide standing at an altitude of 1000 metres. It is an extensive apple, cherry and potato growing area and irrigation is provided by the legendary 10,000 windmills which dot the plain. *Gladiolus sergetum*, with rosy-purple flowers growing from 40 to 80 cm high, was a common flower in the fields.

We were given an hour to spend at the Cave of Zeus, but on this occasion we chose to botanise (we hope Zeus will forgive us) and set

off walking, much to the chagrin of the men hiring donkeys for the climb up to the cave. After a short but steep ascent we came upon *Cyclamen creticum*, its white scented flowers still in bloom at this altitude. These plants were not growing in such deep shade as we had found at other places on the island. Sharing the same habitat was an *Anemone*, later found to be *A. heldreichii*, with a rather washy pink-coloured flower blooming in March.

Interesting plants found nearby included a species of *Daphne*, probably *D. oleoides*, *Trifolium uniflorum*, which covered fairly large areas in the manner that *Thymus serpyllum* does in this country, its cream flowers only 1 or 2 cm above the ground. A last flower of the pyramid orchid, *Anacamptis pyramidalis*, showed its pale blue flowers and one or two *Dracunculus vulgaris* added their 'perfume' to the herb-scented air. An endemic plant named after the mountain we stood on is the Cretan Dittany, *Origanum dictamnus*. We were disappointed not to find it in the wild, as there was plenty of it dried and packeted in the herb shops of Aghios Nikolaos. This is used as a herb tea and as flavouring for foods. It is also "of special comfort to women in childbirth" and Gerard's Herbal states "Its juice taken with wine is a remedy against serpent stings and its very smell drives away venomous beasts and doth astonish them". It is a beautiful plant, the rounded downy leaves are silver-grey and aromatic. In August, red-tinged hop-like bracts develop and from these grow the pink flowers in September. It is a vigorous grower and cuttings generally put on good root growth in a short time. It is a most worthwhile plant for the alpine house.

Another coach tour to the famous ruins of central and eastern Crete took us to Gortys, Phaestos, Aghia Triada and Mallia, passing through vineyards in which grew the grapes for one of Crete's main products—raisins.

Gortys was the capital of the Roman province of Crete and Cyrenaica and dates from the 8th to the 7th century B.C., although many of the buildings date from the 2nd century A.D. Of special interest is the Roman law code dating from 500 B.C., which is neatly carved in the Dorian dialect upon the wall of a curved stone portico. Behind the ruins a crystal clear stream irrigates the surrounding olive groves.

The Minoan Palace of Phaestos, second in size to the better known Knossos, is set in a very attractive situation on a hill, overlooking the plain of Messara to Mount Ida in the north. Although a Neolithic settlement and signs of continuous habitation have been found

on the site, the palace was first built about 1900 B.C. and has been rebuilt three times since.

By the path to the palace we found *Capparis spinosus*, a thorny straggly shrub growing to 1½ metres bearing white flowers with long conspicuous stamens. The pickled flower buds of the plant (capers) are used in sauces. While waiting for the passengers to return to the coach I was determined to use every spare minute and I had a look at a grassy bank above the car park and discovered dozens of seed heads of *Gynandriris sisyrinchium*. This is a small plant 25 cm high which is very close to an iris. The flowers are blue with white centres, growing from papery bracts and only open in the afternoons for a couple of hours, after which they die, to be replaced by a succession of up to 3 or 4 blooms per bulb. Although very briefly in flower, a visit at the appropriate time between February and April to a natural slope full of these flowers would be quite spectacular. The corm is similar to that of a reticulate Iris. The seed pod is covered bythe papery bracts which, when removed, leave a translucent pod through which the seeds are visible.

From Phaestos we continued our travels along a road bordered on one side by more *Ebenus cretica* in flower. In a short time we reached the Minoan Summer Palace of Aghia Triada. This palace is situated among orange and pomegranate groves overlooking the Plain of Messara and the sea. The only plants in the ruins were more *Gynandriris*, *Orchis* seedheads and a shrubby but spiny *Hypericum*. Our coach then proceeded to the south coast of Crete, to the beach at Matala, where we had two hours to spend for lunch and swimming.

Matala is well known for its caves which have been hewn out of the sandstone cliffs at the north end of the bay. These caves were first used as tombs by early Christians and were also used as military store-rooms by the Germans during the last war. Since the mid 1960s, however, they have been taken over by 'Hippies' (mainly of Dutch and French nationality) who are still to be found there despite occasional clearing out by the Tourist Police.

The return journey to Aghios Nikolaos brought us via Mallia on the north coast where we made a brief stop to visit another Minoan Palace. Plants found on this site included *Acanthus spinosissimus*, an impressive thistle-like plant, and an *Arum*, probably *Arum italicum*, growing beneath the few trees on the site.

A few days later we had to pack our cases and leave Crete to spend our second week of holiday on Rhodes.

Lilies and Nomocharis

by JOHN and CHRISTINE GOSDEN

BEFORE embarking on the meat of this article, we must emphasise that it would be impossible to cover the whole range of lilies in an article, or even a series of them, in this *Journal.* There are already two excellent books on the subject: first, "Lilies of the World", by H. B. D. Woodcock and W. T. Stearn (1950); long out of print and now, unfortunately, very rare, but still the most complete work, although there have been a few changes in taxonomy. It is lavishly illustrated with black and white photographs and line drawings, and includes not only *Lilium* but *Notholirion, Cardiocrinum* and *Nomocharis.* The second book we would recommend is "Lilies" by Carl Feldmaier (1970), which is a translation from the German, and deals extensively with hybrids as well as the majority of species.

In this article we intend to restrict ourselves to two groups of lilies, those from North America and those from the Himalayas and the Far East; because of the similarity between the habits and cultural requirements of many of the eastern lilies and *Nomocharis* it did not seem sensible to exclude the latter genus, but in both genera we shall limit ourselves to those species of which we have had experience, which we feel are within the scope of any keen gardener. In any case, writing about species strange to us would simply be copying from one of our recommended reference books! There are, of course, many species of lily native to Europe and North Asia, but although a great number of these are garden-worthy, our favourites are nearly all found in the groups mentioned above. (Perhaps we may write about *L. ciliatum, L. szovitsianum* and *L. monadelphum* on some future occasion, if we have not by then succeeded in boring our readers with the subject).

Lilies, then, are familiar plants to most gardeners, but how many would claim to be successful in growing them? We would guess that most of our readers have tried at least *L. candidum* "Madonna Lily", *L. tigrinum* "Tiger Lily" and *L. regale*, but how many have succeeded in establishing any others so that they make a permanent contribution to the garden? Yet, given the right start and the right conditions, very many lilies are surprisingly easy to grow. They multiply readily, and there can be few gardens which cannot supply the right conditions

for one or two groups at least. And when they are established they provide some of the most beautiful and spectacular sights ("accents", we believe, is the correct term designers and landscape artists use) for any garden, and a judicious selection will give flowers from June till frost.

Why is it, then, that they have a reputation for difficulty? Well, let us have a look at them: lilies are bulbs! True, but have a closer look: that loose collection of fleshy scales, tending to fall apart from a yellowish and possibly mouldy centre that one often sees at the seedsman or garden centre is not much like the "ordinary" bulbs—*Tulipa, Narcissus* (and daffodil) and *Iris.* Those are firm, hard, protected by a tough outer sheath, and that is the first clue to the difference between them and lilies. The others are mostly from western Asia and the countries round the Mediterranean, where a short growing season is followed by a hot dry summer when the plant becomes dormant; indeed, many of them will not flower without that summer baking. Most lilies, however, come from the moist meadows and woodlands of China, Japan, the Himalayas and North America (particularly the Pacific Coast of the United States). They *never* completely dry out, and they are *never* completely dormant; even in winter there is some root activity. So when you buy a lily bulb (much more expensive than a daffodil or tulip) which is packed in a few wood shavings in a plastic bag, with its roots shrivelled up or broken off, is it surprising that, though it may struggle to flower for one season, it then gives up and is never seen again? This is because, although the bulb contains all the elements of a flowering stem within itself, it is, in most species, an annual! That is, the bulb that flowers this year, dies this year, and only vigorously growing plants produce new bulbs to flower the following season.

Mr. Jan de Graaff, founder of the Oregon Bulb Farms, has probably done more than anyone else to develop hybrid lilies which succeed in almost any garden, yet his efforts are largely wasted because of the way the bulbs are sold. If a nurseryman were to raise his own stock of lilies, and sell them as growing plants in containers, instead of dry bulbs, it would be good for the reputation of the lily, and probably for his business. As it is there are, in our opinion, only two ways to succeed with lilies. Firstly, cultivate a friend who already grows them well. Some time between the death of the flower stem and, say, February, persuade your friend to lift a bulb or two—with the root ball intact—and hand the whole lump over to you. If it is a species

which multiplies by division, like many of the American species, you may have to allow the grateful donor to split the clump and retain some for himself, but in this case you must ensure that he is most careful not to damage the roots, and you must be equally careful when replanting them. The second method is to raise your own lilies. There are at least three ways of doing this—from seed, bulbils or bulb scales—but since the second and third depend on access to bulbs or growing plants, we will concentrate on the first. Raising lilies from seed has several advantages: you can get a lot of plants, in a wide variety; you can save money—far more lily seeds are available through the various seed exchanges than ever appear in any modern seedsman's catalogue, and, of course, you will have surplus seedlings to exchange. However, this approach does require a large measure of those two major attributes of the successful gardener—faith and patience.

Patience, because even the fastest lily will not flower until the second year after planting, and the majority not for three, four or even five or six years. Faith, because lilies germinate in two ways, and one group shows nothing above the soil until the year after germination. This is called hypogeal germination (hypogeal—below the earth, in contrast to epigeal—above the earth, like most plants). In the first growing season lilies with hypogeal germination use the reserves stored in the seed to form a tiny bulblet and small root. This is static during the winter, and it is not until the next growing season that the first leaf is produced. Lilies with epigeal germination produce a leaf in their first growing season, so with them it is easier to see what is happening.

There are several ways of treating the seed, but we find that two will suffice for most species. For species with epigeal germination, sow the seed about February in a John Innes compost (lime-free for most species), 15 or 20 seeds to a 7 in. pot. Plunge the pot in a lightly shaded part of the garden, dose with slug poison when necessary, water if the summer is very dry, and otherwise try to forget it. If the seed is fresh, germination will take place in spring: thin grass-like cotyledons, often with the seed husk attached, will unfold like green hairpins from the soil, followed by the first true leaves. Leave the pot alone for at least a year, two or three if the seedlings are not crowded, and plant the contents with as little disturbance as possible in their final position in the late autumn. Small species can stay in the pot until flowering, though a dose of fertiliser will be welcomed. Most of the trumpet lilies, and some of the Japanese and Asiatic ones, behave like this.

Unfortunately, most of the American lilies, and many of the choicer Oriental ones, have hypogeal germination. These can be treated as described above, but you very often save a year by the following method: moisten some horticultural vermiculite and mix the seed with it—as long as the seed is not absolutely touching it can be quite thick. Put the whole lot in a sealed, airtight container (a jam-jar or plastic bag is fine) in a warm place like the airing cupboard. Leave until the radicals—the new rootlets—and the new bulblets are clearly formed —somewhere between one and three months. Tip the contents out onto card or foil, carefully separate the little bulbs and pot them in lime-free John Innes, being very careful not to damage the roots. Put the pots outside where they can be frozen, and the first true leaves will appear that summer. If you can start the treatment as soon as you have the seed—say no later than the end of October—the seedlings should be ready to pot by the end of December, and the first leaves appear in May. Thereafter treat as the first group.

At the end of the article we have a list of the species discussed, showing the type of germination they possess, but in general most Chinese and Himalayan species and all *Nomocharis* have epigeal germination while most North American and some Japanese species have hypogeal germination. One North American species, *L. parryi*, has hypogeal germination, but it does not need the low temperature treatment after bulb formation, and produces the first leaf after a short rest.

Before going on to talk about individual lilies and their particular requirements, there are some factors that all lilies have in common. First of all, whether they need shade or sun, moist soil or dry, they all need good drainage; even the so-called "bog lilies" of western North America will not tolerate poor drainage in our climate. Secondly, lily bulbs (except *L. candidum* and perhaps one or two others) need deep planting—at least two or three times the height of the bulb below soil level—that is, a bulb 2 ins. high should be planted at least 4 ins. deep. Some lilies are stem rooting; they produce roots from the stem above the bulb as well as those from the base of the bulb, and for these deep planting is absolutely essential, but, with the exception mentioned above, we know of no lily which does not benefit from deep planting—provided drainage is good enough. The warning about drainage will be repeated in the pages that follow, but we trust that familiarity will only breed success with lilies.

American Lilies

Most of the American species amenable to cultivation in this country are rather similar in their requirements. There is a group of species which all have many-flowered stems with nodding "Turk's Cap" flowers (like larger versions of our native Martagon lily) on long pedicels. The flowers are in shades of red, yellow or orange and are more or less spotted inside. The plants are tall (between 4 and 7 feet) but sturdy, only needing support in the most exposed places. They need moist, lime-free soil which, despite the requirement for retaining moisture, must be very well-drained. We find most of them do very well growing among and through the smaller rhododendrons and azaleas, though other shrubs would be equally suitable provided they were not too dense. Lilies need the soil over their bulbs shaded, but do not tolerate smothering—heathers, for instance, make too thick a cover. Neither will lilies stand too much shade, unless it is very high; feet in the shade, head in the sun should be the standard.

The species in this group include the Sunset Lily, *L. harrisianum* (syn. *L. pardalinum* var. *giganteum*) from northern California. This is one of the most magnificent American lilies, with many flowers, each 4 ins. across on a 5-6 ft. stem clothed with whorls of rich green leaves. The flowers are carmine red at the tips, shading to chrome yellow midway, and then to green at the centre. It is a vigorous plant, making large clumps when established, and multiplying by a sort of short rhizome which produces new bulbs at its ends, like most of this group. *L. pardalinum*, also from California, where it is called the Panther Lily, is very similar, but rather smaller in all its parts. *L. humboldtii* and *L. ocellatum* have orange flowers, spotted brown, and the former is rather intolerant of winter wet, making *L. ocellatum* more suitable for British gardens. These are also Californians, but the last of this group, *L. superbum*, is more of an Easterner. It is widespread from Massachusetts to Indiana to Alabama to Florida, but its red-tipped orange flowers (pure red and pure yellow forms are also known) on 4 to 7 ft. stems are very similar to the others, and it likes similar treatment. All these species flower in July or August, and they are most promiscuous: if open pollinated seed is offered, other than that collected from pure wild stands, the pollen parent could be any of the related species growing nearby. *It doesn't matter*! Grow it anyway, and if you cannot put a precise name to the progeny, will they be any the less beautiful? Call them Bloggs' American Hybrids if you must have a name! There are several named hybrids, but these are subject to the

caveat already given about bought bulbs. One of the best, if you can get good bulbs, is 'Afterglow'.

Moving on from the orange-red "Turk's Cap" lilies we come to *L. kelloggii*, a real charmer, only three feet tall with pale pink, nodding, scented "Turk's Cap" flowers which darken and become speckled as they age. There is a clear lemon yellow stripe on each tepal (flowers which have indistinguishable, coloured sepals and petals have the problem solved by calling them all tepals). *L. kelloggii* has up to 30 flowers in July, and needs very sharp drainage and the same ground shade as the previous group. It is native to California and Oregon.

After the Turk's caps we have a group which includes some of the most graceful lilies. The best known is *L. canadense* from eastern North America. This species has pendant, bell-shaped flowers, flared out at the tips, so that they look something like a large fuchsia, if you can imagine a fuchsia with a six-pointed skirt. They are about 2½ ins. across and are carried, up to 15 at a time, in a very delicate open spire on a stem up to 5 ft. tall in July. The colour can vary from bright yellow to orange to pale red, and the inside may be plain or spotted reddish-purple. It and the next species need damp, acid, well-drained soil, and again grow well with their roots shaded by small shrubs, though they also appreciate some high overhead shade. *L. grayi* is similar in habit, but the flowers do not open so wide, and are usually deep red-orange outside and orange spotted with purple inside. It grows up to 3 ft. tall and comes from the Alleghany mountains, but it is unfortunately less vigorous than *L. canadense*. *L. parryi* is one of the most beautiful American lilies, but it is definitely not easy. It comes from southern California and grows up to 4 ft. high. There are usually a dozen or so flowers produced in July, but there may be as many as 50. They are scented, pale yellow, funnel-shaped and held horizontally. The inside is spotted brown and the tip of each tepal is flared open. It must have very free drainage, and is best suited by a gritty soil on a slope, with ground shade. It needs plenty of water in summer, but must be protected from excess winter wet.

The last two American species we are going to mention are *L. rubescens* and *L. washingtonianum*. The former is rather like a smaller version of the latter; both are beautiful, with deliciously fragrant, trumpet-shaped flowers which open pale lilac or white and turn purple as they age. The flowers of *L. rubescens* are held nearly erect and are strongly reflexed at the tips. *L. washingtonianum* has horizontal flowers, and is less hardy than *L. rubescens*, but its variety *purpurascens* is

perfectly hardy with us, and often has deep red flowers on opening, though they too turn purple later. *L. rubescens* comes from California, while *L. washingtonianum* extends further north through Oregon. Both can grow 3-5 ft. tall and need damp loam with very sharp drainage. They flower in June-July and are well worth raising from seed.

Oriental and Himalayan Lilies

The lilies from eastern Asia are far more heterogeneous than the American species discussed above. They range from small species only a foot or so tall and eminently suitable for the rock garden or peat garden, to veritable giants of seven or eight feet or more. The flowers may be small or large, brightly or delicately coloured, "Turk's Cap," trumpets or bells, or the enormous richly scented soup plates of *L. auratum.* In an attempt to impose some sort of gardener's order on our arbitrary choice of species, we propose to discuss them in groups which bear some relationship to each other in size, flower type, cultural needs or garden use, but which by no means necessarily agree with any formal botanical system of classification.

First, then, let us take the smaller species, several of which make good subjects for the rock garden or peat bed. Two species from Korea are among the easiest of these: *L. amabile* and *L. cernuum,* the former with up to six shiny orange-red "Turk's Cap" flowers on a 2 ft. stem, the latter with flowers of the same shape, but a delicate lavender-pink in colour, with a shiny, almost lacquered appearance. *L. cernuum* has 8 or 10 flowers on a stem that may be only 12 ins. tall, though it is more usually 18 ins. to 2 ft. Both species flower in June-July and tend to be short-lived, but they make up for this by being easy to raise from seed, and they are quite happy in full sun. The next of these smaller species again tends to be short-lived, is easy from seed and prefers full sun, but *L. concolor* has completely different flowers; they are upright, opening almost flat, with pointed tepals which are scarlet in the type, and up to 10 are carried in June-July. This species is widespread from central China to Japan and, not surprisingly, shows considerable variation in that range. *L. concolor* var. *coridion* is, perhaps, the best form, with lemon-yellow flowers finely spotted with brown, but var. *pulchellum* from Korea, Manchuria and eastern U.S.S.R. (vermilion, apricot or orange-red) and var. *stictum* (like the type but spotted black) are worth growing.

The remaining four small species need rather different conditions; indeed, the first of them, *L. mackliniae,* has from time to time been

classed as a *Nomocharis* and not a lily. Introduced from Upper Burma by Kingdon-Ward in 1946, it grows about 18 ins. high and has nodding, open bowl-shaped flowers, delicate pink in colour. It flowers in June-July, is easily raised from seed, and must have well-drained, acid soil with some shade. *L. neilgherrense* is very different, and something of a puzzle to us. It comes from the mountains of southern India, and is thus expected to be tender. Our plants were raised from seed and correspond to the description of this species, yet they have survived the last four (admittedly mild) winters with no protection at all. We have always kept a few in pots for insurance, and suspect they may be needed after the present winter (1976-77). In any case, this is a trumpet lily, with pure white, scented flowers, flushed yellow inside. Usually two are produced per stem, which may be up to 3 ft. tall, but with us is not more than 18 ins. The flowers are seven or more inches long, yet they do not seem out of proportion as they do in, for instance, *L. formosanum* var. *pricei*. *L. neilgherrense* flowers in August-September and, as it is easily raised from seed, often flowering in two years, it is well worth trying, even if it is less hardy than our experience suggests.

From Japan comes the dainty alpine *L. rubellum*. This is one of the earliest lilies to flower, producing its fragrant shell-pink horizontal trumpets on 1 ft. stems in early June or even May. It must have deep, sandy loam, with lots of leaf mould and plenty of moisture in summer, and is best among dwarf shrubs. Fresh seed, sown in autumn, develops slowly but reliably (germination is hypogeal) but stale seed (as imported seed is likely to be) may not germinate for several years, if at all. There is a pure white form, reputed to be very beautiful, but we have not seen it, and it does not appear to come true from seed.

Last of these smaller species is *L. tsingtauense* from eastern China. In appearance this is not unlike *L. concolor* with up to 6 erect, star-shaped, orange flowers on 18-24 in. stems in June, but it needs light shade and damp soil, and is more suitable for the peat garden. It is sometimes short-lived, but easily raised from seed.

Next comes a group of three species which in garden effect are rather similar to the American group typified by *L. pardalinum*. They are tall-growing, with spires of orange to red, more or less spotted, nodding Turk's cap flowers and, while less brilliant in colour than their American cousins, have the advantage of being generally less fussy in cultivation, as well as flowering later. First is *L. davidi*, a variable species from western China. A stiff, upright stem of about 4 ft. is surmounted in July-August by a pyramid of 20 (or up to 40)

scarlet flowers, spotted black. It seems very easy about soil, tolerating moderate amounts of lime, and likes full sun, as long as its base is shaded by small shrubs. *L. davidi* var. *willmottiae* is similar, with a denser flower spike and orange-red flowers, spotted with chestnut-brown. Both are easily raised from their freely produced seed. A cross between *L. davidi* var. *willmottiae* and a variety of the next species (*L. leichtlinii* var. *maximowiczii*) is generally known as *L. davidi* 'Maxwill'; this is, if possible, even more free-flowering than its parents, and we have seen plants of 7 ft. with more than 50 brilliant orange flowers. It seems to come true from seed, and is as easy to grow as its parents. *L. leichtlinii* itself has pure lemon-yellow flowers, speckled with reddish-purple; unfortunately it is decidedly unco-operative in cultivation and tends to languish briefly before departing. It rarely produces seed and the difficulty in getting healthy bulbs mentioned in the introduction may contribute to its unsavoury reputation. In contrast, *L. leichtlinii* var. *maximowiczii* (sorry about that) is as easy as its name is difficult. It comes from the mountains of Korea and Japan and bears a dozen or so flowers in August. The flowers are orange or cinnabar-red, profusely spotted with purplish-brown, not unlike those of the next species. *L. tigrinum*, the Tiger Lily, is found in Japan, Korea and eastern China where, like several other species, it is used as a vegetable. The usual commercial strain is genetically odd (it is a triploid) which makes it almost completely sterile, rarely producing viable seed. This would not matter as it is easy to propagate vegetatively; unfortunately, almost all stocks are virus infected and, while *L. tigrinum* itself is fairly resistant, many other species are not, so it should not be grown where any other species are cultivated. The reason for emphasising its sterility is that, while lily viruses are transmitted to the progeny in all forms of vegetative propagation, they are not, in general, passed on through the seed, so that an infected lily can produce healthy seedlings. There *are* two fertile forms of *L. tigrinum*: diploid var. and var. *flaviflorum*, but though both can be raised from seed they are not very vigorous and are better left alone—if you grow *L. davidi*, *L. leichtlinii* var. *maximowiczii* (there goes that name again) and their hybrid 'Maxwill', there is no need to bother with the problems of *L. tigrinum*.

A second group of "Turk's Cap" lilies from the East is rather earlier flowering, with flowers of pastel shades which are often sweetly scented. Four of these are so similar in habit and general effect that they may be treated together; in fact from time to time they have been classified

as only two species. All four come from western China or south-eastern Tibet. *L. duchartrei* Fig. 6 is well described by Farrer's name for it; he made the most successful introduction, and "Marble Martagon" admirably suits its scented, marble-white flowers, spotted and streaked with deep purple. Their cool beauty is enhanced by the hot orange of the anthers. Up to 12 flowers, in a flat umbel, are carried on 4 to 5 ft. stems in June-July. It needs light, damp, shaded soil, with plenty of humus and, if well suited, its stoloniferous stem will run about and make large clumps. *L. lankongense* differs from the last species in flowering later (July-August), in having pale rose flowers with purple anthers, and in its racemose flower spike, but is otherwise very similar, and *L. taliense* has flowers like those of *L. duchartrei* but carries them in a raceme. These three species come from Yunnan in western China, but *L. wardii* was introduced from south-east Tibet by Kingdon-Ward. First thought to be a form of *L. taliense*, it is now considered distinct; it has up to 40 deep pink scented flowers, spotted dull carmine, and grows well in humus-rich loam in half shade. Seed of all four species is freely produced, and the seedlings flower in about three years.

Last of this group of martagon lilies is *L. hansonii* from Korea, one of the easiest and hardiest lilies. It grows about 4 feet tall and in June-July carries up to 12 fragrant orange-yellow flowers, with the thick, fleshy tepals not so stronglyr eflexed as in a "Turk's Cap". It seems to tolerate almost any position and any soil, though the flowers bleach in full sun.

The remaining species do not fall into easy groups, so are best dealt with as individuals. They include some of the easiest and most useful, as well as some of the most spectacular lilies. Of those quickly and easily raised from seed, few can compare with *L. henryi*, the orange speciosum lily. This species comes from the mountains of central China, where it produces only two or three flowers. In cultivation, however, 20 or more (even up to 70) large rich orange flowers which open flat, with the tips of the segments strongly recurved, are carried on a stem which may be as much as 8 feet tall. The flowers have prominent orange nobbles or papillae in the middle of each tepal, and the centre of the flower forms a green star. This lily flowers in late July and August, and multiplies readily from daughter bulblets and seed, which should be sown fresh. It is one of the few lilies which definitely appreciates alkaline soil, is very hardy and long-lived (even in our neutral or acid soil) and, in addition to its own merits, is of interest in being one of the parents of the Aurelian Lilies. This is a

valuable race of hybrids whose other parent was a trumpet lily, *L. sargentiae*. This first successful cross between a trumpet lily and a Martagon was made by E. Debras of Orleans, France, in 1928, and was named *L.* x *aurelianense* after the Roman name for that city. Others have since made the same cross, and crossed the progeny with the parents, and with other trumpet lilies and each other. The result has been a fine race of garden plants with flowers which may be trumpets, saucers, stars or bowls, and may be orange, yellow, white, pink, apricot, purple, or shades and blends of these colours. Many clones have been named, and strains selected, and all are excellent *if you can get good bulbs*. We have found 'Heart's Desire', 'Bright Star', 'Honeydew', 'Limelight' and 'Golden Sunburst' to be particularly successful here, forming large clumps in a few seasons.

The other parent of the Aurelian hybrids was *L. sargentiae*, but this is not, in general, a good garden lily in this country. However, *L. regale*, introduced from western China by E. H. Wilson, is as hardy and perennial a plant as one could wish for, and differs only a little from *L. sargentiae*, being shorter, with slightly smaller trumpet flowers, white with a yellow throat, flushed pinkish-purple outside, and very fragrant. It flowers in early July and is related to an even more attractive lily called 'Royal Gold'. Whether this is a form of *L. regale* or a hybrid from it is in some doubt, but there is no question about the beauty of this vigorous plant with deep golden yellow trumpets, flushed purple-brown outside. Both *L. regale* and 'Royal Gold' grow about 3 feet tall and have 6 or 8 or more flowers carried in an outward-facing ring at the top of the stem. Plenty of seed is produced, and seedlings often flower in the second year.

One of the most intriguing and, to us, attractive lilies is *L. nepalense*. Two or three enormous, pendant, wide open trumpets are carried on a stem only 2 or 3 feet high. They are an extraordinary bright pea green, stained inside with deep wine purple. The stem runs about underground, and only appears above ground in May, although this lily flowers in June-July. Although it has survived four winters without protection here, there are doubts about its hardiness, and we always pot some bulbs and keep them in the conservatory each winter. Because of the running habit they would be better planted in a cold greenhouse border if we had such a place. Like the previous species, *L. nepalense* is easily grown from fresh seed, but can also be propagated from the bulblets produced on the underground stem.

The two remaining lilies are Japanese. They are slow to germinate,

slow to reach flowering size, and one of them (*L. auratum*) has the reputation of being susceptible to every plant disease known. Nevertheless, we have no hesitation in recommending them to you, for they are, perhaps, the finest species of all. To take the easier first, *L. speciosum* is found in Formosa (Taiwan) and central China, as well as Japan. It grows up to 7 ft. tall and a well-grown plant may have up to 50 nodding fragrant flowers on each stem. The flowers, produced in September, are 4-6 ins. across, and are the same shape as those of *L. henryi*, but crimson, fading to white at the edges of the segments. The centres of the segments have the same prominent papillae as *L. henryi*, again crimson, and the centre of the flower is a green star. There are many named forms, which vary from pink to deep blackish crimson, together with an exquisite white form which, unfortunately, seems lacking in vigour (but see *L.* 'Everest', below). We feel that only a few of these are distinct enough to be worth growing: probably *L. speciosum* 'Rubrum Magnificum' (the commonest form), 'Melpomene' and 'Black Beauty' (if this is not a hybrid) are enough for most gardeners. A number of hybrids have been made between this and the final species which we shall discuss later. The last lily species is *L. auratum*, rather grandiloquently known as the 'Golden-rayed Lily of Japan'. This is the most spectacular lily of all, and one of the finest perennial plants. From large bulbs it produces stems 4 to 6 feet tall, which in August-September carry at least six but often many enormous flowers. They may be as much as 12 ins. across, widely funnel- or saucer-shaped, of a thick, waxy texture, basically white, with a broad yellow stripe down the middle of each segment, the whole more or less thickly spotted with crimson. As well as this magnificent appeal to the eyes, the flowers are richly fragrant, so much so that indoors the scent becomes overpowering unless the room is very large and well-aired. This is rather a pity, as *L. auratum*, like most lilies, makes an excellent cut flower. The whole inflorescence may be cut as the first flower opens, and the rest will open in water, the display lasting for days or even weeks. It is always wise to remove the flowers from any lily in the first years or so, to avoid seed being set, and you can thus provide marvellous floral decorations with little or no effort, for a single inflorescence in a fairly shallow bowl needs nothing to enhance its beauty.

L. auratum, like *L. speciosum*, has many named varieties, with more or less yellow, denser and lighter spotting, or even a crimson instead of a yellow band, but if you grow it from seed you will find enough variation to satisfy anyone—if you can wait! Flowering size may be

reached in four or five years from the hypogeal germination, but, provided the plants are given suitable conditions, they are hardy and will increase in numbers and beauty year by year. This species and *L. speciosum* and their hybrids need a sharply drained, porous, acid soil, with shade over the bulbs and some high shade. They do well among rhododendrons in light woodland, but can be grown among open shrubs, provided the soil and drainage are right. To avoid any possibility of excess damp, it is good policy to surround the bulbs with sharp sand before filling up the planting holes with light, leafy, rich, sandy soil.

An important and beautiful range of hybrids has been raised from crosses between the last two species and *L. rubellum* and *L. japonicum* (rather like a taller, less amenable *L. rubellum*). Some of the best, *if you can get bulbs in good condition*, are: 'Crimson Beauty' (pure white with cherry-red band on each segment), 'Imperial Pink' (rich pink, shaded yellow at the centre of each segment), 'Imperial Silver' (pure white, spotted all over with crimson), 'Bonfire' (deep crimson, white margins), 'Black Beauty' (deep black crimson form of *L. speciosum*, with green star at the flower centre, very free flowering), and 'Everest' (pure white, green centre, like a large, vigorous *L. speciosum* var. *album*). There are many more to try, but the difficulty in getting healthy bulbs means that the majority do not establish. If someone has a particular enthusiasm for these flowers it would be worth making your own crosses and raising them from seed, but the parent plants would have to be kept in a greenhouse as they flower so late that seed rarely ripens in this country. We feel that a small garden could easily have too many of them, as they are such dominant flowers. In addition to the species, we grow only the hybrids listed above and a few unnamed seedlings.

There we conclude a lightning tour through the American and Oriental branches of the genus *Lilium*. Many species have been omitted, many others have been given less than their due and some, you may feel, have been over-praised, but you must allow for personal prejudice. All, we believe, are worth growing, and can be grown in the average garden, given a little effort and time.

Nomocharis

Before leaving the subject entirely, there is another genus which, in habit and cultural requirements, closely resembles some of the smaller moisture-loving lilies. We refer to *Nomocharis*, and this aptly named genus (Nomocharis—charm of the meadow) is considered by many to

include the aristocrats of the Liliaceae. There are seven or eight species remaining in the genus (several of the duller ones have been transferred to *Lilium*) but only four or five are at all certainly in cultivation. They were introduced from the Himalayas, south-east Tibet, Upper Burma and west China, the source of many plants which are more at home in the (usually) cool summers of Scotland than in the south of England. All have narrow leaves in whorls on the lower part of the stem, and nodding or, occasionally, horizontal flowers on long pedicels. The flowers open flat or shallowly saucered, and the inner segments are often fringed at their margins and more or less spotted, giving a rather *Miltonia*-like effect. They need ample moisture in summer, combined with very free drainage, and will grow in the open in Scotland in normal years, but are better with some shade in England. They are easily raised from seed, sown thinly in a large (7 in.) pot, the whole contents being planted in the flowering position at the end of the second season. They hybridise freely among themselves, and all grow about 2 to 3 feet tall and flower in June-July.

Two closely related species are *N. aperta* and *N. saluenensis*. Both have about six bowl-shaped flowers, 4 ins. across. Those of *N. aperta* are pale pink, spotted and blotched with deep crimson, the inner segments lightly fringed; *N. saluenensis* may have pale pink or white flowers, and lack the fringe. *N. farreri* and *N. pardanthina* are also similar, the former sometimes being treated as a variety of the latter. Both are very beautiful, with many flowers (*N. farreri* up to 18, *N. pardanthina* up to 10), those of *N. farreri* being white, the outer segments mostly unspotted, the inner three spotted with crimson on the lower third. *N. pardanthina* was the first species to be introduced; in this species the flowers are pale pink, again with the outer segments mostly unspotted, the inner three spotted with purple-crimson and lightly fringed. *N. mairei* is similar but white, with rose-purple markings and very thick fringing on the inner segments. There is a very beautiful unspotted white form of this species.

We cannot leave this genus without mentioning *N. basilissa*, which Farrer described as "a pure and luminous scarlet, unspotted". Farrer sent seed, which failed, and this species remains like a Holy Grail for the gardener—an unattainable ideal, until collectors can once again explore Upper Burma and the regions between the great rivers Irrawady, Salween and Mekong. Meanwhile we must be satisfied with the presence of her beautiful sister species.

GERMINATION TYPES

Germination of the species mentioned in this article is shown in the following lists:

Epigeal	*Hypogeal*
L. amabile	*L. auratum*
cernuum	*canadense*
concolor	*grayii*
davidi	*hansonii*
duchartrei	*harrisianum*
formosum	*humboldtii*
henryi	*japonicum*
lankongense	*kelloggii*
leichtlinii	*ocellatum*
mackliniae	*pardalinum*
neilgherrense	*parryi*
nepalense	*rubellum*
regale	*rubescens*
sargentiae	*speciosum*
taliense	*superbum*
tigrinum	*tsingtauense*
All *Nomocharis*	*wardii*
	washingtonianum

Discussion Weekend Show 1977

THIS SHOW was held in Cowan House, Edinburgh University Pollock Halls of Residence, in conjunction with the annual Discussion Weekend on 24th and 25th September 1977. The numbers of exhibits were well up to expectations and the quality of the plants perhaps higher than normal at an autumn show. Most of the colour in the hall came from splendid gentians and cyclamen.

The Forrest Medal for the most meritorious plant in the Show was awarded to a terrestrial orchid *Satyrium nepalensis* with three spikes of small pink hooded flowers shown by Mr. Jack Crosland, Torphins. This exhibitor won the class for one pan rock plant new, rare or difficult, with another orchid *Disa uniflora* which had one large orange-red

flower on a long stem. A note attached to the plant stated that it was endemic to Table Mountain, South Africa, and required protection during winter as it was not completely hardy. This note was of interest to enthusiasts and perhaps it is a practice which could usefully be extended. Mr. Crosland was also awarded a Certificate of Merit and a first prize for a very fine *Cyclamen hederifolium* with extra large pink flowers and beautiful leaves which would make it a highly decorative foliage plant long after the flowers had gone.

Mr. and Mrs. Henry Taylor, Invergowrie, won the Mary Bowe Trophy for most points in Section I, which is open to all members. Among the plants with which they won awards were *Primula rusbyi* with five spikes of flowers, *Origanum rotundifolium*, *Billardiera longifolia* with a number of large purple fruits, *Calluna vulgaris* 'Dainty Bess', *Anisotome lanuginosa* and *Naussavia* CW5189. The Taylors also took a first prize and the Logan Home Trophy for a miniature rock garden which contained amongst other good plants such gems as *Campanula zoysii* and *Leucojum autumnale*.

The principal class in Section I for three rock plants of different genera was won by Mr. A. J. Holman, Milnthorpe, Cumbria, with nicely balanced plants of *Campanula rupestris*, *Cyclamen hederifolium* and *Delphinium chinense*. His success here also gave him the East Lothian Trophy.

The class for three gentians for which the Peel Trophy is awarded was well contested and Mr. and Mrs. M. A. Stone, Fort Augustus, who are particularly interested in the genus, must have been well satisfied to take the first prize and the Trophy with well-flowered pans of the hybrid *G.* 'Glendevon' and plants raised from seed from *G. veitchiorum* x *farreri*. The Stones also took red tickets with *Raoulia eximea* raised by them from seed received from Canterbury R.G.C., New Zealand, in May 1973, and now a fine two-inch cushion, and with the fine little shrub *Pernettya tasmanica* covered with red berries. This shrub can also be obtained in white and yellow berried forms.

Mr. Harold Esslemont, Aberdeen, gained a Certificate of Merit and a first prize for *Raoulia loganii*, a charming little plant grown for its foliage which is thought to be a natural bi-generic hybrid between *Raoulia* and *Leucogenes*. Needless to say it was in splendid condition, as are all the plants which Mr. Esslemont puts on the show bench. He also won tickets with the North American *Shortia galacifolia* shown here for its autumn foliage, *Petrocosmea kerrii* which is said to be not quite hardy, and the rare *Raoulia rubra*.

Mr. Eric Watson, Newcastle, was rewarded with a Certificate of Merit and first prize for a very fine *Haastia pulvinaris* which he had raised from seed obtained from Canterbury R.G.C., New Zealand. Another welcome visitor from across the border, Mr. Jack Brownless, Middlesbrough, won both classes for conifers which he grows so well, with *Juniperus echiniformis*, the so-called "Hedgehog Juniper", *Cupressus macrocarpa pygmaea* and *Pherosphaera fitzgeraldii.*

A nicely flowered shrub *Daphne jasminea* from Greece won a first prize for Mrs. Sheila Maule, Balerno, as did *Ophiopogon planiscapus* var. *nigrescens.* The President of the Club, Mrs. Kathleen Hall, and her husband again found time to compete. Amongst their prize-winning entries were *Cyclamen graecum, Microcachrys tetragona,* bearing many of its small cones, an unnamed seedling of *Calluna vulgaris* which had long handsome spikes of very red flowers, and a hybrid gentian, *macaulayi* x *veitchiorum* which won a hotly contested class of nine entries.

Other first prize plants particularly noted in Section I were a fern with rusty-backed leaves, *Ceterach officinarum* (Mrs. Joan Stead), a very good *Colchicum speciosum album* with thirty blooms (Mrs. Joan Dodds) and *Sempervivum arachnoideum,* looking as though it had come straight from the Alps (Mrs. Bette Ivey). Another plant deserving a mention although only second to Mr. Jack Crosland's *Cyclamen hederifolium,* already mentioned, was the white form of this *Cyclamen* species shown by Drs. John and Christine Gosden. It was in splendid condition and well flowered. What a pity it had to meet on the bench a plant just that little bit better!

The Wellstanlaw Cup for an arrangement of flowers and/or fruits and foliage of rock garden plants was won by Mrs. T. M. Hart, Edinburgh. Her arrangement, small but effective, consisting mainly of various heathers, was much admired.

In Section II, restricted to members who had not won a Medal or Trophy at any previous Show, there were some good plants, but competition could have been keener. The Bronze Medal for most points in this Section was awarded to Dr. and Mrs. D. E. S. Truman, Edinburgh. Among their prize-winning plants were *Hebe catarractae, Phlox tenuis, Dianthus erinaceus, Cyclamen cilicium* and *Sedum spathulifolium* and *dasyphyllum.*

The East Lothian Trophy for the best plant in Section II was awarded to *Chamaecyparis obtusa caespitosa,* a very well grown specimen in robust health, shown by Mr. H. W. Welbourne, Cumbria. This is the

first time, so far as I can recall, that a conifer not bearing cones has won such an award. Mrs. Joan Dodds, Alnwick, just to show that her win with a very fine *Colchicum* in Section I was no fluke, produced another *C. autumnale*, which was equally good, to win another first. She also gained firsts with a dwarf shrub *Micromeria corsica* and a *Scilla* species collected in Morocco. Two members had travelled all the way from Thurso, bringing with them a plant or two, and each was awarded well deserved first prizes, Mr. J. L. Drummond for *Cyananthus lobatus albus*, and Mrs. E. M. Walford for *Calluna vulgaris* 'County Wicklow'. Other plants noted were *Leucogenes leontopodium* (Miss S. Y. Wallace), *Pernettya mucronata* dwarf form (Mrs. Almond) and *Gentiana sino-ornata* x *veitchiorum.*

Our two young members who competed in the class for Juniors at the Edinburgh Spring Show were not deterred by the fact that there were no classes at this Show specially for Juniors. Master Roderick Milne, Edinburgh, won a first, a second and a third with sempervivums and sedums, and Miss Karen Wylie, Dunblane, took a first with *Pulsatilla vulgaris* which was flowering.

Dr. Brinsley Burbidge put up a display of excellent coloured photographs of rock garden plants growing in their native habitat. I have never seen better photographs of plants in the wild and, as I looked at them, my thoughts went racing back over the years to the plants I had seen on my visits to the Alps of Europe. Alas I am no photographer and I have no record of them other than in my mind! I envy Dr. Burbidge! The judges gave a Special Award to the display, which it well deserved.

The Show was supported by the Trade represented by Jack Drake, Inshriach Alpine Plant Nursery, Aviemore (the proprietor John C. Lawson was in attendance) and John R. Ponton, Old Cottage Gardens, Legerwood, Earlston (both Mr and Mrs. Ponton were present). Both nurseries had a very good representation of the quality plants they grow and they did brisk business on both days of the Show. The Club is grateful for their support.

DAVID LIVINGSTONE

The Reginald Farrer Nature Trail

by J. T. AITKEN

REGINALD FARRER, father of the English Rock Garden, is now commemorated by a Nature Trail at Clapham, North Yorkshire, his birthplace.

Clapham, a village now bypassed by the A65 Leeds to Kendal road over the Pennines, is near the summit of the road. The Farrer family have, for many years, been owners of Ingleborough Estate, whose centre is at Clapham village.

The Nature Trail, named after Reginald Farrer, who died in North Burma in 1920 while on a botanising expedition, starts from just above the Information Centre of the Yorkshire Dales National Park in Clapham village, where there is ample car parking. The trail leads up through the woodlands surrounding Ingleborough Lake, a reservoir created by a Farrer ancestor to supply water to the mansion house and village. This reservoir also at one time provided a hydro-electric supply. Indeed, the father of Michael Faraday, discoverer of electricity, had been estate blacksmith to the Farrers before he moved south. The trail passes Ingleborough cave—one of the many caves giving access to the pot-holes for which this upland limestone area is famous. Thereafter the trail opens up into a pleasant small but open valley, affording delightful facilities for picnicking. Thence it continues upward to Trow Gill, a dry valley amid interesting limestone formations.

There are few, if any, Farrer plants to be seen, and indeed little connection, except that this is where Farrer conceived his love for and knowledge of the native alpine flowers of the family estate. And this was the germ which led to his fascination and which inspired his writings.

Ingleborough Hall, home of the Farrers, including Reginald's parents, is now an Outdoor Activities Centre of Bradford Education Authority. In the grounds, by the long terrace above the herbaceous border, is a memorial to Farrer—"Author, Traveller, Botanist and Flower Painter". "He loved God's Works and blessed the world by many glorious flowers named after him"; so reads the inscription.

The Nature Trail is, of course, public on payment of admission money. The Hall is private, but the interested person who introduces himself appears to be welcome.

Book Reviews

Androsaces, by C. F. Smith and D. B. Lowe. Alpine Garden Society hardback monograph. Available from Hon. Publications Manager, Mr. D. Hazelgrove, 278/280 Hoe Street, Walthamstow, London E17 9PL. £3.00 Postage, Packing and VAT 44p.

One has come to expect a very high standard from Alpine Garden Society publications and this one is no exception.

The first part of the book deals with the cultivation of the genus. It is a distillation of the experience of some of the leading *Androcace* growers in the country and could scarcely be bettered. Careful perusal of this chapter by the novice will save years of trial and error.

More experienced plantsmen will be fascinated by the high alpine species recently introduced from Nepal. These will present a real challenge to their skill as cultivators.

The monochrome illustrations are very good and it is difficult to believe that they have been reproduced from colour film. What a pity cost has precluded some colour plates!

In the phylogeny of the genus, botanists will note that the section *Douglasia* has now been included in *Androsace*.

A clear and comprehensive description of the species is accompanied by delightful drawings by D. B. Lowe, well-known for his illustrations in the Alpine Garden Society Journal.

The buff paper was chosen to highlight the drawings; my conservative taste still has a preference for white.

There is an excellent glossary and index.

This is a volume indispensable to any *Androsace* enthusiast and is warmly recommended.

H. E.

A Quest of Flowers. The Plant Explorations of Frank Ludlow and George Sherriff. H. R. Fletcher. 387 + xxix. 114 illustrations, 8 in colour. Edinburgh University Press. £10.00.

This is a personal reaction to a remarkable book. Those interested in an expert's review should read that by Patrick Synge in *The Garden* for April 1976.

Ludlow and Sherriff both had careers in the Himalayan countries; Ludlow trained as a botanist in the educational and diplomatic fields and Sherriff in the military and diplomatic fields. When they met and became friends in 1929 they made plans to explore and collect plants in some of the more remote areas of Bhutan and Tibet. They mounted expeditions in 1933, '34, '36, '37, '38, '46 and '49 and added vastly to the knowledge of the flora and, since Ludlow in particular also collected bird skins for the British Museum, the avifauna of the areas they covered.

Major Sherriff subsequently settled down in Angus and with Mrs. Sherriff developed a beautiful garden at Ascreavie, maintained latterly by Mrs. Sherriff. Many members of the Club must have visited Ascreavie and admired the superb show of meconopses, primulas, rhododendrons and other fine plants, many of which were collected and introduced by Ludlow and the Sherriffs.

The book is based on the detailed diaries kept by the two men on their collecting trips, linked together by Dr. H. R. Fletcher. There is a historical introduction by Sir George Taylor who himself took part in one of the most fruitful expeditions and who was active at the British Museum and Kew at the time of the expeditions and thus closely involved.

The illustrations are based on Major Sherriff's own photographs.

Although Ludlow and Sherriff collected widely in the botanical sense—over 100 of the genera from which they collected are mentioned—they were both increasingly drawn to what they liked to call the "aristocratic" genera, such as *Gentiana, Lilium, Meconopsis, Primula* and *Rhododendron,* and particularly to the last two. Thus almost a quarter of the botanical index covers *Primula* entries and about a sixth is devoted to *Rhododendron,* reflecting both the wealth of species collected and the passionate interest developed. Several other collectors, including Forrest and Kingdon-Ward, have been similarly attracted. Many of the Himalayan primulas present problems in sustained cultivation and not all the species which delighted the eyes of the collectors have been successfully introduced or maintained long in cultivation, though considerable initial success was achieved by sending plants home by air, a method pioneered by Sherriff in 1937.

The last of the pre-war expeditions, in which Sir George Taylor took part, resulted in a very rich collection, but the outbreak of war in 1939 meant that adequate attention could not be given to cultivation and many first class introductions were lost.

The Ludlow and Sherriff forays were by no means done on the "shoestring" basis of some more recent collections. Sherriff was a very able organiser and the respect with which both men were regarded by the authorities in Tibet and Bhutan as a result of their careers allowed them facilities of the utmost value. Despite all this, considerable hardship had to be endured from time to time from leeches, biting insects, the elements, the terrain, illness and accidents. Reading the diaries brings home the high personal cost which is a concomitant of so many of the introductions to our gardens.

A Quest of Flowers was published in late 1975. Since then Mr. Roy Green's book on Asiatic Primulas has been published and Dr. Richard's paper on *Primula* Section *Petiolares* has appeared, both having drawn on *A Quest of Flowers.* At the same time further collections, both private and sponsored, have been done in Nepal by the late Len Beer, Roy Lancaster, George Smith and others. As a result, some of the primulas introduced by Ludlow and Sherriff and since lost, may be re-established. In this resurgence of interest in Asiatic primulas the Ludlow and Sherriff diary extracts and Dr. Fletcher's connecting narrative provide a wonderful source of basic information.

This was not a low-priced book when it was published, despite the fact that substantial financial help was needed from two Trusts and from Mrs. Sherriff before it could emerge at all. Since then, book prices have risen quite steeply. It is worth reflecting that *A Quest of Flowers,* surely destined to become a classic of plant hunting literature, costs less than, say, three of the rhododendrons you may well be tempted to buy when you've read it!

Your reviewer, having read it once, turned to the beginning and enjoyed it again. It is that sort of book.

D. M. STEAD

Angus Group Seed Exchange

AT THE time of writing we are nearing the end of the seed distribution. The first orders are completed, except for the laggards, and we are now dealing with requests for surplus seed.

There was a considerable increase in the number of donors this year, and a bigger increase in the number of orders, and 40,000 seed packets have left the store. We would like to thank those who take the trouble to collect seed, and regret they cannot see the many letters of appreciation that are received here. These letters are made available to and appreciated by the small army of local members who work so hard to make the exchange possible.

There was an excellent response to my plea for seed of small bulbs, but we still had not enough to satisfy demand and hope that more members will take the trouble to gather them. *Crocus, Cyclamen, Narcissus, Fritillaria, Iris*—particularly the small ones—and *Galanthus, Douglasia* and *Cassiope* were again in great demand and very little seed was available to distribute.

On behalf of the Scottish Rock Garden Club I would like to thank all those who make the exchange possible and that all recipients enjoy the results of our labours.

1978 HOLIDAYS
FOR FLOWER AND MOUNTAIN LOVERS
WITH FAIRWAYS & SWINFORD

A selection of our summer and autumn tours is outlined below and details of these and others will be sent on request. All departures are escorted and new, interesting centres have been added.

LV 10: NEPAL—the Langtang Valley: 5 to 25 May—£665
Oleg Polunin, M.A., F.L.S., accompanies this trek on which fourteen nights are spent under canvas and are preceded and followed by a day or two in Kathmandu for acclimatising and resting respectively. The Langtang is famous for its rhododendrons and other plants as well as for its splendid views of Langtang Lirung and many high peaks. This is a fairly tough but very rewarding Himalayan trek: no technical climbing is involved and from the head of the valley where we spend three nights, there are several enticing walks and climbs.

SB 65:SPAIN—the Valle de Pineta: 31 May to 14 June—£248
The small village of Bielsa lies in the Spanish Pyrenees at 3500 ft. at the foot of the Valle de Pineta close to the National Park of Ordesa and is a pleasant walking centre as well as for making expeditions into the high mountains in search of alpines. The tour is accompanied by Terry Underhill, N.D.H., and Mrs. Joan Mestre. We stay at a good family hotel on the slopes at the edge of the village, from which the views are very fine.

NO 6: NORWAY—the Hardanger Fjord: 1 to 15 June—£390
This is a two-centre holiday. The first week is spent at Utne, an idyllic tiny village on the inner Hardanger Fjord and the second week at Ulvik, which lies in a sunny position at the head of the fjord. The hotels at both places are hand-picked and truly delightful. Many short excursions can be made by coach and lake steamer and there are pleasant, easy walks round about. June is blossom time in this part of Norway and a very lovely time of year for a quiet holiday in glorious surroundings. Mrs. Ebba Fordham, herself Norwegian, leads this tour, which is from Newcastle back to Newcastle by air to and from Bergen, with a special supplement of £20 return for those wishing to join and leave in London.

SB 66: SPAIN—Sierra de Cazorla: 14 to 27 June—£295
Accompanied by Dennis Woodland, this is a wonderful holiday for naturalists in country which is famous not only for its rare plants but also for the variety of birds and wild life to be seen. We stay at the *Parador Adelantado* at 6000 ft. in the heart of the mountains at Sacejo for ten nights spend for the last two nights at Granada, from which we fly back to London.

SB 67: ITALY—Ponte di Legno: 27 June to 11 July—£259
At the head of the Val Camonica, this is one of the most attractive of the new centres we are using this year. The main mountain groups are the Ortles Cevendale and the Adamello-Presanella; and we stay in an extremely pleasant hotel from which the views are superb. Miss Moyra Gore, who has recently explored the area, will lead the tour and fuller details are available.

Other holidays include LA GRAVE in the Hautes Alps, and several other HIMALAYAN HOLIDAYS. For full particulars apply to

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Notice to Members

When ordering from these pages, please tell the advertiser that you saw his advertisement in the S.R.G.C. Year Book or Journal

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. Permission has to be obtained from the Exchange Control in the first place, and evidence has to be supplied of the existence of the Society and its membership fees. Having secured sanction, the member obtains a draft from his Bank and forwards it to the Society. In practice it would probably be best first to consult one's Bank, which could supply advice and the appropriate forms.

The annual subscription is 5 dollars, and the Secretary, who will send further particulars, is William T. Hirsch, 3 Salisbury Lane, Malvern, Pa. 19355, U.S.A.

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

SRGC PUBLICATIONS

A SET of the available *Journals* provides information on rock garden plants and their cultivation comparable with the current in-print books. At present there are 44 issues in stock—the number varies from time to time—and a SPECIAL DISCOUNT of 25% is offered to new members who order over 40 *Journals*. The 44 available *Journals* would cost just over £13, which is remarkable value. No discount on any of the 100p *Journals* when available. Overseas members must pay £1 ($2.50) extra postage because two parcels are necessary.

Current availability and price to Members

Journal	*Pence*		*U.S. Dollars*
1-6	150	when available	3.75
7, 8, 11, 14-17, 21, 27, 29, 35	100	,, ,,	2.50
9, 36-53	30		0.75
10, 12, 13, 18-20, 22-26, 28, 30-34, 54-59	40		1.00
60, 61	60		1.50
Index *Journals* 1-19	15	post free	0.37
Index Vols. VIII, IX, X + XI	15 each, post free		0.37

Postage contribution 5p (12½ cts.) per *Journal* up to a maximum of £1 ($2.50).

Waiting lists are kept for the scarce *Journals* (list closed for *Journals* 1-6) but waiting list members must now pay all postage costs.

The Club would be very glad to receive or buy any *Journals* up to No. 35 (except 9), paying postage and, if required, up to half the above prices. Copies of *Dwarf Conifers* by Hillier are also wanted.

All correspondence about *past Journals* should be addressed to the Hon. Publications Manager: Dr. D. M. Stead, Esk Hause, Bishop's Park, Thorntonhall, Glasgow G74 5AF.

SPECIAL PUBLICATIONS

Dr. Richards' article on "Petiolarid Primulas" (*Journal* 60) is available as a separate booklet—very handy for taking into the garden for identification purposes—from the Hon. Publications Manager at 75p, post free.