A REPORT

on the

THIRD INTERNATIONAL

ROCK GARDEN PLANT CONFERENCE

1961

Joint Editors:
R. C. Elliott and J. L. Mowat

PUBLISHED JOINTLY BY

The Alpine Garden Society

10 Rochester Row,
Westminster,
London, S.W.1.

VOL. 29. Numbers 3 and 4

The Scottish Rock Garden Club

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"Jessamine,"
Kirkhill, Penicuik,
Midlothian.

VOL. VII Part 4

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INTRODUCTION

The Third International Rock Garden Plant Conference was organized jointly by the Alpine Garden Society and the Scottish Rock Garden Club, and was held from April 18th to 28th 1961, almost twenty-five years after the first Conference, and exactly ten years after the second Conference. This Report is likewise the product of co-operation between the two bodies, and is published jointly, though, for the sake of convenience, the Report has been divided into two parts, covering—

The Week in London (Part I)
The Week in Edinburgh (Part II)

The fact that this Conference proved such an unqualified success is due to a great number of factors and a great number of people, but we must first express our immense debt of gratitude to the President and Council of the Royal Horticultural Society for their generosity in placing the New Hall and the Lecture Room at our disposal in London, and to the Hon. Sir David Bowes-Lyon, K.C.V.O., V.M.H., for his kind welcome to our Overseas Delegates at the luncheon so thoughtfully provided by his Council. No less sincerely do our thanks go to the Principal and Committee of the Edinburgh School of Agriculture, for the fine facilities freely provided for our Edinburgh meetings. To the Lord Provost of the City and Royal Burgh of Edinburgh, we tender our thanks for opening the Show, and our appreciation of the reception so generously given to Conference Members by the Lord Provost, Magistrates and Council of the City of Edinburgh at the City Chambers.

Next we must thank those Officers of the Alpine Garden Society and the Scottish Rock Garden Club, who, with their Sub-Committees, have been responsible for the organization and administration of the whole of the Conference, its Paper Reading Sessions, its two magnificent Shows, and the excellent excursions which were arranged for us. To mention individual names would be impossible, for too many people were involved, and the organization has been going on for two long years: yet, without their unstinted efforts, a Conference of this magnitude would not have been possible.

We must also express our great indebtedness to the Directors of Kew, Cambridge, and Wisley, the Regius Keeper at Edinburgh, and the Deputy Ranger of Windsor Great Park, for their kindness and hospitality in permitting our Members to visit these wonderful gardens; to Mr. and Mrs. Hammer, Major and Mrs. Knox Finlay, and Mr. and Mrs Renton we tender our thanks for opening their homes to us, and permitting us to share the delights of their private gardens.

Finally, our thanks are due to those who spent long hours producing the excellent papers which comprise this Report, and to the exhibitors who brought so many fine plants to our Shows. The former have their wisdom immortalized—or so we like to think—in these pages, but the latter? Nothing is more arduous than exhibiting alpines, and we hope that all those who so freely gave of their labours may have their reward in knowing of the immense pleasure they gave to others.

The papers which were read at the Conference are, for the most part, reprinted in this Report—often in considerably fuller detail than time permitted at the particular session. There is one major addition: Mr. W. R. Sykes—a member of the botanical expeditions to Nepal in 1952 and 1954—produced for the Alpine Garden Society's publication *A Decade in Retrospect,* a very fine article about plants introduced during the last ten years. As this was the precise period between the last International Conferences, the Editor of the *Bulletin* received Mr. Sykes' permission to offer this manuscript as a part of this Report. We are also much indebted to Mr. H. G. Hillier for a very lengthy review of *Dwarf Conifers,* which it has been decided to publish separately—so that only a brief report on his paper is contained in this Report.

In conclusion, it is felt that record should be made of some of the overseas visitors and delegates whose presence added so much to the pleasure of the Third International Rock Garden Plant Conference. They were :—

AUSTRALIA

Miss H. Schlesinger
O. Fauser

AUSTRIA

Dr. and Mrs. Guggenberger
Dr. and Mrs. Kiesenhofer
A. Kober
Ing. H. Martin

GREECE

M. Ogilvie Grant

HOLLAND

Miss C. M. Cremers
T. Hoog

CANADA
Mr. & Mrs. A. O. Brigden

EIRE
Miss J. Otway-Ruthven
E. G. Quin
D. Shackleton

FRANCE
Mme. Dreyfus
Mlle. Heklova
Mme. Maus
Prof. R. M. May
A. Miland
Dr. G. Morel
M. et Mme. Rabaron
Mme. H. Ribaud
R. Ruffier-Lanche
Mme. Taillard
Mme. M. T. Toutée
Mme. Veissière
Mlle. Vizier

N. IRELAND
Mrs. W. A. Anderson

SWITZERLAND
E. Reiser

U.S.A.
Mr. & Mrs. H. Epstein
H. Logan
R. E. Saxe
Mrs. M. J. Williams
Dr. C. R. Worth

GERMANY
W. Schacht
Dr. F. Schötz
Dr. A. Wihr

* * *

Alpine plants are neither universally difficult or easy. I am fully prepared for someone to assure me that a particular species with which I have vainly struggled for years, flourishes in his or her garden. Local factors, climate, soil, and available aspect, play no small part in the ding-dong struggle between alpine plants and alpine gardeners.

WILL INGWERSEN.

(From the Second International Conference Report)

THE CONFERENCE PROGRAMME

PART I THE WEEK IN LONDON

TUESDAY APRIL 18TH

10.45 a.m. An exhibition of colour slides was given during the judging of the Show.

The following Members kindly provided slides :—

H. Epstein	—	U.S.A.
D. Hearn	—	New Zealand
G. R. Chance	—	New Zealand
W. Schacht	—	Germany
A. Miland	—	France
E. Reiser	—	Switzerland

12.00 noon The Conference Show opened.
Meeting of Joint Rock Garden Plant Committee.

1.15 p.m. The President and Council of the Royal Horticultural Society entertained Conference Officials and Overseas Delegates to luncheon.
The Hon. Sir David Bowes-Lyon, K.C.V.O., V.M.H., gave an address of welcome, to which Mr. H. Epstein, President of the American Rock Garden Society, replied.

3.00 p.m. The President of the Alpine Garden Society, Mr. C. H. Hammer, opened the Conference.
Paper : "Some Plants of the Rocky Mountains," by Dr. C. R. Worth, U.S.A.

7.00 p.m. The Alpine Garden Society's Conference Dinner.

WEDNESDAY, APRIL 19TH

9.30 a.m. The Conference Show opened (second day)

10.15 a.m. Paper :
"Wild Orchids of France", by Prof. R. M. May, France.

11.30 a.m. Discussion :
"Some Plants in the Show", led by
Dr. R. Bevan, London
Dr. H. Tod, Edinburgh
Miss J. Otway-Ruthven, Dublin
Herr W. Schacht, Germany

2.15 p.m. Paper:
"Some Interesting Plants of the Eastern Mediterranean," by Mr. M. Ogilvie-Grant, Greece.

3.30 p.m. Paper:
"Alpine House Cultivation," by Mr. R. C. Elliott, Birmingham.

4.30 p.m. Presentation of Awards.

5.00 p.m. Conference Show closed.

7.15 p.m. The Horticultural Club entertained Overseas Delegates to dinner, followed by a display of colour slides of English gardens, given jointly by Mr. Patrick Synge and Mr. Anthony Huxley.

THURSDAY, APRIL 20TH

10.15 a.m. Paper:
"Interesting Plants seen during my Travels," by Mr. Eliot Hodgkin, London.

11.30 a.m. Symposium. "My experience of growing difficult genera."

Cassiope.	Mr. S. E. Lilley, Birmingham.
Celmisia.	Mr. D. Shackleton, Dublin.
Daphne.	Ing. Hubert Martin, Austria
Dionysia.	Mrs. D. E. Saunders, London

2.00 p.m. Visit to the Royal Horticultural Society's Gardens at Wisley, conducted by the Director, Mr. F. P. Knight, F.L.S., V.M.H.

FRIDAY, APRIL 21ST

9.30 a.m. Visit to the Royal Botanic Gardens, Kew, conducted by Mr. G. H. Preston.

2.00 p.m. Visit to Windsor Great Park, conducted by Sir Eric Savill, K.C.V.O., C.B.E., M.C., M.A., V.M.H.

SATURDAY, APRIL 22ND

9.00 a.m. Visit to Mr. C. H. Hammer's garden at Boreham, Essex.

3.00 p.m. Visit to the Cambridge University Botanic Garden, conducted by the Director, Mr. J. S. L. Gilmour, M.A., F.L.S., V.M.H.

SOME PLANTS OF THE ROCKY MOUNTAINS

By Dr. C. R. WORTH

(Chairman: Mr. C. H. Hammer)

The territory embraced by the Rocky Mountains and Great Basin extends from Canada to Mexico, and from the longitude of Denver to the eastern base of the Californian Sierra Nevada and the borders of Oregon and Washington, an area of well over 500,000 square miles. Its base is a vast arid plateau mostly well over a mile in altitude, at times flat and dull, at others eroded by wind and water into deep canyons and fantastic rock formations, often of the most brilliant colouring. From it rise more than a hundred distinct mountain ranges with varied geological histories, which, all but one, have axes running roughly north-south. They are separated by wide valleys that are sometimes barren, more often clothed with sagebrush or saltbush, usually treeless. Plants of interest in the valleys are few, yet frequently in Nevada and Wyoming one comes across patches of scree-like material in which grow mat-plants and cushions typically alpine in character, and far more perverse under cultivation than their relatives from a mile above them.

Many of the mountain ranges are low and rather barren except in their canyons, yet there are hundreds of peaks and ridges rising well above timberline, while in Colorado more than fifty summits attain over 14,000 feet. Timberline is largely a matter of soil and exposure, so that truly alpine meadows are often surrounded and sometimes surmounted by trees of considerable stature. Climatic conditions are severe, ranging from moderately moist to extremely arid, with intense sunlight and great extremes of temperature, and during the growing season only brief but heavy showers, usually during the latter part of the summer. Snowfall at high altitudes is usually heavy, and in sheltered canyons and on north-facing slopes the snow lingers until late July or August, yet there are no permanently snow-capped peaks, and only vestigial glaciers in the northern half of the region.

Much of this country is still little known botanically, and some of it remains largely unexplored except by prospectors of a past era. There are, however, five major highways, hard-surfaced and offering no difficulty to a modern car, which climb above timberline, so that it is possible to view a limited portion (not always the most interesting) of our alpine flora with little physical effort.

The number of species occurring over this vast area is perhaps somewhere between six thousand and ten thousand, but this is only

a guess, for there are no modern *Floras* dealing with much of the region, and taxonomists differ greatly in their delimitation of species. To gardeners acquainted with the plants of the Alps and of Asia, our flora must seem strange and restricted, for the familiar genera are either lacking or poorly represented. Bulbous plants are very few in spite of what seem ideal conditions for their development. Primula is represented by but two sections: Gentians are few and unimportant; there are only a few insignificant Saxifrages, three Campanulas, and a single perennial Androsace. It is in a few families and genera that we find our most attractive plants, and even these differ considerably from the more familiar ones of the florally richer territory along the Pacific coast.

Among the monocotyledons, *Iris missouriensis* is the only representative of its genus in the region, unless a rather dwarf form, showing infinite variations of colour, which I came upon many years ago on a dry mountain slope in southern New Mexico, has been resolved into a separate species. *Erythronium grandiflorum* is represented, on high meadows which it sheets with gold early in the season, by two or three rather vaguely defined subspecies; the varied colours of the north-western kinds are unknown in the Rockies. In recent years I have several times come upon the dry capsules of *Fritillaria pudica* on sunny grass-covered hillsides at low altitudes, but I have never met it in bloom, nor have I encountered the only other species, *F. lanceolata,* at all. The range of Calochortus is largely to the west, but several of the Mariposas may be encountered on sunny slopes and juniper-dotted plateaux. *C. gunnisonii,* normally a plant of very moderate altitudes, occasionally strays into the alpine zone. Here and there, in good seasons, I have come upon numerous Orchids, but most of them have had small greenish flowers of no beauty. *Calypso bulbosa,* though apparently rare, extends into the mountains of southern New Mexico, while in the northern states one may meet *Cypripedium montanum,* or even the yellow *C. pubescens* of our eastern flora.

One of the most attractive of our monocotyledons, and I believe among the least-known, is *Leucocrinum montanum.* A plant of dry meadows in the foothills, it is amenable and long-lived in my garden. I have never seen it growing wild, for although I have been told where it grows, it has remained dormant during the recent drought years.

Eriogonum, in well over a hundred species of assorted heights and values, is a pleasant but only mildly impressive feature of the less arid sunny valleys. Some of the mountaineering forms, and the minute mats that grow in central Nevada, are really desirable. *E. ovalifolium,* one of the best-known, is also one of the choicest, but

the best of all, dotting a summit ridge in the remote Snake Range of eastern Nevada with heads of brilliant red shades on inch-high stems above tiny silver mats, I have not yet succeeded in introducing or even photographing, and the road to it is long and taxing.

There are numerous high alpine buttercups which differ chiefly in the shape of their leaves and the size of their flowers. One of the best is *Ranunculus adoneus* from steep limestone screes in central Utah, where it flowers as the snow melts, and later attains a height of several inches. There are no white buttercups in the Rockies, and pink *Beckwithia andersonii* is a sagebrush plant from western Nevada, of which seeds have germinated, but have not reappeared the following spring.

Caltha leptosepala loves the wet margins of streams; I once saw a swamp, of perhaps a hundred acres, white with its flowers. It survives reluctantly and never flowers in moderately moist parts of the garden, apparently needing the bog if it is to be happy. *Trollius albiflorus,* reportedly a common plant, I have met only in meadows high above Leadville, Colorado, where it grew among dwarf willows in the company of *Anemone zephyra,* another plant that I have found only once.

Delphiniums, which poison the cattle, are common in subalpine meadows, rather tall and usually dull purple in colour; even *D. bicolor* may be two feet high. If there are worth-while species, I have yet to find them.

Aconitum columbianum appears occasionally in wet subalpine meadows, and on dry Sierra Blanca of southern New Mexico it grows no more than a foot high, but efforts to introduce this dwarf form in the hope that it may remain small under garden conditions, have been unsuccessful.

Aquilegia is one of my favourite genera. All the long-spurred species, and the midgets, come from western America. You are of course familiar with *A. caerulea,* the state flower of Colorado, which even on rock slides at altitudes of well over 12,000 feet may grow two feet high. The white form, *A. caerulea ochroleuca* of subalpine woodlands in central Utah, is even more spectacular, with flowers sometimes nearly four inches across. *A. flavescens* of Utah, and thence north and west, is the least impressive of our species, with smallish flowers of soft yellow or rarely pink. Some of the many forms of *A. formosa* grow in canyons of the desert mountains of Nevada, and are with some difficulty distinguishable from the endemic *A. shockleyi.* The flowers are usually darker and duller in colour than the ones shown. *A. micrantha* of south-eastern Utah and adjacent Colorado and Arizona is usually a lowlander, descend-

ing to 4,000 feet in the canyons, where it clings to damp sandstone cliffs or grows tall in the moisture at their base. Pale yellow is its usual colour, but from its occasional reddish or pale blue forms, distinct "species" have been established. Of the four miniatures, I have yet to find *A. saximontana* of alpine heights in central Colorado. *A. laramiensis,* closely related but much larger in plant and leaf, with tiny cream flowers, was, when I revisited its granite crevices in south-eastern Wyoming three years ago, reduced to a single, and fortunately inaccessible, plant. Some time I must return to see whether it has vanished or re-established.

Aquilegia jonesii I know from three stations in Wyoming and Montana, but in repeated visits there I have yet to meet it in bloom. In many seasons it is shy-flowering, and more than once I have searched acres of the limestone screes and crevices it inhabits, without finding more than one or two plants that had flowered.

A. scopulorum is a very high alpine from screes of limestone and tuff on two peaks of central Utah, and several of south-eastern Nevada. The form from the type station is the poorest, taller than most, and favouring pastel yellows and blues, with very rarely a pure pink. Elsewhere it is much clearer in colour even varying to rich purples and pinks, but the scarlet—that occurs in Cloqey's specimens—I cannot find. At lower altitudes, in canyons of brilliant red limestone, *A. scopulorum* var. *calcarea* is a much taller plant, even to two feet at times, with marvellous lacy rosettes of soft blue leaves, and flowers of brilliant deep blue. In even the most unfavourable seasons one can find a few flowers long after the main crop of seeds has been shed.

Dianthus is entirely lacking in the Rockies, but Alsine and Arenaria occur in great variety, not merely in the usual alpine types, but in compact buns and sharp-needled mats on the most arid plains. *Silene acaulis* occurs on most of the higher peaks, but seems far less floriferous, and poorer in colour, than in the Alps. Years ago I introduced from southern New Mexico, the great jagged scarlet suns of *Silene laciniata greggii,* where it grew in open woodland. It is completely hardy, but difficult to maintain. *S. petersonii* comes from very high limestone screes in two or three small areas of central Utah, where it flowers in late summer. It is usually frail, with only a few flower stems, but there are at least one or two really vigorous specimens. Although I have sent back seed five times, it seems never to have settled down in cultivation, and I have yet to raise a plant to flowering size.

Among the Crucifers, one finds a number of Erysimums, often good but unexciting. Among the best is *E. amoenum,* a small plant from high altitudes in south-western Colorado, with flowers that

change from yellow to purple and brown. It is apparently very scarce, and I have not seen it. *E. glaciale* from rocky slopes at nearly 13,000 feet in central Colorado may prove to be a prize, which grows happily but has not flowered in my garden. When I first met it, a few enormous second-crop flowers nestling among the jagged foliage, I almost fancied that I had met a high-alpine Oenothera. Drabas are numerous, largely tiny tufts of minute rosettes, mostly ill-tempered in the garden. *Smelowskia calycina,* on high peaks of Colorado, makes great sheets of finely cut silver foliage, topped by a profusion of white flowers. It seems undeservedly neglected.

Of greatest interest in the Mustard Family are Physaria and Lesquerella, which above silver rosettes, bear clusters of elongated flowers, yellow except in one species which I have never seen. *L. hemiphysaria* grows on hot sunny limestone banks in central Utah, at elevations of more than 10,000 feet. Lowland species are easily grown, but less brilliant in flower. *Physaria didymocarpa,* widely spread at low altitudes but always scarce, may form a rosette as large as a dinner plate, almost hidden under the inch-wide balloons, each of which contains at most a single seed. It is easily grown but short-lived in the garden and apparently in the wild, for I believe I have never met the same plant in two successive years. Last summer I came upon a species new to me, growing on a limestone bank at 8,500 feet in southern Colorado. It had incurving blue rosettes that resembled a thin-leaved Echeveria, and very small capsules. Seed was distributed, and if it can be grown successfully it should be a worth-while garden plant.

Petrophytum caespitosum (*P. elatius* is merely a more robust form with branching inflorescences, which sometimes appears with the type) has a curious distribution, occurring frequently along the arc of a semi-circle from southern New Mexico to the Grand Canyon and eastern Nevada, then north-eastward across Idaho into northern Wyoming, with a few appearances in southern Montana. It is strictly a plant of limestone cliffs and boulders, usually in full sun, normally a lowlander, yet in three ranges it appears in the alpine zone. with *Aquilegia scopulorum,* Eritrichium, and a Primula of the Section Parryi.

Kelseya uniflora is a great rarity, known from only three or four limestone canyons in the northern Rockies, at 4,000-5,000 feet. It selects only shaded cliffs, where it develops over perhaps a century into mats and humped domes as much as two feet across. The tiny sessile flowers are officially white, but the single one which I have seen was of a pure rose pink. It is so rigidly selective of its habitat that its successful culture in Great Britain seems almost incredible.

The Rose Family offers little else of interest. *Geum turbinatum* is often profuse at alpine levels, but one quickly becomes bored with it. *Sieversia ciliata* seems to me dull. *Potentilla fruticosa* ranges as far south as New Mexico, and alpine species there are in quantity, but none of special merit. *Dryas octopetala* is common in many ranges, and *D. drummondii* I met once in the gravel of a stream-bed in central Montana.

Saxifraga is poorly represented. *S. caespitosa* is common in Colorado, *S. austromontana* farther north. *S. oppositifolia* strays as far south as northern Wyoming, but I have not met it, nor the intractable *S. chrysantha* and *S. flagellaris,* for many years. Whether *Boykinia jamesii,* apparently restricted to Pike's Peak and one or two nearby mountains, is or is not distinct from *B. heucheriformis,* taxonomists cannot agree. The latter is of rather frequent occurrence in limestone canyons of northern Wyoming and southern Montana, occasionally straying into the alpine zone. All I have seen have been intense carmine in colour, never the violet of the descriptions. Heucheras are frequent, usually greenish or whitish in flower, of little value except for their foliage.

The West is rich in members of the Pea Family, of which the most interesting and varied are the Astragalads, including those which cause insanity in stock which has browsed on them. They insist on full sun, and many seem to require extremely alkaline soil, but the best are worth a great deal of trouble. Perhaps the most brilliant is *Oxytropis lambertii,* which last summer sheeted many acres of meadow at the foot of the Snowy Range in Wyoming.

With the exception of one or two alpine species, Lupins are tall and gawky, often with minute flowers. There are several alpine clovers, of which the least showy but most fascinating is *Trifolium nanum,* which forms small mats in the northern alpine meadows.

There are but three Campanulas: circumpolar *C. uniflora,* which I am doubtful that I have ever found; ubiquitous *C. rotundifolia*—or *C. petiolata* as most western botanists prefer—more upright and bushy than the form which occurs in the hills of New York; and *C. parryi,* of high moist meadows in central Colorado, which I met for the first time two years ago, and have yet to catch in seed.

Either Dodecatheons are quite scarce, or more probably my visits to the mountains have been too late in the season to find even their capsules. As soon as the snow melts, one high limestone ridge in central Utah is sheeted with a plant that seems close to, yet not quite identical with *D. pauciflorum.* In canyons and on alpine ridges of southern Nevada *D. jeffreyi* remains green all summer, and often grows in very dry locations. *D. uniflorum,* an

alpine of two inches, I recently rediscovered on another range some twenty years after I had first seen it, and hope that it will accept cultivation.

Primula is represented in the Rockies by only two sections. *P. parryi* occurs in nearly every high range from southern Montana into Arizona and eastern Nevada. It seems completely indifferent to exposure and soil, occurring on scree and in woodland. I have never succeeded in catching the brilliant red-purple of its flowers. On the sheer limestone summit cliffs of a high peak in eastern Nevada grows a species which Sir William Wright Smith declined to identify, although an American taxonomist has called it *P. maguirei,* otherwise known only from a low canyon hundreds of miles away. *P. ellisiae* is apparently restricted to two mountains in New Mexico, on one of which it sheets screes so gale-swept that photography has been impossible. *P. rusbyi* I have sought in vain. Of the several representatives of the Farinosae, I am acquainted with only *P. specuicola,* which clings to sandstone walls in dark grottoes, where there is constant seepage; in favourable locations it forms mats a foot or more across. It flowers in April, so that I have never seen more than wilted flowers, which are reputedly dark violet. It seems to be taking kindly to cultivation, but its hardiness is suspect.

Douglasia montana, in Montana and northern Wyoming, does its best to compensate for the lack of perennial Androsaces. I am told that it dots low hills with patches of brilliant pink in spring, but have never found it there except when in ripe seed. *D. montana biflora,* an alpine form from limestone meadows and fine scree, is the better plant in my garden, where for some years it self-sowed freely, and then departed without warning.

In most seasons one encounters along the roadsides great sheets of Evening Primroses, Oenothera spp., a foot or more high and rather blowsy in flower. They have been notably missing in the past three years of drought. The only really desirable ones are, in my opinion, the acaulescent types, of which *O. caespitosa* is best known. It is variable in size of plant and in foliage, and has been divided into several rather dubious "species". The most attractive have leaves softly gray and silky. Although it is normally a lowland plant, I once came upon it sheeting a ridge high above the last Eritrichium, so that even the alpine purist need have no qualms about its place in the rock garden. On a hot lime slide in central Nevada I have watched a few plants of *O. caespitosa crinita* struggling to survive, with never an offspring to carry on. It grows in humped domes of silken rosettes of an inch or so high, with flowers about two inches across. *Oenothera*

flava, of central Utah's high limestone ridges, is a small plant which I like very much, but in recent years it has developed a distaste for my garden.

You all know the Lewisias better than I, for only two are found in the Rockies. *Lewisia rediviva* is infrequent in the north, often growing under sagebrush. *L. pygmaea* is normally alpine or subalpine, but in one unusually wet season I found it dotting a sagebrush flat in eastern Utah. Last summer, high in the Snowy Range of Wyoming, I came upon a large flowered form, with pink blossoms fully a half-inch across. *Claytonia megarrhiza* of the highest peaks of Colorado makes vast succulent rosettes, often two feet across, ringed by small white or pinkish flowers.

Violas are few and unimportant. *V. venosa,* if it is correctly named, is another of the plants of central Utah, and is the only interesting one I have found.

Linum sedoides, at least in the alpine form from western Wyoming, is one of our choicest plants, but in gardens its flowers have proved misshapen and ugly. The other yellow-flowered species, and blue *L. lewisii,* are of little importance.

There are numerous mallows, of which one from along the Colorado River in eastern Utah is fairly typical. *Malva coccinea* sheets the dry and windswept plains of central Wyoming, and in my garden spreads underground and threatens to become a pest. Of the fascinating and incredibly scarce *Sphaeralcea caespitosa* of the West Desert of Utah, I have yet to find enough seeds for distribution. It will probably be an impossible plant, for lime crevices with 100° temperatures and rainfall of three or four inches a year are its choice.

With the exception of Arctostaphylos, the few ericaceous plants belong chiefly to Montana. *Phyllodoce empetriformis* and *P. glanduliflora* grow together in sunny wet alpine meadows, and hybridization is frequent. There seem to be two forms depending on which species serves as seed-parent, but neither is especially striking. *Cassiope mertensiana* I know from a single peak northwest of Yellowstone Park, where it grows on the highest slopes; it is probably at the eastern limit of its range. *Kalmia microphylla* is a shrublet of only three of four inches, with flowers that seem as large as those of our eastern species, and of even purer colour. It likes to grow in water from melting snowbanks, or in sphagnum bogs.

Our Gentians are disappointing. *G. parryi* and *G. calycosa* somewhat resemble *G. septemfida,* but lack its good nature. *G. romanzovii* of non-alkaline meadows, whitish with dark stripes, is

perhaps not far from *G. frigida.* It is rather striking, but difficult in the garden. *G. thermalis* (*elegans*) is a beautiful fringed biennial that sheets acres of wet meadow in Yellowstone Park. To the same section belongs perennial *G. barbellata,* a rare dwarf that runs underground with fine threadlike stolons, and flowers in September, so that seed rarely can ripen.

Polemoniaceae is in many respects the most worth-while Order that occurs in the Rockies. Of the Polemoniums themselves, among the species with coplanar leaflets there are various stalwarts, such as *P. occidentale,* inferior to *P. caeruleum;* there are some of a foot or two, that occasionally have magnificent flowers—among them *P. foliosissimum*—and several midgets, of which *P. delicatum* seems the prevalent one in the central regions. Dainty and delicate, pale lavender-blue, they are quickly forgotten when one comes upon the group with whorled leaflets. Whether these belong to a single species, two, or several, taxonomists still dispute; horticulturally they are certainly distinct. *P. confertum* of high slides and meadows of the Colorado mountains forms broad tufts, with stems up to ten inches high, and light lavender-blue (occasionally much darker) trumpets that may be an inch across the limb. *P. viscosum* of more westerly ranges is strictly a scree plant of half this size, with more deeply coloured flowers. There seem to be intermediate forms also. The two yellow-flowered members of this group are subalpine, both extremely rare. *P. brandegei,* tiny, with straw-yellow trumpets, clings to shady volcanic cliffs and is known from a few widely separated stations in southern Colorado, northern New Mexico, and central Utah. *P. mellitum,* which, so far as I have been able to learn, may be restricted to a small region near Laramie, Wyoming, is much larger and more vigorous. In its native granite cliffs it may make a mound nearly a foot across of loosely whorled, almost decumbent leaves above which rise the creamy trumpets. Unlike most of the group, it is (despite Farrer) odourless.

Gilia aggregata is frequently met, in canyons and on open subalpine hillsides, over a large range. Its trumpets, usually of flaming scarlet, make it a very showy plant that seems to be ignored by gardeners. In one limestone range in Utah, as soon as it ascends from canyons to alpine meadows, it changes abruptly from scarlet to white with minute red dots, so that it appears to be a soft pink. *G. nuttallii,* usually subalpine, is a loose bushlet of perhaps six inches at most, dotted with white phlox-like stars. *Collomia* (*Gilia*) *debilis* is a rarity that I have met in only two or three places, and have yet to introduce, for it flowers constantly throughout the summer and seems never to ripen seed.

Phlox is confused in nomenclature, and efforts to reconcile the multitude of names simply add to my confusion in the field. *P. caespitosa pulvinata* of the Snowy Range of Wyoming is the only one whose name I can guarantee. High alpine, a companion of Polemonium and Eritrichium, in some seasons many plants have flowers of rich violet. On two peaks in Utah grows one of the finest of all, dense frosted domes with long-tubed white flowers. Seeds of both of these were sent to your Seed Distribution last autumn. Almost every high peak north of Arizona and New Mexico has at least one species, sometimes more—all good, some superlative. In early summer one is likely to come upon the lowland species almost anywhere within our territory, on open or wooded slopes, on sunny plateaux, or on outcrops of lime rubble. They vary from tight little tufts, such as *P. hoodii* and *P. bryoides,* and the rock-hard domes of *P. tumulosa,* through loosely tufted forms to few-stemmed upright clumps of a foot or so, often with flowers in various shades of rose and pink. Seed is extremely difficult to procure, for it is scattered the instant it is ripe, and plants are difficult to re-establish.

The entire-leaved Phacelias, with flowers of washed-out lavender, are hardly of interest, but *P. sericea,* cut-leaved and silvered, often a very high alpine, has tufts of tiny flowers that vary from lavender to black-purple. It seems to be short-lived, even in the wild. *Hydrophyllum capitatum* is little more than a curiosity, with large balls of palest lavender sitting flat on the ground.

Among the Boraginaceae, Eritrichium is of course supreme. There are perhaps three species, although I find the characteristics used to separate two of them rather inconsistent. *E. argenteum* from Colorado and southern Wyoming is a minute tuft with stems no more than an inch high. *E. elongatum* of northern Wyoming, Montana, and Idaho is slightly larger in rosette, with stems of two to three inches. Both are plants of meadow or very fine scree, growing in the company of tiny Phlox, Erigerons, Polemoniums, and the like, equally happy on limestone, quartz, or granite. A third species, *E. howardii,* a minute bushlet with much larger flowers, I have seen only twice, many years ago, and have been unable to find since.

Mertensia varies from stalwarts of three or four feet, profuse of leaf and tiny of flower, to minute and evanescent lowland species, and two or three superlative alpines. *M. bakeri* from the Snowy Range is perhaps what I have distributed as *M. alpina* unless, as I debated at the time of harvest, two species were growing intermingled. Certainly the flowers I glimpsed last August in a driving

snowstorm at nearly 13,000 feet are not those of the supposedly synonymous *M. tweedyi* of high peaks in southern Montana, one of our loveliest alpines, for they are usually more compact and deeper in colour.

Occasionally in canyons one comes across a few plants of Lithospermum. *L. linearifolium* is apparently more plentiful in the neighbourhood of the Black Hills than of the Rockies. In my garden it often produces only cleistogamous flowers. Tiny cream-coloured *L. cobrense* I once found sheeting an open meadow in southern New Mexico, but was unable to persuade its seeds to germinate. *Myosotis alpestris* may sheet high ridges of the northern ranges.

Scrophulariaceae is perhaps the largest Order of distinctly ornamental plants which we have, and one of the most problematic in gardens. Castillejas are found everywhere, from canyons and sagebrush slopes to high alpine meadows. In spite of their reputation for parasitism, one may occasionally come upon an isolated plant growing happily in a rock slide without visible host. At times great sheets of bloom, many feet across, almost preclude the possibility that the plants can be dependent on something else to furnish their food supply. Yet a few grow among sagebrush or willows, and some in dense alpine meadow turf. Perhaps the best method of growing them is simply to broadcast seed in an alpine meadow or lawn, or near willows, and hopefully to wait for results.

Pedicularis are likewise subject to suspicion, but they occasionally select very strange locations. I have always regarded them as plants of wet places, yet last summer I met one species growing in arid lime scree near *Aquilegia jonesii,* a pink-flowered one in splendid isolation from its kind near the summit of a granitic knoll, and *Elephantella groenlandica* happy on a dryish alpine slope where underground moisture seemed out of the question—its companions *Polemonium confertum, Aquilegia caerulea, Phacelia sericea,* and Erigerons.

Penstemon, with well over a hundred distinct species in the region, is so varied in form and habit, and so temperamental in gardens, that only a few of the types will be considered. *P. pinifolius,* from dry hills at rather low elevations in south-western New Mexico and adjacent Arizona, should from its habitat be among the most difficult, yet since Priest and I introduced it in 1947, it has probably become more plentiful in gardens, and is certainly happier there, than in the wild. Of the small-flowered mat-forming types, some less than an inch high, all are delightful, and

Cypripedium calceolus.
(*See p.* 31)

Photo: Roy Elliott

Serapias lingua.
(*See p.* 32)

Photo: Roy Elliott

some are reasonably growable. *P. caespitosus* of Utah and south-western Wyoming varies from the compact to a few-branched erect shrublet of three inches (*P. caespitosus suffruticosus*) which flatly refuses to have anything to do with gardens. *P. laricifolius* is taller, to nearly a foot at times, with flowers that are sometimes of purest pink—a plant of dry plains and canyons of central Wyoming, yet not impossible in the garden. The only species of the shrubby subgenus Dasanthera to be found in most of the region is *P. montanus* of high lime slides, with relatively enormous flowers of lilac to dark blue; no one seems to have succeeded in growing it. With the exception of *P. cardinalis, P. barbatus* is probably the most tolerant of the group with tubular red flowers. *P. eatonii,* although it ranges from dry canyons to subalpine woodlands, is rarely a success in gardens, nor is *P. palmeri,* a giant from dry canyons of Nevada and western Utah. Its relative *P. rubicundus* is more colourful, but is confined to a single range (perhaps a single canyon) in western Nevada, has rarely been collected, and has been, I believe, a failure in gardens. *P. erianthertus,* wide-ranging and variable in northern Wyoming and southern Montana, offers no great difficulty in cultivation, but the other members of its section (Aurator) are largely exquisite miniatures from the incredibly dry low ranges of western Utah and Nevada—plants to tempt the gardener who finds Eritrichium an invasive weed! The clusterheads, Proceri, are easiest of all in gardens, with flowers of intense blue so small that only the most dwarf species are worth bothering with. Habroanthus is one of the more amenable sections, in which alpine *P. hallii* is the only true dwarf; the others vary to three feet or more, with long spikes of brilliant flowers of lavender and lilac to rich pure blue. *P. unilateralis* is of Colorado, *P. subglaber* of central Utah, where they often form wide sheets of brilliant colour. *P. secundiflorus* is a less generous species of south-eastern Wyoming.

Synthyris laciniata, of limestone ridges in central Utah, has bronzy leaves and deep blue flowers which appear as soon as the snow goes. Farther north, but also on limestone, *S. pinnatifida* and *S. paysoni* are larger, with finely cut foliage. All are reasonably adaptable to the garden.

Composites are everywhere, more than a thousand species ranging from the ubiquitous sagebrush and rabbit brush to delightful little daisies. Erigerons may be found among the sage, on mountain slopes, and atop the highest peaks. Many are really attractive, and easily grown, so that if they were more varied they might be more appreciated. *E. compositus* in a good form is perhaps the best of the lot; I prefer it to the only other cut-leaved

species, eight-inch *E. pinnatisectus* of the Colorado peaks. *E. simplex,* or closely related species, are on many of the summits, far more attractive than their pictures. A tiny Aster, currently, I believe, *A. alpigenus,* is exquisite, but so far as I can learn, it has never accepted cultivation.

Many of the Townsendias are lowlanders, but there is at least one true alpine. *T. montana,* which in western Wyoming has stems of several inches with coloured flowers, while on one lime ridge in central Utah it makes compact tufts, white-rayed, with heads twice the size of the minute rosettes. Cool lavender *T. parryi,* most exquisite of all, is a northerner, usually alpine or subalpine. It often flowers when just emerging from the ground, but may reach eight or ten inches late in the summer. It is short-lived, perhaps only biennial.

There are several Arnicas, of which *A. cordifolia* is the most widespread, all showy heads, but tallish ragged plants. It favours light woodland. *Hymenoxys* (*Rydbergia*) *grandiflora* displays its great suns in high alpine meadows on plants that are sometimes a foot in height. Among the curiosities, perhaps the strangest is *Cirsium eriocephalum,* which at altitudes of more than 13,000 feet in central Colorado, where the other alpines are stunted and unhappy, rises to more than three feet, with compound heads up to nine inches in length, carefully wrapped in wool for protection from the wild storms so common at those heights. It is perhaps only fair to warn those who are trying to grow it, that at more moderate elevations, around 12,500 feet, what seems to be the same species has only a loose spray of golden heads that, at least in late summer, are without a trace of wool. It is the most ferociously prickly plant that I know.

We have wandered far, but have seen only a small fraction of the interesting plants of the Rocky Mountains and Great Basin. Some I have not sought, others have eluded me, many more have proved camera-shy, especially when in flower. For some of the slides I have shown, I am indebted to various correspondents, Ralph Bennett, Frederick W. Case II, Chester Strong, J. W. Thompson, and Charles Thurman. To them go my thanks.

Discussion

Dr. R. Seligman. May I at the outset say what pleasure it has given me to listen to Dr. Worth and to see so many old friends in the beautiful pictures he has shown us.

My first contact with the Rocky Mountains was in the early days of this century when, in 1904, my interest in mountains was

solely geological, and it was not until much later that I began to take note of mountain flowers. In the autumn of 1937 I was privileged to spend a short week-end with Mrs. Marriage at her mountain home of Camp Aspen and, with her as guide, to visit Pike's Peak. In the spring of 1946 I spent another day at and around Camp Aspen.

My main impression of the Rocky Mountain flora is its extreme richness. My notes show that in my very short visits to a restricted area I was able to record some 69 flowering species. I was also struck by the great beauty of some of the plants, among which I may name *Boykinia jamesii, Pulsatilla hirsutissima* and, above all, the dwarf evening primrose, *Oenothera caespitosa.*

Dr. Worth has pointed out that the great majority of the Rocky Mountain plants are unknown in European mountains, but to one who has always been particularly interested in the wanderings of plants it is quite striking to note several commonly found European favourites in their western home. I may mention, for instance, *Dryas octopetala* and *Viola biflora* which were both recorded during my very short visits.

There is one question to which I would very much like an answer from Dr. Worth. My notes record both *Antennaria dioica* and *A. rosea.* Are they not identical? To judge by their popular names it would appear that they are, since *A. rosea* is known in America as "Pussytoes" while Swiss children give A. *dioica* the closely related name of *Katzenpfötchen.*

In conclusion, may I repeat my personal thanks to Dr. Worth for the pleasure his pictures have given me.

Mr. E. B. Anderson: I have corresponded and exchanged seed with Dr. Worth for many years, and I have been most interested to hear and see how the plants grow under what appear to be severe climatic conditions. I was most impressed by the fact that so many of these plants grow on limestone—a fact seldom appreciated in this country, and was interested to learn that many plants like *Aquilegia jonesii* are not free flowering in the wild.

WILD ORCHIDS OF FRANCE

By RAOUL MICHEL MAY
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(Chairman: Dr. H. Tod)

This modest review is presented as a homage to Charles Darwin's work on the fertilization of Orchids, on its hundredth anniversary.

The Parisian basin, while not favoured with lakes or mountains, nevertheless presents to the nature lover a wide variety of plant habitats. This is due to several factors, one of which is that a large belt of forests encircles the capital of France, forests which have been kept as nature reserves throughout the centuries, largely as hunting grounds for the reigning heads. These forests occur on very varied types of soils, calcareous, acid, dry and marshy. Numerous rivers, ponds and rolling hills exist not far from Paris, so that a diversification of microclimates allows for the qualitative and quantitative multiplication of Orchid species.

In late April and early May, the first Ophrys are to be found in the Paris region. Their haunts are the calcareous hills, often exposed due south. Under scrub or in glades—more rarely in the heavy shadow of trees—these harbingers of mid-spring remind one strangely of various types of insects. *Ophyrs sphegodes (aranifera)* the Early Spider Orchis, is often to be found in old quarries or in dry meadows. It is rather inconspicuous, with its brown labellum on which two to four longitudinal bluish-white stripes closely resemble a spider in quest of its prey.

I have had good results with this species in my garden, where its first leaves are to be seen long before winter is over. One should never attempt to transplant Orchids unless one can carry with the plant a good quantity of the surrounding soil, with the necessary symbiotic fungi. But as the weeds are brought along also, it is best to place the Orchid and the soil in a pot and to wait a few months until the stalk withers. The soil is then sifted, and the tubers are carefully placed in the chosen spot, surrounded by the sifted soil, and the whole is watered.

Transplanting a few specimens in this way does not prejudice the survival of Orchids if one restricts oneself to common species, which are often as beautiful as the rare ones. Indeed, the common species are often seen by the hundred in certain meadows or hills, and taking a few specimens does no harm to their natural equilibrium, which must be respected. This is, of course, not true if one collects the rarer species or if, even with common species,

all the specimens are taken, as is sometimes done for commercial purposes. However, many Orchids cannot long exist away from their natural milieu. Such is the case with most of the Ophrys :— *O. insectifera* (*muscifera*), *O. apifera, O. fuciflora* (*arachnites*) only last two or three years in the garden. On the other hand, many species of Orchis may find the new surroundings so congenial that they reproduce naturally there, and often form new hybrids.

Ophyrs insectifera (*muscifera*) the Fly Orchis, while rather rare in most parts of France, is not rare near Paris. Photographing it is always difficult, as the small size and the almost linear disposition of the various flowers along the stalk, together with the sombre reddish-brown of their petals and labellum, sorely tax the photographer's desire to separate the flowers from the background.

Such is not the case with two other Ophrys which I have already named : *O. apifera,* the Bee Orchis, and *O. fuciflora* (*arachnites*) the Late Spider Orchis, both of them little jewels which may be seen in late May and during June in the Paris region, often quite isolated. They much resemble each other, and at first glance one sees but the pink sepals and the brown labellum with its yellowish maculae. But closer observation reveals greenish-pink upper petals, and a trilobed labellum in *O. apifera,* and reddish upper petals and an oval-rounded hairy labellum in *O. fuciflora* (*arachnites*). Although these two species may be surrounded by grasses of their own height (up to forty cms.), the pink colour of the external divisions of their flowers makes them stand out in a most striking fashion, and they are easily visible from afar.

If these species of Ophrys are found in relative isolation, such is not the case with many species of Orchis, both near Paris and in many northern parts of France. During the entire month of May one can see large meadows so carpeted with Orchids that they are transformed into a living tapestry, all the more beautiful in that the whole gamut of colours is shown by a single species. Such is the case with *Orchis morio,* the Green-winged Orchis. From ten to forty cms. in height, its flower may be pure white, pink, lilac, red, or often violet. One of the most precocious of the Orchids, its tubers are not deeply buried in the calcareous soil which is its habitat. Yet it is difficult to acclimatize in the garden.

More ubiquitous in its habitat but equally varied in its coloration is *Orchis militaris,* the Soldier Orchis, with its two sub-species, *Orchis purpurea,* the Lady Orchis, and *Orchis simia,* the Monkey Orchis. They all have their sepals organized into a hood, pink in *Orchis militaris,* violet or deep red in *O. purpurea,* greyish pink in *O. simia.* In the latter the inflorescence begins to bloom at the apex, while in *O. militaris* it does so at the base. *O. simia* really

resembles a series of little pink gesticulating monkeys, the hood representing the head, while all the divisions of the labellum are directed outwards and remind one of the arms, the legs and a little tail.

Photographing this series of species and sub-species is a never-ending adventure, not only because the various specimens differ in size—from thirty to eighty cms. in height—and coloration, but also because in their natural habitat they occur singly, in groups, or in masses, and because they hybridize with each other. This makes for great variety and for many aesthetic possibilities. Indeed, *O. purpurea,* which is the commonest of the three, with its large and brilliant leaves and the splendour of its large inflorescence, is really a very sumptuous plant. I have seen specimens which were pure white in the forests north of Paris, and others which were so numerous that their violet colour was the dominating hue of a thicket. It is not rare to find hybrids, especially of *O. militaris* x *purpurea.*

O. purpurea is the ideal species for acclimatization in one's garden, as its transplanting is often successful, and the great numbers in woods and meadows cause no regrets if one fails. In the rock garden it vies with the most brilliant alpine species, and it does well in a variety of positions.

Another lover of calcareous soils is *Gymnadenia conopsea,* the Fragrant Orchis, also called Long-tails because of its spur—which is about twice as long as its ovary. It can occur in masses, and I have seen fields of it near Obernai in Alsace, and goodly numbers at the Lautaret Pass at an altitude of 2,058 metres. But even near Paris one may see patches numerous enough to colour the grassy background with their pink hue. While not as showy as *Orchis purpurea,* their sweet fragrance is an advantage over the latter, but unfortunately I have never been able to transfer them to my garden.

While the aforementioned species are the principal ones which one may expect to find in the open spaces of the Paris region, there are others which are less showy but very curious. Such is *Aceras anthropophorum,* the Man Orchis. One must be really alert to see it, as its greenish-yellow colour so resembles that of the grass of late spring that only experienced eyes will discern it. In French its name is *Homme-pendu* ("Hanged-man") and it certainly is less gracious than the Monkey Orchis with which it hybridises; its labellum hangs straight down, with its four divisions, resembling the arms and legs of a dead man, unlike the gesticulating members of *Orchis simia.* It is only when they begin to wither that the flowers of *Aceras anthropophorum* take on a more life-like tint and attitude.

It is often on the slopes along the roads, on embankments, or in old quarries that one observes the very curious *Himantoglossum hircinum,* the Lizard Orchis. Its inflorescence is constituted by fifteen to forty rather strongly-scented flowers whose odour resembles that of a he-goat. Although their colour, greenish-white with reddish spots, is not such as to attract attention, the height of the plant in bloom, from thirty to ninety cms., and extraordinary labellum with its three tongue-like elongated lobes—the central one up to six cms., in length—are immediately noticeable. As a matter of fact, I have often spotted this species from a moving car, and it is best to stop and photograph it immediately, for its flowering season, late spring and early summer, is the one chosen by roadmenders to mow its favourite slopes.

In spite of its Latin synonym, *Platanthera chlorantha* (*Orchis montana*) the Greater Butterfly or Green Orchis, is rather common on the hills around Paris. The greenish-white colour of its small flowers renders their spikes rather inconspicuous, but one's attention is drawn to them by the curious arched spur which is somewhat club-shaped and almost twice as long as the S-shaped ovary.

Another lover of open spaces, but far rarer, is *Anacamptis pyramidalis,* the Pyramidal Orchis. Its haunts are the calcareous fallow lands of the plains, the sunny hills or the lower mountains. In the Paris region one may find small groups flowering in middle or late June. The short spike of intensely pink flowers is at first pyramidal in shape, later oblong.

While the species which we have so far described are mostly to be found in the sunshine, the woods and forests near Paris, even the dense ones, are the habitat of several most interesting Orchids. One of the least conspicuous of these is *Goodyera repens,* the Creeping Lady's Tresses. This used to be rare throughout France, but it has become much less so these last years. A walk through the pinewoods of the region to the south-west of Paris long before Spring, reveals the little rosettes of its basal leaves already well formed. Apparently the proximity of *Pinus silvestris* is necessary to it, and it has been introduced with plantations of this forest tree. I have but one pine in my garden, and I have never been able to keep *G. repens* in it beyond the first year. It is late in flowering, its stalk ten to thirty cms. high, bearing in mid-July a terminal spike of closely-pressed small white flowers, which are covered with glandular hairs.

Two Helleborines are common in the shade of the woods near the capital: *Epipactis atrorubens,* the Dark Red Helleborine, and *Epipactis helleborine* (*latifolia*), the Broad Helleborine. Of these bulbless Orchids the former is the more striking, its long cluster

of beautiful violet-red or deep-red flowers reaching up to fifty cms. from the soil, almost all of them on the same side of the stalk, with a delicate vanilla-like fragrance. It blooms in the summer, but *Epipactis helleborine* (*latifolia*) flowers even later in the season, up to September. The latter's flowers are disposed in the same manner as those of *E. atrorubens,* but there are generally fewer on the stalk and their colour, greenish on the outside, reddish on the inside, does not distinguish them well from their milieu, as is the case with those of *E. atrorubens.* However, *E. helleborine* (*latifolia*) is really very common in the woods, so much so that it has spread naturally into gardens. What was my surprise last year to see several specimens amongst the ivy under the shade of a Thuja and a hawthorn! Their bloom was the last of the Orchids, and expressed for me a nostalgic adieu to summer.

Deep in the woods of beech and conifers one can occasionally observe an Orobanche-like Orchid, and like the Orobanches it is parasitic or semi-parasitic, apparently on the roots of trees. Without chlorophyll or real leaves, with a nest-like clump of roots—whence its name—*Neottia nidus-avis,* the Bird's nest, has an inflorescence which is yellow or sandy-coloured at first, later becoming a darker brown. It really is much more abundant than one might think, but many inflorescences never reach the light and bloom within the soil. The entire evolution of the plant may take ten years. It was while studying this species in 1898 that Noël Bernard elucidated the mystery of the germination of Orchids. Up to then, gardeners and horticulturalists like Neumann in France and Dominy in England, had been able to reproduce exotic Orchids from seeds by sowing these on soil or Sphagnum already inhabited by Orchids. But no one knew why seeds grown on ordinary soil never germinated. While taking a walk, Bernard found a Neottia which, after blooming, had bent into the ground so that the seeds had germinated within their capsule. Examination of these seedlings showed him that they had been invaded by the mycelium of a fungus, which we now know was probably the one found normally in the roots and the rhizomes of Neottia. Further careful work under sterile conditions led Bernard to isolate in 1904 a fungus from Orchid tissues, which he called Rhizoctonia, and whose pure cultures, added to the ungerminated seeds of various Orchids, penetrated into the latter and brought about their germination.

This was a beautiful demonstration of the symbiotic mode of germination and life of Orchid seedlings; it has had great practical applications in Orchid horticultural practice. We know now that all Orchids have a similar biology. Together with Charles Darwin's great work on the fertilization of Orchids by insects, done just a

century ago, Noël Bernard's contribution has done much to elucidate the mode of life of the Orchid.

Far more beautiful than *Neottia nidus-avis*, but with a similar biology, *Limodorum abortivum*, the Limodore Orchis, whose height may reach seventy five cms., is of a splendid violet or blue colour. Saprophytic or parasitic, no one is sure, it certainly must get its subsistence from other lower or higher plants, since it has no chlorophyll or real leaves, whence its name of *abortivum*. I have always found it in the shade, often of *Pinus sylvestris*, although not as deep in the woods as Neottia. Finding a group one year is no assurance that one will find it the next in the same spot, as it may skip one or more years without showing itself. A group of Limodorum in full bloom is a sight which no naturalist will forget.

These Orchids are all inhabitants of calcareous soils. There is an insensible gradation from these to the ones which show little preference for particular soils, or those which thrive in acid ones and finally those which are inhabitants of the bogs and marshes, either calcareous or acid.

Thus *Orchis mascula*, the Early Purple Orchis, has a distinct preference for argillaceous compact soils and is rather rare in the region of Paris, but common in most parts of France except for the Mediterranean region. I have photographed beautiful specimens in Burgundy and in Auvergne. Superficially it resembles *Orchis morio*, but its stalk is usually higher, its labellum is longer than wide, and its spur is as long as the ovary—while in *O. morio* the labellum is wider than long and the spur shorter than the ovary. But, like *O. morio*, the colouration of the flowers runs through a wide gamut from pure white to pink and deep violet.

Two species with finger-like tubers are somewhat difficult to differentiate in certain cases, especially as they sometimes hybridize: *Orchis maculata*, the Spotted Orchis, and *Orchis strictifolia* (*latifolia*), the Early Marsh Orchis. They both have leaves with brown spots and bracts which are as long as the ovary in *O. latifolia* and a little longer in *O. maculata*. The variation in colour is wider in *O. maculata* (from white to pink or lilac, with violet marks) than in *O. strictifolia* (*latifolia*) (usually deep pink with violet marks). But their habitat is different; *O. maculata* is found in siliceous or decalcified soils, while *O. strictifolia* (*latifolia*) is an inhabitant of humid and marshy calcareous terrain; both are found from sea-level to two thousand metres.

It is but a step to the Orchids of bogs and fens. Of these we shall speak of only two—*Orchis palustris*, the Bog Orchis, is rather rare, and difficult to differentiate from *Orchis laxiflora*, the Jersey

Orchis. Here again the pH of the soil is a good guide, *O. palustris* preferring calcareous marshes, *O. laxiflora* acid ones. It is in Brittany that I have found *O. palustris* most abundant, so much so that the people make bouquets of this Orchid, which is quite attractive with its rose-violet colour which stands out from the greenish tint of the marsh vegetation.

Epipactis palustris, the Marsh Helleborine, where found, often forms abundant colonies. I bring to mind the Cirque du Fer à Cheval, not very far from Chamonix. At the foot of a series of impressive waterfalls, at an altitude of a little under 800 metres, the marshy terrain harboured thousands of Pinguiculas and Marsh Helleborines. How gracious were the latter, in full bloom in mid July! The colours of the flowers are far from striking, as the three sepals are greyish, the upper petals and the labellum white with a few pink stripes. But it is the general aspect of the plant which has a noble bearing, up to sixty cms. in height, with the bunch of terminal, rather loose flowers, almost all turned towards the same side.

Three Cephalantheras may be found in France: only one, *Cephalanthera damasonium* (*pallens*), the White Helleborine, is rather common in the Parisian woods. To see the other two at their best one should travel to the Midi; in the woods or among the calcareous rocks of the plains, or in the mountain forests, such as those of Mont Ventoux or Sainte Baume, one comes upon colonies of the other two Cephalantherae: *Cephalanthera longifolia* (*ensifolia*), the Long-leaved Helleborine, and *C. rubra,* the Red Helleborine. The three species may reach sixty cms. in height, and they have no bulbs. The sepals and petals of their large flowers are all of the same length, and there is no spur on the labellum. While *C. damasonium* has yellowish white flowers and *C. longifolia* (*ensifolia*) pure white ones, the most exquisite of the three is surely *C. rubra,* with its spike of deep-pink flowers, each of which has a bright-green bract. I well remember a large colony of them, at an altitude of about eight hundred metres, under Lebanon cedars. With the interplay of sunshine and shadow their colour changed from a pale to a very deep pink, and the colour photographs of the same specimen were quite varied. To my mind this species, so rare in Britain, is, after Cypripedium, the most beautiful of our native Orchids.

In the Sainte Baume forest, which has been set apart as a Nature Reserve, one may also find *Orchis sambucina,* the Elder Orchis, a species quite close to *OO. maculata* and *strictifolia* (*latifolia*). This is a mountain species, quite rare in the plains, and absent from the north and west of France. There are two types: one with pale yellow (or rarely white) flowers, and a labellum with

red spots: the other deep red with a labellum whose base is sometimes yellow or white.

It is in the high mountains that one is sure to find many Orchids, some of which are abundant in the plains, others whose habitat is exclusively on the heights. Others still may be found rarely in the plains and yet be abundant in the mountains up to the sub-alpine zone. Such is the Lady's Slipper, *Cypripedium calceolus,* (illus. p. 19) the most showy of our Orchids, and the only one whose labellum, two or three cms. long, is formed into a hollow slipper-like structure; its yellow colour is distinctly different from the other divisions of the flower, which are organized into a deep purpish-brown cross-like structure. *Cypripedium calceolus* is very rare in the Eastern plains of France but fairly common, in places, in the Alps. It is easily acclimatized in gardens, and with its frequent destruction in the mountains wherever it grows near the roads, one wonders whether its culture in gardens should not be encouraged.

Such could certainly not be said for *Corallorhiza trifida* (*innata*) the Coral root; saprophyte or parasite, no one knows for sure, but we find it in the mountainous forests of beech or fir. This leafless species, of short vegetative visible life, has insignificant greenish-white flowers. I found it only once, at an altitude of 1,150 metres on the Mont Aigoual, not far from Montpellier.

Another rather insignificant species, from the aesthetic point of view is *Coeloglossum viride* (*Orchis viridis*), the Frog Orchid, which is not confined to the mountains, but especially abundant there. I have seen many in the Vosges and at Val d'Isère, in Savoie. The divisions of its flowers, green with a reddish border, would easily be overlooked, were it not that the plant stands quite erect among the surrounding grass.

Less easily overlooked, not only because of the whiteness of its flowers, but also because of their fragrance, is *Platanthera bifolia* (*Orchis bifolia*) the Lesser Butterfly Orchid. Their spur is most curious; filiform and curved, it is almost twice as long as the ovary.

What is more charming than an Alpine meadow in July, with its millions of multi-coloured flowers gently swaying under the breeze? It is here that, among other gems, one may observe the Nigritellas and *Orchis globosa.* The red variety of the former, *Nigritella nigra* var. *rubra* is the rarer and the more precocious in blooming. which it does late in May. Otherwise, it is much like *Nigritella nigra,* the Black Orchid.

In the same habitat, at an altitude from 900 to 2,600 metres, but less frequently found, is *Orchis globosa.* Its stalk is much taller

than that of Nigritella, here thirty to fifty cms. Its name, the Globular spiked Orchis, really describes well the close spike of crowded lilac or lavender-pink flowers. The trilobed labellum is marked with violet spots. How well do I remember a group of them on the mountain La Dôle, at an altitude of 1,680 metres, completely surrounded by masses of *Paradisea liliastrum* and *Lilium martagon!*

The Pyrenees also have their treasures, some of which we have already named. But one need not climb these mountains, but merely go near them, to find the Serapias, extraordinary Orchids quite different in their form from those I have described. As a matter of fact, the Serapias are present also along the entire Mediterranean coast, and one finds some in the south-west of France. Their stalk, about twenty five cms. high, bears a terminal spike of only three to six or eight big flowers. Their three sepals are fused into a greyish-red hood, and the long labellum is tongue-like in shape and colour. This gives its name to *Serapias lingua,* the Tongue-flowered Orchid, (illustration p. 20) where the labellum may be one and a half cms. long. In the case of *Serapias cordigera,* whose labellum has two lumps at its base, and may reach three cms. in length, we are rather reminded of a heart, whence its name, the Heart-flowered Orchid.

Serapias is the name of an Egyptian divinity. These Orchis are links between those of Europe and those of Africa. Their aspect is really exotic, and while observing them our mind wanders far and away over the plains and into the jungles of other continents, where Orchids constitute the most numerous of the Angiosperm families, and where our small European specimens are magnified into the most beautiful and the most ubiquitous of all the flowers.

Discussion

G. M. Morel (Paris): The mycelia of Orchids have been well studied by Bürgeff and according to their morphology they can be classified in several groups. Those of our native non-saprophytic orchids seem to belong to the same group.

As far as the specificity is concerned, the information we have derives mainly from the cultivation of tropical species. It seems to be very wide. Plants as different as Cypripedium and Cattleya have the same type of endophyte and may be grown with the same mycelium.

The symbiotic technique is not used any more now by orchid growers: almost everybody uses the asymbiotic technique of Knudson.

THE LONDON SHOW

By RHINANTHUS

It can be stated without much fear of contradiction that the London Show produced the most comprehensive collection of alpine plants ever to be brought together under one roof (illus. p. 2). There were 772 entries, and the writer may therefore hope to be forgiven if justice is not done in this report to every worthy exhibit. Mr. Clifford Crook and his Sub-Committee, assistants and stewards are to be most sincerely congratulated on a Show which will long live in the memory of those who visited it.

Quite the most outstanding feature of the Show was the magnificent rock garden built by the Royal Horticultural Society's Wisley Garden staff, under the direction of the Curator, Francis Hanger; it was magnificent. A high sandstone escarpment sloped gently down, by way of a scree, to the turfed foreground (illus. p. 37). The scree was full of fascinating plants, including Orchis and Iris species newly introduced by Patrick Synge and Admiral Furse from Turkey and Iran, and also the unusual *Carduncellus rhaponticoides* which received an Award of Merit. In the foreground were fine clumps of *Soldanella villosa* and a fourteen-flowered group of *Cypripedium pubescens.* Dotted about were fine specimen conifers such as *Chamaecyparis obtusa minima* and *Juniperus communis echiniformis,* another plant of which received an Award of Merit at the Show. Outstanding, too, were the plum coloured flowers of *Rhododendron campylogynum* var. *myrtilloides* with the flowers covered with bloom like choice grapes.

One mentions the Wisley exhibit first, because it was the first thing to catch the eye on entering the Hall, but no less praiseworthy and interesting was the remarkable amateur exhibit, by J. W. Archer, including eighty five different mutations of *Picea abies,* each one taken as a cutting from various Witches' Brooms, and each one entirely different in shape, colour, leaf and habit. The many fine dwarf conifers exhibited by J. W. Archer, and also by R. S. Corley, were certainly one of the highlights of the Show for those to whom this form of specialization appeals. The Show was well supported by our friends in the Trade. There were nine very excellent Trade exhibits and I fear that space does not permit me to do justice to the fine display of individual plants which they provided. W. E. Th. Ingwersen received a Gold Medal for a particularly outstanding exhibit, but hardly less outstanding were the many other displays by such firms as Hilliers Ltd., Frampton Plants, G. B. Rawinsky, Alan Smith and others. In addition to these Trade exhibits a very fine feature of the Show was the six non-competitive exhibits. There was, for instance, a remarkable collection of interesting plants in pots displayed by Cambridge University Botanic Garden (Gold

Medal), which was the more notable for the very great care in arrangement and documentation showing the habitats of each plant, and brought many appreciative comments from visitors. Amongst the many unusual plants on this exhibit were the attractive (but presumably tender?) *Cheiranthus arbuscula,* from wild collected seed from Madeira, and *Lotus paivae* from the uninhabited Salvage Isles in the Madeiras. *Ranunculus bupleuroides* was an attractive grey-leaved plant with large yellow flowers, collected by F. Waley in Portugal in 1959. Here too, was a small plant of *Pyxidanthera barbulata*—the only other specimen which the writer has ever seen was in the same Hall: Harold Epstein, President of the American Rock Garden Society, had very nobly carried a well-flowered specimen of it all the way from New York with him, and a great pleasure it was for us to see it (description p. 46).

Tribute must also be paid to two other non-competitive exhibits; firstly the wonderful collection of Lewisias displayed by A. G. Weeks (Silver Medal)—a most remarkable feat by an amateur, which provided us with our first sight of his incomparable seedling *Lewisia* 'Weald Rose' since we saw it at an earlier Chelsea Show. Secondly, there was the most impressive collection of Sempervivum displayed by Mr. S. A. Gault of Regents Park, comprising close on eighty beautifully grown pans, for which display the Society owes Mr. Gault its most sincere thanks (Silver Medal).

But what was the finest plant in the Show? This is always a popular question, and in the opinion of as distinguished a set of Judges as we have seen for many a day, the Farrer Medal went to Dr. J. G. Elliott's *Castilleja hololeuca.* This was a most interesting plant (illus. p. 38), with silver foliage and pink flower spikes. It is referred to in the discussion reported on p. 48, and is an endemic of the islands off the coast of California, of which Santa Cruz is the most easterly; here it grows in company with *Eriogonum arborescens.* It has been described by Dwight Ripley as a "large woody shrub with linear leaves like those of *Helichrysum stoechas*". It has been grown with moderate success—I understand—at the Santa Barbara Botanic Garden, and was offered as collected seed in the A.G.S. 1960 Seed List.

After the finest plant in the Show, must come the Sewell Medal, and on this occasion both an R.H.S. Sewell Medal and an A.G.S. Sewell Medal were awarded for groups of six plants. The former was won by S. E. Lilley, whose exhibit included magnificent pans of *Cassiope lycopodioides* and *Pleione formosana* 'Oriental Grace'. Second prize went to R. C. Elliott, whose *Gaultheria eriophylla* (*willisiana*) attracted much attention, and third to Mrs. Earle, whose group of six included as fine a pan of *Cyclamen balearicum* as has been seen for years.

The A.G.S. Sewell Medal, with a pan-size limitation of nine inches, was most deservedly won by Mrs. Greenfield with exceptional plants of *Daphne petraea* and *Eritrichium nanum.* Miss Rome was third, with a fine pan of *Schizocodon macrophyllus,* and another interesting plant seen in a non-prizewinning group of six was R. C. Elliott's purple-blue *Oxalis laciniata,* recently introduced from Patagonia by Mrs. Ruth Tweedie.

It is hoped that readers of these notes will appreciate that it is the writer's intention to pay tribute to the really outstanding plants in the Show, rather than to the growers who were responsible for them. Next in importance, perhaps, come the A.G.S. Medal Classes, each for a group of six plants. In the Asiatic Class was a particularly fine specimen of *Verbascum dumulosum* (Dr. J. G. Elliott, the winner). Mrs. Griffith won the Medal for Bulbous Plants, with some excellent Fritillarias, including *FF. pyrenaica, pallidiflora* and *tuntasia.* Other interesting plants in this group were the small-flowered *Fritillaria liliacea,* and—to the writer's astonishment—*Cypripedium cordigerum,* which he always thought rhizomatous. In R. C. Elliott's prize winning group of European Plants was *Anchusa caespitosa*—interesting because it was adjacent to another plant of the same species with pale blue flowers to contrast with the deep blue of the former.

In the Medal Class for American Plants, Dr. J. G. Elliott's name was again to the fore with a fine plant of *Calochortus lilacinus* and a singularly compact plant of *Uvularia perfoliata,* a member of the Liliaceæ related to Tricyrtis; his group included a superb specimen of the difficult *Eriogonum ovalifolium*—a dense silver foliage plant with primrose-yellow flowers on six inch naked stems. The Medal Class for six dwarf conifers was won, appropriately enough, by J. W. Archer, with six distinct forms of *Picea abies* showing remarkable variation.

The Medal Class for six pans of Saxifraga was won by Dr. J. G. Elliott, and it was interesting that *Saxifraga florulenta* was displayed in three out of four exhibits. Yet how many of us have ever seen it in flower—or indeed, has it ever been known to flower in cultivation?

The Roger Smith Cup, which was offered for collected plants, or those raised from seed went to Mrs. Greenfield, with a perfectly formed cushion of *Androsace helvetica* and the rare, white-leaved *Senecio uniflorus* with yellow daisy-like flowers; the runner up was Mrs. Saunders with some fine pans of *Cyclamen persicum* and *C. repandum.*

Finally, amongst the major award classes, we must mention the Donald Lowndes Memorial Bowl, which was offered for a group of three plants shown by an amateur who has never won a first

prize at the Society's Shows. The Award went to Dr. J. A. Hobson, and it is only fair to remark that the three plants exhibited were an absolute model of good cultivation : they were *Asperula suberosa,* tight and compact and a smother of pink flower : *Androsace villosa arachnoidea,* which is not the easiest plant to show in good condition, and *Phyllodoce empetriformis*—that genus which is the despair of all exhibitors, for if the tiny bells open, they invariably drop off in transit to the Show. Yet this plant was absolutely perfect, and Dr. Hobson is to be sincerely congratulated on an exhibit which was —in its small way—quite outstanding.

And of the other seventy classes in the Senior Section? Let us consider some of the outstanding plants. The Primulas were disappointing, as was to be expected in so "early" a year, though a good *P. albo-cincta* (C. H. Hammer) and *P. aureata forma* (S. D. Albury) were shown—the latter a poor thing by comparison with *P. aureata* itself. A particularly fine *Androsace wulfeniana,* with many pink flowers, was shown by Mrs. Greenfield, and it was a pity that Mr. Hammer's wonderful cushion of *A. helvetica* was not in flower. Sempervivums were there in profusion, gaining a 1st Prize for Mrs. D. A. Moore, with Mrs. Hecker a close runner-up—her pans almost approaching in size the wonderful display featured by Mr. S. A. Gault.

The four most outstanding Conifers were *Juniperus communis echiniformis* (an Award of Merit), *Cedrus libani sargentii* (Mrs. Gray) *Dacrydium laxifolium* (R. C. Elliott) and John Burges's wonderful specimen of *Cedrus* 'Comte de Dijon', which was one of the finest individual plants in the Show. Mrs. D. E. Saunders always distinguishes herself in the entries for bulbous plants, and it was a pleasure to see her rare *Scilla peruviana* var. *hughii* in flower. F. W. Buglass showed an outstanding plant of *Cyclamen persicum,* and *Pleione limprichtii* (J. Edmunds) was equally good.

Gentiana 'acaulis' always gives one a thrill of pleasure, and I counted fifteen flowers on Dr. J. G. Elliott's lovely plant of it. This reminds me of the charming gesture of the Scottish Rock Garden Club, whose official table included *both* Society's emblems. The Gentian was in full flower, while the Dryas was in bud—showing promise of the future. If this was symbolic, it was certainly brought to fulfilment at the wonderful Edinburgh Show, which was to delight us later. (Full report on p. 152).

It was pleasing to see Mr. Hammer's *Ranunculus* 'Essex' (*amplexicaulis* × *parnassifolius*) on display again, and the more interesting to see it alongside *R. amplexicaulis* for comparison. Dr. J. G. Elliott's 'blue buttercup' (*Anemone obtusiloba patula*) was particularly good, with solid flowers of very deep blue.

The classes for Compositæ were again disappointing, and one

The London Show—the Wisley exhibit.

Photo: J. E. Downward

(*See p.* 33)

The London Show—Farrer Medal Award, Castilleja hololeuca.
(*See p.* 34)
Photo: J. E. Downward

questions why, with all this vast genus to choose from, exhibitors should show such conservative attachment to the Helichrysums and Leucanthemums; in just the same way the classes for Orchidaceae were full of the forms of *Pleione formosana*—though there were many other orchids to be seen amongst mixed genera classes. The 'Everyday Rock Plant' classes seldom seem to justify their retention in the schedules, though Miss Beausire's *Armeria caespitosa* was a good example of what can be achieved.

The Shrub Classes are always amongst the most interesting, and here the Judges quite rightly insisted on well-flowered specimens. Mrs. D. E. Saunders took first prize with *Acer cretica,* and *Cytisus demissus* in full spate of flower, but Lady Drury's three Daphnes (DD. *sericea, retusa* and *petraea*) must have given the Judges much cause for reflection. Miss Christie Miller's venerable *Daphne petraea grandiflora* was, to the writer, the most outstanding plant in the Show: it had a span of seventeen inches and was a mass of deep red, sweet scented flowers. One of the great joys of the shrub classes, however, is to study the many exhibits which won no prizes, but were exhibited for interest. Mrs. Greenfield's *Ilex crenata mariesii* was a wonderful plant of tremendous age, and a rare Tasmanian shrub, *Citriobatus multiflorus* is one seldom seen in cultivation. *Rosmarinus prostratus* (Dr. Tomlinson) was beautifully flowered, and Mrs. Griffith's *Prunus prostrata,* though unplaced as a prizewinner, was quite delightful.

Ferns are amongst the many things about which the writer feels unqualified to comment, but R. F. Cartwright's group of three were delightfully fresh and well grown—as was S. R. Piggin's *Ceterach officinarum.* One always looks for inspiration from the classes for 'Rare and Difficult' Plants, and on this occasion I felt a mild disappointment. There have been so many fine introductions of late, that one expected to find a far greater array of them here to entrance the eye. Be that as it may, *Fritillaria guicciardii* (Mrs. Saunders) collected in Greece by Mr. Schatzl of Linz, was most noteworthy, as were the foliage effects of the Rhodes form of *Cyclamen repandum* (Mrs. Saunders) and the fascinating little composite of Mrs. Tweedie's Patagonian collecting, *Nassauvia revoluta* (R. C. Elliott).

Much of this report has been devoted to the Senior Section, and it should be explained that at this Conference Show, the two sections A and B of previous London Shows were combined. The Junior Section therefore did not comprise previous Section B exhibitors, but the previous Section C exhibitors (together with those who had not been awarded the Society's Bronze Medal) and it offers great hope for the future that the plants in the Junior Section were so many, and of so very excellent a standard.

The Judges had a very difficult time deciding on the winner of the Three-pan Rock Plants Class, the prize eventually going to Dr. J. A. Hobson by an almost indiscernable advantage over the plants of G. S. Woollatt. Similar difficulty arose over the Conifers—Dr. J. A. Hobson's trio eventually winning on age alone, but the same exhibitor's *Juniperus echiniformis* was quite outstanding in the single pan class. In the Ericaceae, Mrs. Wilson had a most attractive plant of *Andromeda polifolia,* whilst Mrs. Scott's hybrid *Rhododendron* x *radmosum* was also exceptional. Of the Sempervivums and Sedums it is always hard to write, but if one considers what most Judges look for, the winning plants are generally obvious. For instance, with Sempervivums one expects cleanliness of rosettes, and tightness of hummock, and a species is preferable to a hybrid. Mrs. Wilson's entry admirably fulfilled all these requirements. With the Sedums, one must watch for tenderness, and although tender, Dr. Hobson's *Sedum palmeri* was first, Mrs. Steven's *S. stahlii* was equally suspect from a hardiness point of view.

Of the Shrub Classes, mention must be made of Mrs. C. Wilson's excellent group of three, and it was a pity that the runner-up was disqualified on the grounds of *Helichrysum virgineum* being considered NOT a shrub. It is a good rule in Shrub Classes to say that if exhibitors have doubts as to whether a plant is a shrub or not, they should refer the matter in advance to the Hon. Show Secretary.

Ferns, Conifers, and " Pans planted for Effect " generally baffle the Judges, and Mrs. Dawson's delightful small form of *Asplenium adiantum nigrum* took first prize against R. F. Cartwright's rare *Cryptogramma crispa,* whilst a well-merited first went to Mrs. Usher in the " Pans for Effect "—it must have been very difficult to judge these excellent entries, and G. S. Woollat's entry seemed equally meritorious to an inexperienced eye.

In the Cut Flower Classes, Mrs. P. G. Carter and Miss M. Sharples distinguished themselves, the former producing a delightful bowl of flowers which went delicately through the range from blue to white. The Artistic Section was not well supported, though Mr. G. Parker kindly put on display his botanical watercolours of Cyclamen which were beautifully portrayed (non-competitive). Miss M. C. Stonor, of Ottawa, showed three delicate watercolours, and Herr W. Schacht showed six wonderful black and white photographs. Last, but by no means least, mention must be made of the display of large colour prints by Miss Valerie Finnis, which were quite the finest of their kind we have ever been privileged to see at our Shows. This was a Show we shall remember with pleasure for many years to come.

DISCUSSION—
PLANTS IN THE SHOW

(Chairman: Dr. G. Taylor)

Dr. Roger Bevan (London): It is very difficult to pick out some four or five of the things most worthy of comment in this magnificent Show. I feel that I must start off with one of the most beautiful, *Androsace helvetica,* grown by Mrs. Greenfield. There are certain plants for which one has a great affection over the years, particularly if one goes to the mountains to find and to photograph them. This plant is superbly grown, and is as good as it can be. It was collected in 1948, thirteen years ago, and that is a great triumph. It is about four inches across, it is absolutely in character, as if it were in its own limestone cliffs. It is not completely covered with flowers in the way that *A. argentea* covers itself, but it has nevertheless a great deal of flower on it. The flowers are utterly stemless, overlapping, and I think it is perfectly beautiful. It is a characteristic high cliff plant, and is a great tribute to its cultivator.

Another plant that always strikes me as being most romantic, as well as very beautiful, is *Corydalis cashmiriana.* This is one of the plants that I have always wanted to find in nature ever since I first saw a rather miserable one in the "thirties" in this Hall. The sky-blue Corydalis is very exciting, and it grows in Kashmir. As a result of the war, I was able to get up into Kashmir twice. On the first occasion I did not find it, but on the second occasion, I found it on a pass 12,000 feet up. It was in July, and it was growing, as nearly always, as a single bulb, under low shrubs. It was very delicate, and so fragile that one would think it could hardly exist in those hard conditions. I collected sixty bulbs during a morning on that pass. I brought them back, divided them into four parcels, put them into tins, and sent them to the four best growers that I knew in this country. That was in 1944. The aeroplane in which the parcels were sent, crashed; the four parcels were delivered, but the bulbs were squashed flat, and there was no chance of any of them surviving. I was furious, because I had hoped to introduce this plant. But no! It was introduced later on.

Certain people can grow it very well, particularly in Scotland.

Major Knox Finlay does so marvellously; he has two or three square yards covered with it; it seeds itself and is absolutely happy.

A third plant for which I have a special feeling is *Allardia tomentosa* which always appears here in the classes for grey-leaved plants. It is a high alpine plant, also from Kashmir. I do not think that it goes very far east in the Himalayas. I had a single plant of it before the war, and it survived three years, but only once did it attempt a flower, and that was not very good. The flower, if one is lucky enough to see it, is a clear rose pink, and combined with that whitish-grey ferny foliage, I think it is astonishingly beautiful. It appears in the Show today. Wisley have got it, and so have several private exhibitors, but at Wisley it has not flowered. On a second trip to Kashmir, I found a solitary plant of it at 6,000 feet on the dryish bed of a river, which was an odd place to find it, and I assumed that it had seeded down from what might be regarded as its proper place up above. On going higher, however, I failed to find it again.

The last plant I want to mention is one of the most staggeringly beautiful of all plants, *Tecophilaea cyanocrocus,* named after the daughter of an Italian botanist. It grows in Chile, between Santiago and Valparaiso, at a height of 10,000 feet. I should say that it *did* grow, because most people think that it is extinct in that habitat. All the plants of the typical blue form in cultivation, are propagated at home and are not collected, because no one knows where to collect them from. I think that the most beautiful form is the deep sky-blue, but there is a form which is violet, (*T.c. violacea*) and a splendid pan of it is in the Show today. There is another form in which there is a great deal of white in the throat and the blue is paler (*T.c. leichtlinii*). But all of them are beautiful, although I think the most beautiful is the deep blue. It is perfectly hardy and is grown very well out of doors by Mr. Trotter in Inverness, and it has been grown in various parts of the country in the past with success. In Sussex there is a twenty yard long strip of it, and the grower says that he used to put some frame lights over it after it had flowered. That great expert, Mr. Anderson, who has looked up all that has been written about this plant, says that it should not be allowed to dry out after it has flowered, and that a certain amount of water appears to be necessary. I think that is the case. I had it flowering last spring, it having wintered without protection in the open, and I did not cover it up after it had flowered. So it is not an impossible plant, but its cultivation is a question of finding out what it needs.

Dr. Henry Tod (Scotland): Dr. Bevan has spoken about

Corydalis cashmiriana. This has interested me, because it is a plant with which I had very considerable difficulty to begin with. I was given about six bulbils of it and planted them in pots, and with a sort of mathematical regularity they just disappeared. I was left with one small pot and some very weak, unhappy-looking plants. I was thoroughly disgusted with myself for having made such a complete mess of its cultivation, so I just pushed them into an appallingly bad mixture of what was virtually sweepings off the drive, plus a very small amount of soil, and with a fair amount of tree roots underlying it to rob it more completely. To my astonishment, the plant has prospered magnificently in those very inhospitable surroundings, and this makes me suspect that it is a plant that requires rather poor soil, extremely stony, with very sharp drainage. It also has light shade in its present position, and I think that is a clue to what it requires. At the moment it is certainly growing and flowering very well.

But there is one curious point which some of you may not have observed if you do not get it growing reasonably strongly: it almost invariably flowers twice in a year. It flowers in the spring as you have seen it in the Show—a wonderful, fantastic bloom. But when it flowers in the autumn, it is quite revolting; it is a horrible, muddy, purple colour. If anybody has an explanation of this, I should be most interested to hear it.

One of the things that has struck me about this Show is the astonishing difference between plants here and in the north. I was talking to Mr. Elliott this morning, and he was commenting on the fact that a very large plant of *Euryops evansii* had been overlooked by the Judges. He said that this was a magnificent plant, and that it was a particularly difficult plant, and so on. *Euryops evansii* appeared for the first time at Chelsea about three or four years ago; I got a small plant, which I duly planted in my rock garden, and it is now a solid ball of silver about one foot across. It has never been protected, and is in a rather poor soil. I have a rather damp garden with a lot of trees around it, and the humidity is fairly high. Yet this plant has gone from strength to strength. To me this is a perfectly simple, straightforward plant which presents no problem at all, and yet I gather that in this part of the world it is extremely difficult to grow, and a great many people lose it.

It has struck me very strongly that there are a lot of plants that are shown here which we cannot grow at all well in Scotland, whereas there are a great many other plants here which have won prizes which, frankly, I would be ashamed to put on the Show bench.

One plant that interested me was *Chrysanthemum haradjanii.* I put this up a few years ago as a silver-leaved plant, and it has the reputation of being tender. I have it growing in the open in a very poor soil, fairly near the same conditions as for *Corydalis cashmiriana,* only with a great deal more sun, and with me the plant is completely prostrate. It is absolutely tight to the soil, the leaves are very much smaller, and almost dazzingly silver. If you grow it in a pan with any protection whatever, it comes up and out in a more light, feathery type of growth. If you grow it hard in the open, it is an absolutely prostrate silver mat.

Another thing which has struck me is how the ground orchids have suddenly aroused such interest. I think that Pleione have proved to be quite easy plants. I started some years ago with about three *Pleione formosana,* and after giving away two six inch pans, I now have a twelve inch pan, and also six young ones coming on. If that is not a good return, I should like to know what is. I have merely grown it in a mixture of John Innes No. 1. You cannot stop it growing; it multiplies in an almost embarrassing way. I think we will find that in a few years time, the Pleiones have ceased to be large prize-winners.

Herr W. Schacht (Munich): I find it very difficult to express myself in English, but I should like to say how very impressed I have been by this wonderful Show; I have never before seen such beautiful plants. As you know, I live very near to the mountains, and I often go climbing and collecting there, and I can say that I have seen better plants here than I have ever seen in the mountains. For instance, *Androsace helvetica* had beautiful flowers such as one never sees, or only very rarely sees, in the mountains. I was most impressed with *Saxifraga florulenta,* which is an extremely difficult plant. I have never had much success with it, but I think your climate in England is much better for the growing of alpine plants than Bavaria; there is more humidity in the air, and many plants are therefore happier here than they are in our lowlands, where the air is too dry.

Another old friend of mine is *Jankaea heldreichii.* Last year I was on Mount Olympus and saw this wonderful plant growing on the rocks. It grows in shady places, and likes humidity and moisture in the air, though it likes to keep its roots dry. I think it should not be too difficult to grow this plant in your alpine houses, protected by glass.

There are two plants which are absolutely new to me; *Carduncellus rhaponticoides,* which I have never seen before, and never heard of. I gather that it comes from the Atlas Mountains.

The second is the very interesting plant, *Castilleja hololeuca,* previously known to me only by name; I am very astonished to see that it is grown in pots without any other plants, for I had thought that it was a parasite. I should be interested to hear more about the way in which it is grown.

Miss J. Otway-Ruthven (Dublin): I was rather disappointed when I looked at the classes for plants collected, or grown from seed by the exhibitors, to see that only the first prize winner had really used seed very much. It seemed to me odd that in a Society which has such a valuable seed exchange, there should not have been more use made of it in the Show.

I was a little disappointed too in the Primula classes. They are my real love, and there were not as many as I had hoped to see. No doubt that is due very largely to the extraordinarily early season that we have had. Of course, Primulas on the whole do better with us than here, just as they do better in Scotland. I have been surprised sometimes by the things that the gardening papers say about certain Primulas. For instance, there is the very beautiful *Primula reidii* var. *williamsii.* People always say, "Of course, I kept it under glass." The first time I heard of it was about eight years ago; I got seed from Jack Drake when it was still under a collector's number, and I intended to put it in a pan under glass for the winter, but it was not done. That pan just sat out on a bench fully exposed to the rain, and I got first prize with it at the only Show the Alpine Garden Society has held in Dublin in my time. It has never been under glass, and the last survivor was showing flower in the open ground when I came away last week.

Primula rotundifolia, which is said to be suitable only for the alpine house, is one that I left outside last winter by mistake, and it was coming on quite nicely when I came away. I think that a good many of these Primulas are not as resentful of overhead moisture as one is generally told. But Dublin is not as wet as most of Ireland, although one sometimes find that rather hard to believe.

The next thing that caught my eye was that remarkable pan of *Daphne petraea grandiflora.* I think it was the most extraordinary sight I have ever seen in the way of a plant. I know that there are greater rarities, but the area of that plant was really very remarkable.

Mr. H. Epstein (U.S.A.): I had more or less anticipated that I might be asked some question about how to grow *Pyxidanthera*

barbulata, the flowering moss that I brought over with me on the 'plane. I will tell you how I grow it, but it is a very difficult formula. Seventy-five miles to the south of New York, in New Jersey, there is a remarkable piece of land with an extraordinary type of flora. It is a place to which I usually take visitors who are interested in seeing a very distinctive piece of land quite different from anywhere else in the world. I must tell you how the moss grows in this native stand. It grows along the shore. The soil is not soil, but fine beach sand impregnated with a great deal of humus, so that is a blackish or greyish compound which, to many people, seems to be quite dry—particularly in summer—but in fact is not so. There is a high water table there, so that whereas the top few inches may be dry, the very fine roots of the plants get down into moisture even during the heat of the summer. The moss has an extraordinarily fine root system, very hairlike, and in collecting the plants one must use discretion and find the tiniest young seedlings, perhaps an inch, or an inch and a half in diameter, and collect them that way – and take approximately half an acre of land with the seedlings. One comes back with an automobile full of soil, with perhaps a few meagre plants in it, and we find that this is the only way to grow the Pyxie moss.

As I warned you, it is a very difficult formula, and you will find it very difficult to imitate. I do not know anybody who has actually propagated the plant. As I mentioned yesterday, the only places in which you can find good American plants are in English nurseries. The only way any of us can get the Pyxie moss, is to go and collect it ourselves, because there are no commercial dealers who will do it for us. I think the most successful grower of it I have seen in the States is in Boston, where the same general idea of getting it started was followed as with the plants I have mentioned. Over a period of a few years the plant has ramped until there are a few square yards of it; just a solid mass which have made a home for themselves there.

Perhaps I might say a few words on the new form of *Kalmiopsis which has been heralded in the *Bulletin* of the Alpine Garden Society. The few people who are growing it and propagating it have found it a far easier and much dwarfer plant than the original. It is an acid-loving plant. I would encourage you to try it once you can get your hands on it.

Mr. E. B. Anderson (Gloucester): Mr. Epstein has talked about Kalmiopsis. I think I left behind in my garden in Porlock twelve good-sized plants of that, which I had raised from seed received from Seattle. It was growing in acid soil in almost complete

* *K. leachiana* 'M. le Piniec.' A.G.S. *Bulletin* vol. 28 p. 23.

shade and in the coldest part of that garden. I did not find the original form a difficult plant if raised from seed. Of course, like many other ericaceous plants, it is a slow job, but once they are an inch or two high, they are easy. Some of those plants were given away, and I think that the rest of them are still in the seed bed.

A very significant point was made by both Dr. Tod and Miss Otway-Ruthven about growing plants in the open. I have always been an enthusiast for growing plants in the open, although I bow to those who spend the time and thought in growing excellent specimens in pans. I have never had time to do that, and I have never had the energy to do it. But I think that the secret with many plants is to grow them in the open. Dr. Tod referred to *Chrysanthemum haradjanii,* and how its habit in the open is compact and it forms an excellent silver plant. With many other plants in pans, if you look at them carefully you will see that, despite all the precautions taken in growing them in well-ventilated alpine houses, with the glass kept clean, they do get out of character. There has also been reference to the growing of Primulas in the open, with exposure to all weather, and of their being quite successful. I think that one of the reasons is that in the open there is a big bulk of soil, and the variations both in the moisture content and in the temperature is very much less than it is in the small bulk of soil in a pan. You have only to go to Edinburgh, among other places, to see the way the Primulas will grow in any part of Scotland. They have a much better climate there for Primulas.

Dr. Bevan talked about *Corydalis cashmiriana.* We know how it grows in Perthshire, and I was interested to hear him say that it grew under the shelter of bushes. Dr. Tod also mentioned that it was growing in very sparse soil, in more or less scree conditions; I would be interested to know from them whether it was growing in limestone, in which I am particularly interested, or in a neutral soil.

Regarding Tecophilaea, there is no difficulty in growing it out of doors. Until recently it has been an expensive bulb, and when one was paying twenty-five shillings for a bulb, one did not risk it out of doors. You can grow it for a year or two in a pot, and the increase is rapid. Then you will surely have a spare plant to put out of doors, in a well-drained position in the sun, and if it is left alone you will not have any difficulty at all with any of the forms. I believe that it is extinct in Chile. I have a correspondent in Santiago, and I had pleasure in sending him one of these plants a few years ago. There was great jubilation

among the few gardeners in Santiago because their native plant had got back there.

Mr. Saxe (U.S.A.): First, I want to say that I think it does one a great deal of good to leave home. You either develop an extreme *ego* or you develop an extreme modesty—and I must confess that I have developed both.

I will not take up too much of your time, but I must say a word about that *Daphne petraea grandiflora*. It was actually growing over the side of the pot—and we cannot even make it grow in the pot, let alone over the side. I have a friend in my native San Francisco who is growing Daphne, and he thinks he is doing well to have a plant that is much smaller. So what joy I got out of taking a photograph of that beautiful plant to make him feel bad.

I was very much interested to see a Castilleja; that is something with which I am familiar. We have them blooming around the hills in San Francisco. If one sees them in the high mountains, as I do every year, it is a marvellous sight. They are of all colours, all heights and all sizes. As far as I know, we have considered that the plant was almost impossible to grow. It is supposed to be parasitic.† Would it be too much to ask Dr. Elliott, who grew the plant, to tell us a little bit about it and how he grew it?

Dr. J. G. Elliott (Kent): I am afraid I cannot give much helpful information about why this plant grows.† It is a two year old seedling. It was grown from collected seed and it was collected, I thought, in California, although Mr. Saxe tells me that he is rather doubtful about that. It was sown in 1959, probably in John Innes seed compost. It transplanted quite well. I had about half a dozen plants, all of which died except one which is just alive, and the one that you see in the Show. It was potted in a well-drained compost of two parts loam, one part peat and an equal part grit, and quite honestly it has not presented any difficulty at all so far. I was asked whether the Castilleja is hardy. It survived the last two winters in a cold frame only.

Might I make one small point about *Corydalis cashmiriana*. Many people struggle to raise them in pots. I think that if you do, the main secret is not to kill it with kindness. It prefers not to be under glass during the spring and summer. The more rain it gets, the better.

I nearly lost mine in the early stages by tending it with too much loving care. Then I put it out.

The Chairman then closed the discussion.

† See Dr. C. R. Worth's comment, p. 18.—*Ed.*

SOME NOTES ON THE SLIDES SHOWN

(Chairman: Mr. P. M. Synge)

During the judging of the Show, an exhibition of colour slides was given by a number of our Overseas Members.

The slides throughout were of a very high quality and included many rare and difficult alpines. The fact that most of the photographs were taken in the wild not only added to the pleasure, but clearly indicated how much we have yet to achieve in their cultivation before we can enjoy the full charm of so many of those cherished plants in our gardens.

Mr. Harold Epstein, President of the American Rock Garden Society, opened the exhibition of colour slides by showing a number of North American plants. Particularly notable were the *Darlingtonia californica* in great masses, a good coloured form of *Penstemon rupicola,* and *Xerophyllum tenax,* of which he showed a series of slides to illustrate the varying stages of development of the most unusual flower spike. He also included slides of *Claytonia nivalis, Campanula piperi* and its white form, several Phyllodoce spp. and a good pink Douglasia.

Dr. G. Cone from Dunedin followed with a number of slides sent by two of our members in New Zealand, Mr. D. Hearn and Mr. G. R. Chance. Speaking on the New Zealand mountain plants, and in particular some of the rare endemics of which there are a large number in the country, she emphasised the isolation of their flora from that of Australia and commented on the high proportion of white and yellow flowers as opposed to blue and red ones. Amongst many notable plants shown were *Celmisia coriacea, Ranunculus lyallii* and an unique and rare *Ranunculus paucifolius.* The silver-leaved plants were represented by drifts of *Leucogenes grandiceps, Celmisia sessiliflora, Raoulia grandiflora* and *Raoulia hectori.* Included amongst the mat-forming plants were *Donatia novae-zelandiae* and that attractive member of the lily-family, *Herpolirion novae-zelandiae,* shown as a dense hard mat studded with numerous lilac-blue or white sessile flowers. To conclude, a number of cushion plants were included which gave the true meaning of the popular name "Vegetable Sheep" from the massive mounds of *Haastia pulvinaris* and *Raoulia eximia* which were shown. Mr. D. Hearn has since sent us a fine illustration of *Raoulia eximia* (p. 55) grow-

ing on Mount Torlesse, Canterbury, N.Z. at about 4,800 feet on a sunny scree, surrounded by Celmisias—*CC. viscosa* and *spectabilis.*

Herr Wm. Schacht from the Munich Botanic Garden then showed us an absolutely superb selection of pictures taken in the Schachengarten in the Bavarian Alps. Particularly striking were his *Soldanella alpina,* showing the dew sparkling on the tiny fringed bells. The deep pink *Primula tyrolensis* was magnificent and so was its hybrid with *P. minima, Primula* x *schottii.*

He showed also a number of interesting Dianthus which included *D. freynii* and a close-up of the true *D. callizonus* with its characteristic zoning. His pictures of a number of the Himalayan Primulas and Meconopsis clearly indicated how happy they were in their mountain surroundings. Each plant was grown, arranged and photographed with the outstanding skill which we associate with Herr Schacht.

Mr. E. Reiser, of the Zurich Botanic Garden, then showed a selection of beautifully arranged pictures of plants in the Alps and in the Himalayas, the latter taken on the 1958 Swiss Dhaulagiri Expedition. Particularly fine were the close-ups, and some of the high alpine Androsaces. Among the Himalayan slides, we saw *Primula nivalis* actually flowering out of the snow, and a magnificent golden *Potentilla argyrophylla,* surely a plant worthy of much wider cultivation. There were also some beautiful pictures of Dhaulagiri, which were much appreciated.

Finally M. A. Miland of Grenoble showed a most interesting set of coloured slides of his "Floralies Alpines" to which he had skilfully synchronised a commentary and soft music. We were much indebted to him for this added treat and all the trouble he had taken in having an English translation made specially for our benefit. This he followed with an interesting selection of "Flowers of the Alps" which included such treasures as the true *Daphne verlotii,* taken near Grenoble, and a beautiful slide of *Campanula cenisia.* Professor R. M. May of Paris very kindly translated his commentary.

The Chairman expressed the warm thanks of the Members to the Overseas Delegates who had so kindly brought slides, and congratulated them on their photographic skill so that we were able to see in the wild a number of plants which the majority of our members had probably never seen before.

INTERESTING PLANTS OF THE EASTERN MEDITERRANEAN

By M. OGILVIE-GRANT

(Chairman: Sir Frederick Stern)

Geographically, the subject of my talk is "Greek Plants", though botanically speaking, the flora of certain islands like Samos and Mitylene, hugging the coast of Asia Minor may belong more to that Continent than to Europe. Greeks themselves never quite know where they belong: you constantly hear them say they are going to Europe, which in their view is an undefined area vaguely centred on Paris. At least it is an undisputed fact that four-fifths of their country is a natural rock garden, and as such, a perfect theme for discussion at this Conference. It is also one with an extremely rich and varied flora where new spectacular plants are still being discovered all the time. My friend Dr. Constantine Goulimy has discovered—together with a host of other good things within the last few years—a beautiful mauve autumn-flowering Crocus and a scarlet tulip, both new to science and now named after him. What is more, both of these hail from the Southern Peloponnese and are thus well within our East Mediterranean area, unlike many of his other finds from the mountains of Northern Greece where the vegetation is more Balkan in character, and all must admit their decorative value. For Dr. Goulimy, like Professor Rechinger, who has contributed so much to our knowledge of Greek plants, is at heart a herbarium botanist to whose mill every sort of vegetation is grist, whereas the gardener, who is always to some extent creating a garden picture, must consider bolder effects.

On the whole, the plant-collecting areas which have the greatest appeal to me are those above the 2,000 ft. level, where the fir trees begin, but this may be a case of familiarity breeding not contempt but acceptance. Friends with whom I go walking in Attica often complain that whenever they bring some flower to me, it always turns out to be quite uninteresting. The truth of the matter is that the eye takes in the everyday vegetation in its stride and it is only some new form which can stimulate it. Someone once told me that he had gone ahead of the late Shirley Atchley, who of course knew the Greek flora like the back of his hand, and planted a Flanders Poppy among the rocks: this had the desired effect, though I feel sure that it would not have worked often. His eye would automatically have lumped in Flanders Poppies with the familiar Cistus and Anemones. Once in a way, however, excitements occur on the

best trodden ground. One night in April, 1960, I went to dine with some friends from our Embassy and was electrified to see a sizeable Fritillary in a mixed vase, the size of *F. graeca,* but having the uniform colouring of *F. obliqua.* That is to say, it had no green stripes but a blue bloom on a plain chocolate ground. On the other hand, it had the horrible smell of *F. graeca* in place of *F. obliqua's* rose water. Spurred by the enthusiasm of the late Miss Beck, to whom we had posted the original flower, we went back to the place where my friends had picked it and found a number more, cheek by jowl with striped forms. This was on low ground within a few miles of Athens.

One of the most pleasant features of the Mediterranean area to those who hail from the North, where November heralds such a defeat of the vegetable kingdom, is the springing up of fresh young growth on every hand after the autumn rain has softened ground baked hard between June and October. Not only is there the exhilaration of seeing the first new sprouts of plants which will not flower for months to come, like the Asphodels, Umbellifers such as *Thapsia garganica* and many others, but also enough good things are in bloom to make expeditions to various places well worth while at this season. This is particularly true of the Southern Peloponnese with its mild climate. There in late October you may find the glorious snowdrop, *Galanthus reginae-olgae,* named after Queen Olga of the Hellenes, in bloom along the ravine which leads down from Sparta to Kalamata. It grows in pockets of dark leaf mould under the tall pine trees and planes beside the water. But Crocus and Colchicum are the main features of interest at this time of year and a considerable number of species is to be found in the area of Athens itself. *Crocus cancellatus,* pale lilac and white, with tough netted corms and little sign of leaves, starts in September, and is succeeded by *Crocus cartwrightianus,* our local form of the Saffron Crocus. This varies from pure white to deep mauve, with violet lines, and opens very wide to show the scarlet stigmata. You often find it side by side with *C. laevigatus,* easily distinguished from the other species by its corms with hard triangular scales. The flowers of these early forms are either white with mauve lines, or pale butter yellow on the outer sepals. The variety *fontanesii,* which carries on the blooming season into mid-winter, has larger flowers, rosy lilac on the inside with distinct violet pencilling on a buff exterior. Both these species, *C. cartwrightianus* and *C. laevigatus,* do excellently in English gardens and used greatly to encourage me in December when I lived on Kew Green. Another species which I have found at Kaisariani, on the lower slopes of Hymettus, is *C. boryi,* white with white anthers and brilliant scarlet stigmata, but to me this is more a Peloponnesian plant. In that part of Greece,

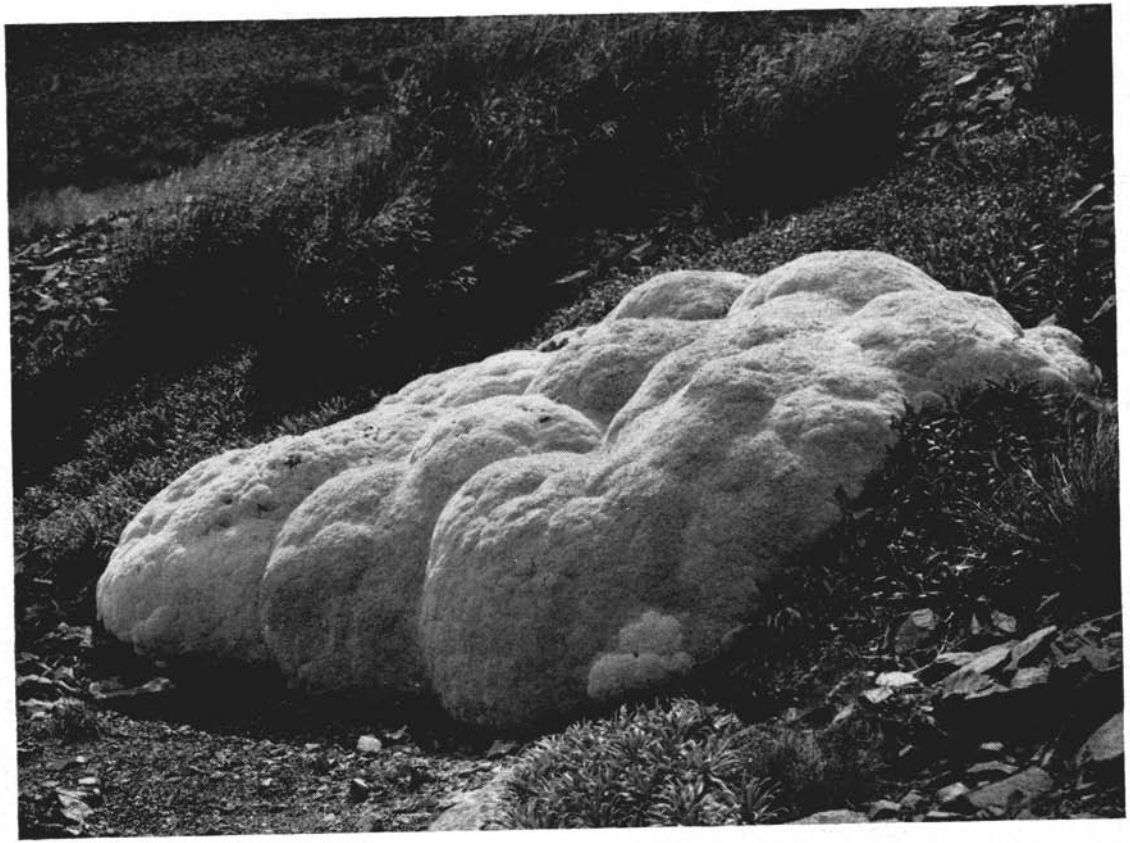
the ground is often covered with crocuses in early November. Apart from *C. goulimyi,* they are all white and yellow based, some with white and others with yellow anthers, which character should divide them into *CC. boryi* and *niveus* respectively. But there are also differences in the shape and texture of the flowers, which make one feel that these two species do not cover the whole ground. For instance, there are forms with narrow, weak flowers, and others globular in shape with far firmer petals, both having white anthers.

In the Mani, you will find sheets of large white crocuses under the olive trees, far more robust than those on the open hills and occasionally touched with lilac on the outer sepals. This may be the result of a misalliance with *C. goulimyi,* often to be seen growing at the base of the stone dykes which there divide the plots of cultivation. This latter species has a remarkably long tube. It is very free-flowering with clear mauve blooms with a white base, and seems from Athenian experience to flourish in captivity. The truth of the matter is that there is great variation in the flowers of these plants in the wild, and quite a number of botanical characters have to go by the board. I know a ploughed field in the Peloponnese where I have collected Colchicums at this same season, varying in colour from pure white to deep rosy purple with darker tesselation: some of the flowers are globular in shape, others like starfish. Their leaves, five or six in number, vary from 2 to 4 cm. in width and 19-23 cm. in length. They are upright and green, unlike those of *Colchicum sibthorpii,* to be found on Mt. Parnes, with its flattened glaucous rosette.

Another family which varies enormously from plant to plant is that of the terrestrial orchids, in particular Ophrys, which is very well represented in Greece—though of course a feature of Spring. But *revenons á nos moutons,* all the Greek autumn-flowering crocuses are, with the faint butter-coloured *C. laevigatus* as an exception, white or mauve in varying gradations. Yellow species like *CC. chrysanthus, balansae, aureus* and *olivieri* belong to the Spring, and their place—at any rate to the uninitiated —at the other end of the calendar is taken by Sternbergias, as very much a feature of the Greek scene. There are three larger *Sternbergias; SS. lutea, sicula,* and its variety *graeca* which has narrow straplike leaves and is common on the desert hills round Athens. Any of these three, especially when allied with such other plants as the autumn-flowering *Cyclamen graecum* and *C. neapolitanum* and, as you may see them on Parnassus, with masses of *Crocus pallasii,* is a sight for sore eyes. The other species, much less showy but well suited to an alpine house pan is *Sternbergia colchiciflora,* with its rather starry, lemon yellow flowers. It is not so common as the others I have mentioned, and I personally have always found

it high up, and only in any profusion on Mt. Parnassus, where the strange *Colchicum boissieri* is the most prevalent of its ilk at the same time of year. This species, one of three distinguished by having corms lying at right angles to the stem, has medium sized flowers of a beautiful clear pink with no tesselation. The two other species with horizontal corms, *CC. zahnii* and *psaridis* are both very small and occur singly, so that *C. cupanii,* which is common near Athens, would be a better plant for pan cultivation as it often grows in compact groups which make a more decorative effect, but I fear it does not do very well. The large Greek *Colchicums* seem to fare quite well in England. *C. sibthorpii* and *C. macrophyllum* were both quite happy at Kew. The latter has enormous leaves like a Veratrum and its pale faintly tesselated flowers are rather a flop in comparison with the impressive foliage. *C. bowlesianum* seems to be a northern species. At least, the only places where I have found it are between Salonica and Serres and high ground in Skiathos, most northern of the Sporades. It certainly has very fine globular flowers of considerable size, though to my taste *C. variegatum,* an island species which I have collected on Samos, Cos and elsewhere, is perhaps the most alluring of all. Its starry flowers are brilliant and sharply tessellated, while the leaves are easily recognised in Spring on account of their beautifully waved edges.

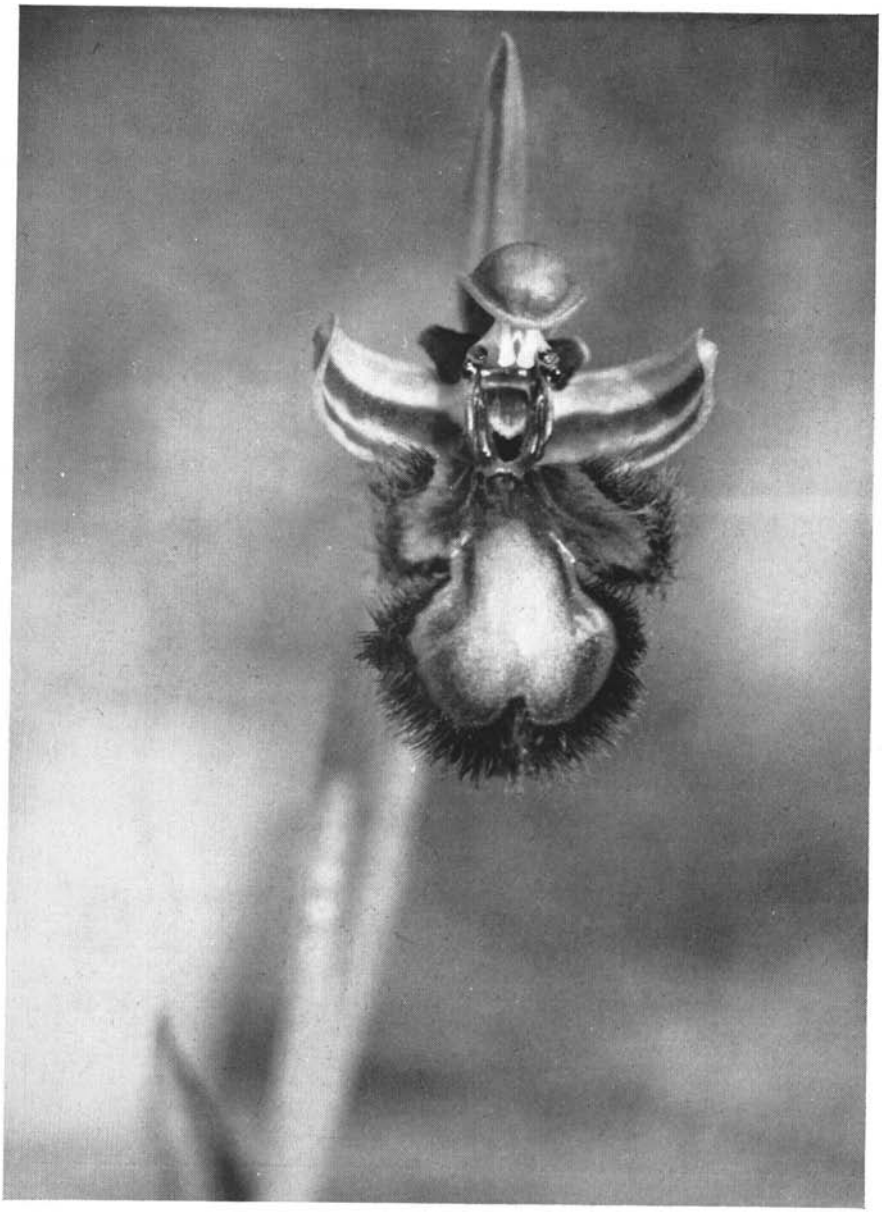
So far, although I have only spoken of monocotyledonous plants, the jewels set among the rocks and squat shrubby plants, many of them aromatic, which make up much of the Greek hillsides, I have said nothing of the Fritillaries, numerous and extremely local, of Muscari and Ornithogalum, both genera represented by spectacular plants, not to mention Tulips and Lilies, Alliums, Narcissi and Irises. Certain tiny plants such as Romulea, particularly *R. linaresii* with its minute violet stars, *Lloydia graeca,* a doll's house Madonna lily, the yellow Gageas and others add greatly to the detailed charm of these pockets, but I am afraid that most of them do not take kindly to garden life. This too applies to the tiny scented *Narcissus serotinus,* so common with us, but more a plant for the cold frame in England. Before speaking of expeditions to particular districts, among the flora of which I shall hope to include some of the more exciting of these other bulbous species, I must turn to their shrubby and herbaceous setting, for here we have a great many treasures for the rock garden. The *maquis* areas are covered with cushions most of which are anything but soft. *Poterium spinosum* and *Euphorbia acanthothamnus* are both built up on a skeleton structure of thorns, used later by Greek peasants to strain the water through the necks of their pitchers, and a good many species of Astragalus are equally prickly. *Phlomis fruticosus* and the Cistus species, *CC.*



Raoulia eximia, on Mt. Torlesse, N.Z.

Photo: D. Hearn

(*See p.* 49)



Ophrys speculum (3 × magnified).
(*See p.* 58)

Photo: Roy Elliott

incanus, creticus, parviflorus, salvifolius and *monspeliensis,* though all beautiful, are too well known for comment, but I should like to put in a good word for three low shrubby plants common round Athens which would be real additions to the rock garden if they could be persuaded to honour our climate. First is a wiry little bush with a strange name, *Globularia alypum.* It has narrow spoon-like leaves, and many round composite flowers like double daisies, generally powder blue, but sometimes white or pink. Globularia has a long flowering season. It is at its best in March, but you may easily find it blooming in late autumn, when there are hardly any other flowers but the greenish-yellow bells of *Clematis cirrhosa.* My other two recommendations are cousins of the Daphnes, *Thymelaea hirsuta* and *tartonraira.* Both are delightfully compact plants with attractive evergreen foliage, that of the latter being silver grey suggesting minute olive leaves, and though its yellow flowers are very small, they have a certain charm.

No description of the Attic landscape would be complete without mention of two primary ingredients, the Asphodel of which there are several species though *Asphodelus fistulosus* with a hint of rose in its flowers is far the most graceful—perhaps it was the one favoured in the Elysian Fields? The other ubiquitous plant is *Urginea maritima,* the Sea Squill. This pushes up its tall Eremurus-like spikes of white stars early in August, even before the rains have started, and later on its fat rosettes of coarse green leaves are all over the ground. Sometimes it is quite difficult not to believe the smaller ones are *Colchicums.* The Greeks carry the huge bulbs into their houses and hang them up in the New Year as a fertility rite.

While I was typing these lines, a mixed bunch gathered on our Sunday walk was cheering me with its dazzling colour. It consisted of three species, *Anemone coronaria* and *A. pavonina,* in every colour imaginable, with scarlet forms of the latter often reaching enormous size, but always remaining graceful, unlike the hideous cultivated forms. Atchley used to say that the first thing to do with your anemones was to "de-Brigid" them. My third species was *Hermodactylus,* the Snakeshead Iris, flourishing in the grass alongside the stream where we had picked the tall anemones. Another Iris which adds greatly to the Spring scene in Greece is *Gynandiris (Iris) sisyrinchium.* Its flowers are very fugaceous, but remind one of Moraeas, triangular in shape with a white spot on each clear lilac petal.

I now propose to say something of various specific areas to which I have made rewarding expeditions, sometimes at more than one season. Parnassus makes a good beginning. Enormous numbers of visitors only see the immediate surroundings of Delphi, which

lies below the mountain. There in fact you will find a lot of good plants among the ruins, though possibly hesitate to use a fern trowel! Two of the most spectacular cushion plants are *Onosma echioides* with its golden drops, and another member of the borage family *Alkanna graeca,* this time covered with stars against foliage with tightly waved margins. Both these would, I imagine, require a piece of glass to protect them from winter damp in most parts of the British Isles. Campanulas are well to the fore, with the grey rosettes of *C. andrewsii* clamped against the rocks and the tall *C. versicolor* in the gorge behind the Castalian Spring. Ground cover in many places is furnished by *Anthemis chia,* an attractive chamomile daisy well worth introducing into the garden. Mr. Bowles had it in a gravel path at Myddleton House. Here, it often provides a happy foil for two other lovely annuals, the Greek field poppy with a black spot edged with white at the base of each blood-red petal and *Erodium gruinum,* of vivid jacaranda blue. In the early part of the year, there are plenty of terrestrial orchids among the ancient stones. Of these, *Barlaea longibracteata* is the most showy, but there are fine species of Ophrys too, such as *O. tenthredinifera* with its "bee" backed by lilac-pink petals, or the wonderful *O. speculum* with its blue "looking glass." (Illustration p. 56).

The zigzag path winds far above the ruins, at first flanked by much the same vegetation as below. *Euphorbia wulfenii* grows nobly in this part of the world, as does the handsome *E. dendroides,* while *Cerinthe major* with its exotic spotted leaves and curious purple bracts is an interesting herbaceous plant, as is *Lunaria pachyrriza,* which is an Honesty with neat paired seed heads. Before we leave the lower ground at Delphi, a charming little hyacinth should be mentioned. This is *Strangweia spicata* with Eton blue spikes and black bulbs.

The first time I climbed up to the foothills of Parnassus was in March. Snow was still lying when I came to the fir-tree zone, and where it had melted round the bases of the isolated *Abies cephalonica, Crocus chrysanthus,* a pure yellow form, and a small Spring-flowering Colchicum, *C. bulbocodioides* were blooming side by side. This Colchicum has narrow purple flowers with its leaves. That time, I did not go farther up into the wood, but last April, a party of us climbed as far as the Corycian Cave, where the devotees of Pan were wont to gather. So we passed over a part where the trees give way to open grassland, close-cropped and thick with two forms of *Iris pumila* var. *attica,* one of them deep violet and the other pale yellow. The light shining through the Iris flowers made them a sight of the greatest beauty. Another charming small plant on that hillside was a pale yellow Erodium, *E. chrysanthum.* As we penetrated deeper into the wood we came on a fritillary in

bud and nearer to the Cave itself, *Tulipa australis* was already out, rather more profusely than is the wont of Greek tulips, which tend to produce masses of grass but relatively sparse blooms. This incidentally, is true of *Tulipa orphanidea* on Mt. Parnes, but the scarce flowers with their peculiar combination of orange-red insides and grey-green exteriors are all the more welcome for being hard to come by.

The only other plant which I remember from that Easter adventure on Parnassus, is the common scented violet, *Viola odorata.* We should not have seen this had we not lost our way, and, in an ill-starred attempt to get back to Delphi down the gorge which ends up at the Castalian Spring, slid a good thousand feet into its depths. There the plants either side of the track were respectively deep blue and pale pink, with so many flowers as practically to hide the foliage. This is a sight which few must have seen, and some of the party paid dearly for it. Their cruise had left the harbour four hours before we were picked up by the police, half frozen in the dark on the mountain. As the victims included a Duke, this misfortune was recorded by the London Press and may serve as a warning to plant hunters not to keep their noses too close to the ground! Both the other times I have been up on Parnassus, we approached it from Arachova, some miles away from Delphi. The first was in July before the war and we slept in a shelter before ascending the summit next morning. The plants which stand out in my memory are *Viola gracilis,* growing in rough grass near the peak, *Geranium subcaulescens* of a most brilliant blood-red colour which it quite lost in an English garden, and *Crocus veluchensis* in blossom beside the patches of melting snow, varying greatly in colour from deep mauve to pure white, but always with a white base to distinguish it from *C. sieberi.* The way down from that shelter to Delphi was, as I recollect it a gentle and glorious descent of some seven hours mostly through fir wood, and it was this which encouraged me to go with some friends last October on much the same itinerary. This time, however, we found that modern progress had led to the key of the shelter being kept in Athens, so that we had to go as near the summit as car could reach on the same morning, there meeting a muleteer with a beast to aid the lady of the party. Distance must have lent enchantment to the view, or else the summit had changed places, for the net result was our walking at least thirty miles down—and very often precipitously down—to Delphi. But there were indeed the fine plants I have mentioned, *Sternbergia colchiciflora* and *Colchicum boissieri,* and near the Corycian Cave, to which we climbed with pain and grief, there was a dazzling combination of *Sternbergia sicula, Cyclamen neapolitanum* and *Crocus pallasii* (or *hadriaticus* as you may wish to

call it), with white and lilac forms of *Crocus cancellatus* for good measure. But Parnassus is a mountain to beware of. Pan may have something to do with it. This time he did not make us lose our way, but instead threw my spectacles down a well from which I was trying to haul up a much needed water bottle. On the other hand, he *did* show us eagles at fairly close range and a black squirrel with a white shirt front busy among the fir cones.

Rhodes, Karpathos and Crete have a certain number of good plants in common. There are for instance the fine *Paeonia clusii, Colchicum macrophyllum* and *Arum creticum,* looking like a slender *Calla* and not smelling quite as nasty as *Arum nigrum* or the redoubtable *Dracunculus vulgaris,* Gerarde's "Great Dragon" with its eighteen inch mahogany spathes, which are also denizens of this and other parts of Greece. Crete, in *Aristolochia cretica,* provides the only other Greek plant which inspires the same shocked surprise as the Dragon. Its flowers look like monstrous spotted snakesheads creeping through the bushes.

The Cyclamen of these islands are also interesting. *Cyclamen persicum,* the sweet-scented parent of our greenhouse monsters, occurs in Rhodes and Karpathos. In the former, it grows alongside its local cousin *C. repandum,* white with a pink nose, which since I collected it in some quality last Spring is, I fancy, to be given varietal status. The pure white Cretan form, of which the mottled leaves and velvety tubers are indistinguishable from this, is honoured by its own specific name *C. creticum.* Neither of these compares in splendour with the brilliant crimson form of *C. repandum* from the Peloponnese.

Whereas the low ground in these islands is rewarding quite early in Spring, as they have a milder climate than the mainland, the high mountains of Crete cannot well be explored before June. At lower altitudes, the island can provide a multicoloured show of *Ranunculus asiaticus* and the beautiful *Anemone heldreichii,* with its pink petals and powder blue stamens, but by May the snow melts in the White Mountains and peasants go up to the high plateau of Omalo, 3,000 ft. above sea level to cultivate their fields. This region is packed with endemic plants, many of them adapted to face the baking heat of summer by exchanging leaves for spines. You have *Berberis cretica,* spiny chicory and *Verbascum,* and *Acer cretica,* in which the process of changing over from a trilobate leaf to a spine may be witnessed on the same branch. The white *Paeonia clusii* grows on the edge of the plateau and in the surrounding ravines, while I have found *Tulipa bakeri,* a relative of *T. saxatilis* from the lower levels, in the corn stubble. As you climb the surrounding peaks, spring flowers are still blooming. You will see *Tulipa cretica,* smallest of the genus, while the edges of melting

snow patches reveal *Corydalis uniflora,* the pale blue *Chionodoxa nana* and, best of all, the wonderful Cretan form of *Crocus sieberi,* once called either *heterochromus* or *versicolor* but now installed as the type of *C. sieberi.* Wide open, the flowers all seem to be pure white with a yellow base, but should they close, many will be seen to have strong patches of plum purple on the outer sepals, the colour of a Peacock butterfly's wing. It is well worth trying to cultivate, being more striking than the mauve *C. s.* var. *atticus* which covers the hills round Athens from Christmas onwards, or even the mauve white and yellow banded Chelmos variety from the Peloponnese, which Mr. Bowles aptly described as "an egg in an egg-cup." A good many Cretan plants have adopted long tap-roots to penetrate the rock crevices and keep cool in the torrid heat. One of these is *Anchusa cæspitosa,* which in its native haunts forms a cushion of large forget-me-nots clamped into the grey rock. *Dianthus fruticosus,* which you may find quite low down in August, grows in the same way, and curtains of its pink flowers may be seen set against curious narrow fleshy leaves on the cliff faces.

Crete has numerous shrubby plants eminently suited to the rock garden if they can be persuaded to live in it. *Prunus prostratus* is one of them, and so is the famous Dittany of Crete, *Origanum dictamnus,* one of the plants used locally for tea. *Linum arboreum,* with its handsome yellow flowers, *Ebenus cretica,* with heads like a great pink clover, the handsome *Petromarula pinnata* which often grows near it, *Daphne sericea* and others. Daphne is a genus well represented in Greece and includes the familiar *D. mezereum,* though most species have white or cream-coloured flowers.

Samos and Mitylene, to both of which I have made expeditions with Dr. Goulimy and on my own, are of great interest from a botanic point of view, and have the practical advantage of decent motor roads. Their proximity to Asia Minor makes it questionable whether the flora should be counted as European, especially when we find such a phenomenon as the stream bed in Mitylene full of *Rhododendron luteum.* Both islands boast a Crocus, now named *Crocus nubigenus* from Herbert's original description, which I collected on Mt. Kerketeus, Samos and showed to the R.H.S. in 1952. The typical form is bright mauve inside, with a yellow base and black anthers. Externally, the sepals have strongly marked feathering on a cream coloured ground. In the past, this scented species has been lumped with *C. biflorus* and confused with *C. crewii,* with which the fields between Tripolis and Sparta are filled at the beginning of the year. It seems to have numerous forms, including one in which the outer sepals are speckled with minute greyish dots, and to be spread over a wide area in Asia Minor. When I collected it late in March, the corms were already ripe, as were those of

C. chrysanthus alongside it. This latter is another plant which bridges the territorial gap, occurring both on Mt. Parnassus and on the Bithynian Olympus. Here at the same time I found leaves of *Colchicum variegatum,* the beginnings of *Fritillaria pineticola,* a delicate little plant with yellow bells, and the splendid *Centaurea exscapa,* with large rosettes of silver leaves and butter yellow cornflowers.

There are two mountains in Samos. Mt. Kerketes has a rival, Karvounis, also well over 3,000 ft. high, more in the centre of the island. Here you may find an agreeable collection of plants in the " fir-tree " zone. *Crocus balansae* shows the habitual variation of the genus: some flowers have no chocolate marking at all on their orange sepals. Growing near it is *Crocus nubigena, Scilla bifolia, Fritillaria pineticola, Sternbergia sicula* and *Colchicum variegatum.* but to my mind far the most exciting plant in the area grows near the village from which we hired our mule for the climb. This was *Muscari macrocarpum* Willd, bright yellow with blue buds at the apex, which turn yellow as they open. It is a large striking plant and on seeing it from the car window I leapt out in great excitement to get a closer view. As I was trying to extract a bulb from the edge of the group, some peasants passed below on their mules and I explained the predatory act. Far from showing any resentment, the owner of the plot dismounted and fetched a pick to assist the operation. This is one of the few wild plants Greeks cherish in their gardens because of its very sweet scent. They call it *Kore,* the maiden. When I was in Samos last June, I asked whether it would be possible to find some bulbs of the plant which should then be ripened off and was kindly given a bagful. These flowered this March in my Athenian garden and to my great interest proved to be *Muscari moschatum* (Sweet) another yellow grape hyacinth with a sweet scent. In this plant, however, the leaves are much shorter and narrower while the flowers have no blue in the immature buds. As far as I know, only one yellow species has been recorded from Samos, so whether these are cultivated bulbs from another island remains to be seen.

In April, Mitylene is remarkable for the beauty and variety of its Verbascums, which may be because it boasts some Asia Minor species. One of the most outstanding is *V. vacillans,* which has foliage covered with long silver hairs. But in fact it is hard to beat *V. sinuatum* so common in Attica with its wildly waved, grey rosettes, which would be a delight in the rock garden if they were a practical proposition for British gardeners. Outside the village of Ayasso, the grass strips under the flowering cherry trees contain some useful plants like *Fritillaria pontica, Tulipa theophrasti,* a form of *T. hageri,* both flowering in April with leaves of *Crocus nubigena*

and a *Colchicum* species, while as you go further uphill, the leaf mould under a wood of Spanish Chestnuts is full of Cyclamen and Muscari, some with pale pink and others with piebald dark blue and white heads, the pale rose *Corydalis densiflora, Colchicum variegatum* and, where the ground becomes open at the top of the hill, paeonies and plenty of *Galanthus elwesii* with very variable foliage. Another unusual plant we found in Mitylene is *Merendera sobolifera.* This species, unlike *M. attica,* which grows with its pale pink flowers in a group, remains solitary and its narrow white flowers appear very early in Spring with part of the foliage, which eventually reveals three or four slender leaves six to eight inches in length.

August is the right month to climb Mt. Olympus. The highest peak is nearly 3,000 metres high and at that season you can sleep out of doors, near the shelter some 500 feet below the peaks, a very rewarding experience. The early stages of the climb from Litochoron takes you through a wooded area where *Lilium heldreichii* can be seen among the bushes. This fine scarlet Turk's cap lily is one of a number of good species to be found in Greece, such as *L. albanicum,* the yellow Turk's cap from Pindus, *L. martagon* in various forms, including the red *var cattaniae* collected by Dr. Goulimy on Mt. Vourino in Macedonia, and *L. candidum* recorded from numerous parts of the country far from human habitation. I myself have found it in the foothills of Mt. Taygetus in the Peloponnese. Other plants in this first section of the climb include pink helleborines, an Olympus variety of dog violet and, where the path crosses a stream at about 2,000 feet there are patches of lily-of-the-valley, the famous *Jankaea heldreichii,* clinging to large rocks and *Lathyrus grandiflorus,* with huge magenta flowers, scrambling through the shrubs. Further on, I remember the fine dark blue *Salvia ringens* (this is another genus in which Greece is very rich) at least two good yellow *Achilleas* and a fritillary, probably *F. messanensis.* Two remarkable plants enliven the last dizzy zigzag of the climb to the shelter, both growing into the rock face. One is *Viola delphinantha,* surprisingly unlike a Viola with bright pink spurred flowers and narrow heath-like foliage: the other is *Campanula oreadum.* The cliffs near the shelter also yield a beautiful blue and white columbine, *Aquilegia amaliae,* named after the first Queen of modern Greece. The vegetation near the summit is of course Alpine, including *Gentiana verna var. pontica* and you are quite liable to see chamois running alongside the snow patches. High in that rarified air, it seems a far cry to baking August Athens.

In this very cursory skimming of the Greek flora, I have omitted whole genera of interest to the rock gardener, my only excuse being its immense size and variety. In conclusion I must stress that it is not only March and April which are good times for a gardener to

visit Greece. These months, it is true, will show you the well trodden track in the height of its beauty, but June, July and August are months for the higher ground. A trek from Metsovo will lead you through alpine meadows where *Narcissus radiiflorus* is blooming among a host of other Spring plants, to woods full of cuckoos in full cry, where *Tulipa australis* and the yellow Albanian Lily grow. If you go to the Styx at this time, there are many rare local things to be seen like *Teucrium aroanum* and *Aquilegia othonis* growing in the cave behind that waterfall from which the ancients went down to the nether regions. There is the strange flora of the White Mountains in Crete with the certainty of brown vultures and the possibility of the unique Cretan ibex. Olympus in August has its fascinating butterflies, Apollo, Queen of Spain Fritillary, and others, its chamois and Jankaeas. Finally, when the first rain has come at the end of October, November ushers in its Crocuses, Colchicums, miniature Narcissi, Sternbergias and Cyclamen, while all the ground, hard-baked through the long summer months, is sprouting with the promise of Spring.

Discussion:

Mr. A. J. HUXLEY (London)

"Having recently covered some of the ground which Mr. Ogilvie-Grant describes, I was particularly fascinated by his talk on a country which has almost limitless plant resources. While climbing Parnassus last year I noticed what appeared to be mats of *Silene acaulis* and *Potentilla nitida*. Can you confirm whether they exist there?" (This was confirmed by Mr. Ogilvie-Grant). "I was also interested in the lecturer's reference to *Paeonia clusii* on Rhodes. The plant I myself saw recently on Rhodes did not look like the *P. clusii* we know in cultivation; is it not, in fact, *P. rhodia*? I believe *P. clusii* is a Cretan endemic.

Finally, may I say that we all hope Mr. Ogilvie-Grant will produce a Greek flora—it is certainly sorely needed."

Rear Admiral J. P. W. FURSE (Kent)

"Greece has contributed so many valuable plants to our alpine gardens that it has been most valuable to hear this first-hand account of the Greek flora, and we look forward to the speaker putting his knowledge into a book.

Our knowledge is still much too scanty, and we need a far greater quantity of collected plants than we have got now from the Eastern Mediterranean, if we are to be able to understand the extent of the possible variation inside each species, which is very noticeable in many of the plants from this area. I hope that many of our Members will make collecting trips to this area, and bring back a good range of plants."

THE CULTIVATION OF ALPINES UNDER GLASS

By ROY ELLIOTT

(Chairman: Mr. H. Epstein)

When I was asked to read this paper to you I immediately reflected upon my qualifications for so doing; I have a small garden in an industrial town and in that garden some two thousand or so different plants from the mountain ranges of the world manage to grow. If they will not grow in my garden, I try to make them grow under glass—thereby imputing the blame to the sooty atmosphere—never to myself. There I grow another thousand or so, some of which grow very well, and I bring them to Shows or photograph them, and I receive the credit for their growing well; others do not grow well, and few people see them; many die—and only I remember. On this frail foundation as a successful grower do I appear this afternoon to discuss details of cultivation under glass.

At our last International Conference, alpine house cultivation tended to be scorned, but ten years have passed and although the sentiment that the rock garden is the proper place for all rock plants remains a very proper sentiment, those who live in town atmospheres invariably find cultivation under glass an essential if their choice of species is not to be severely limited. Our one desire is to grow these plants, and I myself am not particular as to the means used to achieve the end; it may seem unethical to suggest that the last decade has produced mechanical aids to cultivation that may greatly affect our ability to grow difficult plants, yet it is fifty years or so since the immortal Farrer suggested underground watering for his moraine (an advanced suggestion in its time) and we have progressed far from there.

Many plants grow easily North of the Border which we find difficult in England because of a deficiency of moisture in the atmosphere—yet humidifiers are already a commercial proposition, and can easily give a controlled humidity to alpines under glass. This would be an invaluable replacement of the morning and evening spraying which most people recommend in hot weather. 'Mist' propagation has already revolutionised the nursery trade, and enabled difficult plants to be rooted in as many days as once took weeks. In 1959, when many of us were blaming our inability to flower *Dionysia curviflora* on a non-flowering strain, we had a Summer that produced flowers on nearly all Dionysias in the following Spring—but could not controlled artificial light achieve

the same result? I am often criticised for having heat in my alpine house—I dislike the word heat, because in actual fact I only limit the cold; I still have ice on my Alpine House water tanks—but never thick ice. I do not want *heat* but I am unable to supply *cold,* and when the tremendous recent advances in the science of refrigeration have produced something suitable for my pocket, I hope before I die to have a uniform winter temperature of about 30° F. in my alpine house irrespective of freezing nights and warm foggy days. Then I believe I will see a large cushion of *Eritrichium nanum* growing beside the tender *Trichinium manglesii,* and both equally happy. In Summer we open all the doors and all the windows and give our plants free ventilation—just as our forebears did sixty or so years ago. But if we shut all the doors and all the windows and used extraction fans and a humidifier, I suspect that we should achieve better results. All that is mere supposition, and anyway concerns only the future; my task is to deal with the present, and let me start by showing you a picture of an ideal medium for cultivation—a high Dolomite scree: it has most of the features I try to give my plants under glass. Sun loving plants and shade loving plants can grow adjacent to each other; the winter temperature is constant below the snow, and the plants are thus protected against that most vicious enemy, winter damp. They have a long root run, and constant moisture at the roots draining down from the mountains above, and when the snow melts and their season of growth begins, they have the warm sunshine and clear air of the mountains to bring them speedily to perfection of flower, and fulfilment of seed. In other words we know what is necessary to grow *Eritrichium nanum* and we at least suspect that we know what are the requirements to enable us to make *Silene acaulis* flower like Aubrieta in a Cotswold garden, but we cannot provide them. And even if we had the conditions of that Dolomite scree, we would not be satisfied, because we do not wish to grow only plants from the Alps, and I hardly think that such conditions would enable me to grow my favourite daisy, *Chrysanthemum atlanticum*—that lovely but somewhat tender plant which Dr. Peter Davis introduced from Turkey soon after the war: and it certainly would not provide a home for the little dwarf chicory from the hot foothills of Crete, *Cichorium spinosum,* which brightens my alpine house in the dog days of Summer. Hence the constant necessity for compromise—the problem of tenderness is one of the most misunderstood problems of alpines. If plants could be gently frozen in a uniform manner throughout the Winter, then I believe that even Australian plants like *Trichinium manglesii* would prove perfectly hardy. No plant worthy of the name 'alpine' objects to cold—but many of them cannot stand a warm

spell in December which awakes them from their winter rest and starts them into growth just before a vicious frost in January. Therefore, I feel that if I cannot control their resting period, I will keep out excessive cold and keep the plants growing as much as restricted watering permits. In my Alpine House the pots are plunged in galvanised trays, and the plunge medium keeps the roots cool in Summer and preserves the moisture in Winter, whilst the fact that the trays can be flooded by a small pump situated above the rainwater tank, saves a tremendous amount of labour in Summer. It is not an ideal method of watering, but it enables me to grow far more plants than if each pot needed individual watering. The alpine house runs approximately North and South, and a convenient boundary fence on the north side coupled with judicious shading of the glass gives me a shady side to the house, whilst the fact that it is situated on the highest, windiest place in the garden is also a distinct advantage. The glass prevents excessive moisture from reaching the plants and keeps off the worst of the industrial pollution which would otherwise descend upon them. Thus everything is controlled to some extent, except a suitable low winter temperature, and humidity in Summer, and it is hardly surprising that plants grow better here than they do in the open. That then, is the background to cultivation under glass. The secret of successful growing, however, must always be to know the individual plants and to know the conditions under which they grow in the wild.

Every grower of alpines since time immemorial has stressed the importance of drainage, and I still think it is often the key to success. I have found that cushion plants like *Draba polytricha* will grow to considerable age in a compost of 50% chippings—but soon " miff off " in soil alone. The growing of plants in tufa implies first class drainage, and I find that notoriously difficult plants like America's *Lepidium nanum* are thereby made much easier to grow. My personal rule is 'the higher the alpine, the quicker the drainage'; it means more frequent repotting, but I think it is a good rule of thumb. I do not attach overmuch attention to soil composts but use the standard John Innes No. 1 suitably adulterated with sand, peat and/or chippings to approximate to what I believe to be habitat conditions. I do not think my plants are any better or any worse than they were when I used fibrous loam and special recipes measured out like one of Mrs. Beeton's cakes. Habitat conditions are not invariably a help, and only experience can teach one that *Boykinia jamesii,* for instance, will only flower well when its roots are restricted, and that every time you repot *Kelseya uniflora* you are depriving yourself of a sight of its flowers for two years to come (or such has been my experience). All these are American plants,

yet experience tells me that I shall *not* see flowers on another American plant *Eriogonum arborescens* unless I repot it frequently in the richest soil at my disposal. My experience with those difficult Campanulas, *CC cenisia, excisa* and *zoysii,* also indicates that they want grossly overpotting and plenty of room to ramble about. Other plants, such as *Helichrysum marginatum* are completely baffling, and I find it hard to flower under any conditions. Others find it flowers freely in the open garden. Dionysias—as I have already mentioned—might well have been equally baffling had not the hot Summer of 1959 induced almost everyone's to flower—except my own. I had shaded mine from the hot sun,* fearing scorch, which is a direct contradiction of my own rules for studying habitat conditions—*D. curviflora* can get little shade on its Persian mountain top, or so I suspect. This question of shading is another debatable topic, although personally I regard it as of the most vital importance, as I find my Kabschia saxifrages scorch very easily under glass; the ideal shading is pumped coloured water—ideal because it can be thermostatically controlled and therefore automatic; next come removable slat blinds, having the advantage—particularly with Aretian Androsaces that only chequered shade shields the plants; lastly of course comes the permanent and generally ubiquitous coating of colour-wash on the glass, with its inevitable tendency to " draw-up " plants in dull weather.

The greatest proportion of the plants in my Alpine House are never moved, thus taking advantage of a small ' continuous Aerosol ' apparatus—the advantage of which in Spring and Summer with all windows open is negligible. But plants like the Douglasias which I have always found very prone to aphis attack, are generally free from pests if exposed to continuous aerosol throughout the year. Special cannisters are available against red spider, but I seldom use them as there is danger in their use, nor do I seem able to prevent " white fly ". I am told that African Marigolds grown in the alpine house will prevent white fly, but I have never been able to decide which of the two I would dislike most. Bulbous plants such as *Fritillaria citrina* are only brought under glass to flower, and are kept in frames for the rest of the year; bulbs and tubers which demand a real hard baking like *Cyclamen rohlfsianum* or *Calochortus maweanus major*—that delightful little ' Cat's Ear ' from Oregon —spend the Summer and Winter on a sunny shelf in a heated greenhouse.

Other bulbs do not require baking, and I am beginning to suspect that *Tecophilaea cyanocrocus* is akin to many of the easier Cyclamen species in that a slight restriction of water is all they need. I provide this by plunging the pots in dappled shade in an ash bed

* The question of shading Dionysias is fully dealt with on p. 116. EDITOR.

and covering them with a triangular cloche. This suits certain of the Orchidaceae too—a family which is interesting many of us in this country at the present time—and the treatment is suitable for the damp-loving orchids like *Habenaria radiata,* an attractive woodlander from Japan. Other orchids—in fact the majority of the so-called hardy orchids, need a period of complete rest—like the Pleiones. One cannot generalize about pot culture, but it would not be a bad rule of thumb to advise that most of the Ericaceae, and particularly Rhododendrons are best out of pots. The finest flowered *Kalmiopsis leachiana* I ever saw was grossly pot-bound (and there is little doubt that root restriction assists free flowering) but I believe it died soon after. The Ericaceae have very fine roots which are irreparably damaged if the pot dries out. In my town atmosphere I find that the foliage of many woodland plants, particularly the Phyllodoces and Schizocodons is very prone to damage and leaf drop in Winter, and it may be interesting to mention an experiment. I have placed all my plants of these two genera, together with Cassiopes and Pleiones (the latter prior to resting) in pots in a large frame in which 'mist' nozzles are coupled to the 'weaning system'. This is the system of acclimatization for cuttings which have been successfully rooted in a 'mist frame', whereby they receive one spray of mist for every three sprays in the mist frame proper. The system appears to be working wonders, but it is too early to be certain about its effectiveness. Certainly the Japanese woodlanders appear to be very happy under such conditions. Both the mist propagation and the 'weaning frames' are disconnected from October onwards.

I have explained to you that the Alpine House is used only for the growing of difficult or tender plants which will not prosper in the industrial atmosphere of my native town—yet what a puzzling word this 'difficult' is; I have always found the cushion Drabas, like *Draba mollissima,* easy to grow, and I have always found the Cassiopes extremely difficult. Yet my good friend Mr. Lilley who gardens about 5 miles away as the crow flies, cannot grow Drabas, and the Cassiopes in the Hall below are sufficient criterion of his ability to grow them easily. These Cassiopes are easier to grow north of the Border, and the answer is probably the greater amount of water in the atmosphere: there they can even grow fabulous plants like *Myosotidium nobile,* but this does not explain why Mr. Lilley and myself have such differing results under virtually identical conditions.

Some plants, like *Anchusa caespitosa,* will always be difficult, but I am told that it grows outside in the scree at R.B.G. Edinburgh. Yet this is no plant from the damp valleys of the Himalayas—it comes from sunbaked hot ground in Crete—and yet it thrives in this

garden famous for Asiatic Primulas, Gentians, Rhododendrons and other plants of such different habitat conditions. South of the Border we are also fortunate in our way, for doubtless we are better able to grow the sunlovers like *Silene hookeri,* and there must be very few plants which are so difficult as to border on the impossible; of these I would mention two superlative introductions of Dr. Peter Davis: *Linum olympicum,* and its very near relative *Linum hirsutum* var. *anatolicum.* These are amongst a number of Turkish species which appear unwilling to set seed in this country, and which I for one find myself quite unable to root as cuttings. Other plants, like the wonderful form of the Edelweiss, *Leontopodium alpinum* var. *crassense,* which that great gardener the late Walter Ingwersen introduced from Bulgaria before the war, have proved so difficult that this and many other lovely species appear to have been lost to cultivation. On the credit side, of course, we have other plants like *Helichrysum coralloides* which have for years been surrounded in a cloak of difficulty, when really they are simple to propagate and not difficult at all. (Illustration p. 131).

Now I have glossed very briefly over as many points of cultivation of alpines under glass as I can think of, and as this is essentially a Conference and not a lecture, I hope you will question me about any points I have not covered, and also perhaps enlighten me about my own errors and the many things that bewilder me.

Discussion:

Dr. W. Weir "Mr. Elliott has stressed the importance as growth factors of control of temperature (hot and cold), moisture, drainage.

He has cited *Eritrichium nanum* as a typically difficult plant; But why is it difficult?

Temperature.—It grows at or above snow level, so that cold does not kill it.

Drainage.—All who have collected it know that its habitat in the high ensures efficient drainage.

Moisture.—The plant lies long under dry snow: but snow layers, as with glaciers, often melt their under-surfaces first, so that the dormant plant must lie in very wet conditions for some time before its annual reappearance. It is then surrounded by wet hill mists each evening after its emergence from dormancy. I therefore doubt whether moisture *per se* kills it. I am wondering whether the factor of light stimulus on the early growth has been considered. It spends most of its life in the dark—my only partial successes have been with those pans which I have kept covered by tin lids, i.e. in the dark, whereas other pans fully exposed to light went the way of all flesh."

Mr. W. K. Aslet said he found Mr. Elliott's ideas stimulating but tantalizing (being without an electricity supply). On the question of shading by pumping coloured water over the glass, he asked, "Need the water be coloured? Is it not possible that if temperature could be kept down without a reduction in light intensity, that this might be an advantage, and nearer to mountain conditions?" Agreeing that some bulbs were better without "baking", he pointed out that such Narcissi as *N. cyclamineus* and *N. bulbocodium* appeared to have a very short resting season, with rather fleshy roots active most of the time—the leaves of some *N. bulbocodium* often being several inches high by October. For these reasons they do not fit well into the routine of lifting and drying and are best grown from seed. On the question of "controlled cold"—a stream of cool air dried out the plants too much, and a temperature of even slightly over 32° F. would not stop some alpines growing. So still air, and some humidity, seems essential. On overpotting, is it possible to overpot? Is it not really a matter of soil content and texture? e.g. we plant choice plants in troughs and scree beds with extensive root runs, but they need not be overfed. With regard to pests; may not systemic insecticides be the eventual answer to our problems?

Dr. Henry Tod recalled that at the 1951 Conference Mr. L. S. Beyts proposed the construction of a 'fully automatic' greenhouse with control of (*a*) Temperature (*b*) Ventilation (*c*) Humidity (*d*) Light, all under electrical control—and in 1961 the same proposals were brought forward.

For the protection of high alpines, e.g. *Eritrichium nanum* it had been suggested that a sheet of fully flexible fibre glass should be placed over the plant in the late autumn. This would insulate from extreme cold and keep the plant dry and let in a low level of illumination as it is moderately translucent.

Mrs. Kilpatrick.—"Might not atmospheric pressure be of importance to high alpines brought down to low (or even sea) level? This seems reasonable, as one would imagine that odd things might happen to the cell walls if the plant had been at a low pressure on the heights and was transferred to our atmospheric pressure on low ground."

Mrs. Greenfield.—"I was rather horrified to think of so much possible automation in the alpine house. I would be afraid that if so much were done for me I should miss the personal contact with my plants. In winter I think it is especially necessary to watch over each individual and water when necessary. Unless completely dormant, no plants are ever allowed to get dry. All that show any green, even *Eritrichium nanum* are watered as they require it."

THE GENUS CASSIOPE

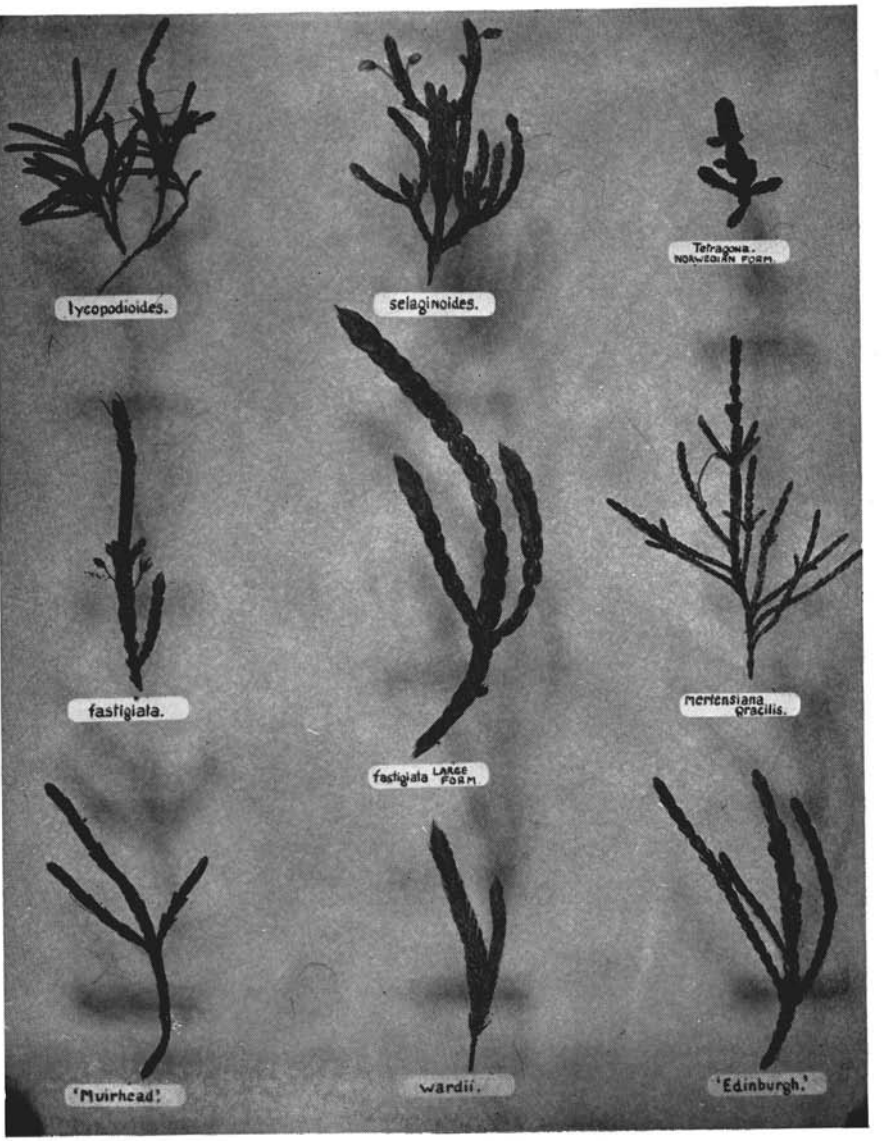
By S. E. LILLEY

(Chairman : Mr. E. B. Anderson)

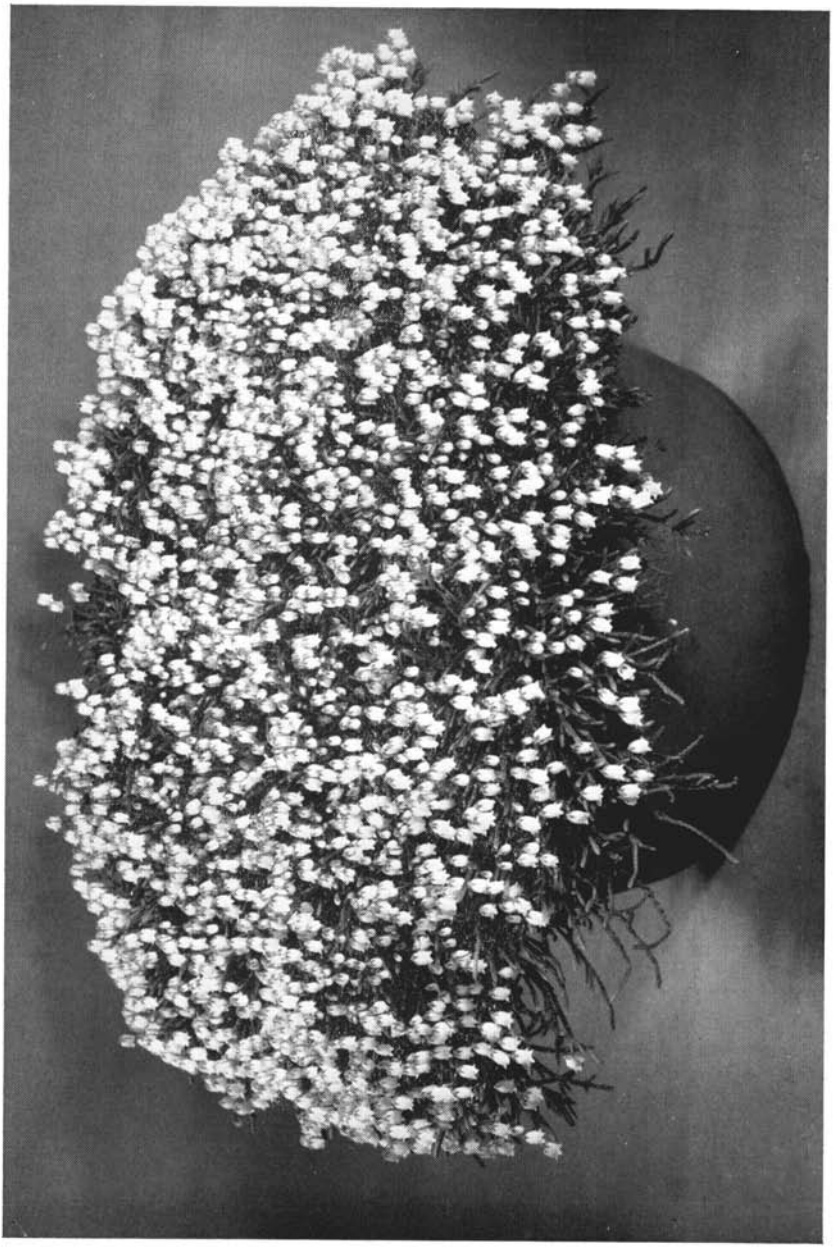
The mother genus Andromeda in the early days included such genera as we know today as Chamaedaphne, Cassiope and Daboecia. Two of the species now included in the genus Cassiope were known to Linnaeus the founder of modern botanical nomenclature, he having become acquainted with them in the wild on his Lapland journey of 1732. In his *Species Plantarum. Ed.* 1. 393 (1753) he included them in the genus Andromeda as *A. hypnoides* and *A. tetragona.* When David Don in 1834 separated them, together with other species, as forming a distinct genus, he retained the classical association by naming this genus Cassiope. Mother of Andromeda, Cassiope, wife of Cepheus, was put among the stars when she died, and whilst there is no implied connection, it requires but a small flight of fancy to suggest that the genus Cassiope is one of the brightest stars in the Natural Order Ericaceae.

The genus is neither large nor varied, and there is more variation in the foliage than in the flowers (see opposite); it is a genus that is not amenable to cultivation in the British Isles; indeed, some of the species would rank with *Eritrichium nanum* and *Jankaea heldreichii* in this respect. The flowers themselves cannot be classed as exciting, flamboyant, or even outstanding; it is difficult to understand the appeal this genus has for so many cultivators of alpine plants, and if one were asked to define it in a word, that word would have to be *delicacy.* To see dozens of the tiny Lily of the Valley flowers poised on slender stalks no more than 1 in. long, each flower of a purity and whiteness that reminds one of the unsullied snow, is a sight that would make the most *blasé* of persons exclaim at their beauty; that this delicate beauty is coupled with a certain reluctance to grow as well in cultivation as they do in the wild, presents a challenge, and these notes are penned by one who long ago took up this challenge.

The genus belongs to the Natural Order Ericaceae. The habit ranges from the tiny moss-like *C. hypnoides,* no more than one-inch high, to the shrubby type of which *CC. wardii, tetragona* and *fastigiata* are a few examples, and which grow from three to twelve inches high. The foliage is distinctive, because most of the species have their leaves overlapping and so closely adpressed to the stem as to give a whipcord appearance, and indeed the leaves look more like scales than anything else. Undoubtedly this habit is the result



Cassiope—leaf variations. *Photo: Roy Elliott*



of the plant's efforts to seek protection from the fierce winds and the extreme cold it has to endure in its native habitat. It also serves to cut down transpiratory losses by reducing leaf area to a minimum.

The tiny sessile leaves range in length from *C. hypnoides,* with leaves no more than one sixteenth of an inch, to the largest of the genus, *C. wardii,* which may have leaves slightly over a quarter inch long. In some of the species, (mainly those from the Himalayan regions) there is a deep groove or furrow on the back of the leaf running centrally from the base upwards; this characteristic is invariably coupled with the presence of hairs on the margins. In others the leaves are unfurrowed and smooth. They grow in four parallel columns and give a distinctive square look to the stems.

The flower buds, tucked well down in the leaf axils, appear as early as July, and when fully formed early the next Spring, hang from fine, sometimes hairy pedicels up to one inch long; campanulate and small, like the Lily of the Valley; they range in colour from cream to pure white, and a few are said to be flushed with pink. The pedicel and the calyx are either green or red.

The genus is found throughout the Arctic and sub-Arctic regions of Europe and America, the Himalayas, Japan and north-east Asia. It is, in its native habitat akin to the heath and the heather in this country. The plants carpet large areas of the mountain side, covered with snow for long periods, and during the rest of the year are subjected to fierce drying winds and hot sun. Yet one must remember that, though they must endure these drying winds and hot sun, their roots are always in almost bog like conditions caused by the melting snows from above. Why are we so often advised to plant our Cassiopes in shade? Simply because we are unable to provide the continuous supply of moisture to the roots which is so essential if the plant is to replace the normal loss caused by transpiration through the leaves. The shade cuts down the transpiration loss, and it would appear that the same result is achieved. But is this really so? Insofar as the foliage is concerned, yes; for it is a certain fact that if a Cassiope, planted in a dry position is exposed to full sun, the foliage will soon lose its healthy green colour and will quickly assume a brown "burned up" appearance; on the other hand, a Cassiope grown in anything approaching full shade very rarely flowers well. If one's garden is situated, as Mr. R. B. Cooke's is, at the foot of a sloping hillside in Northumberland, where the water from the fell above drains down below the surface and moisture is in the air, then one's problem is solved. But very few growers from the Midlands or the South possess such conditions; here the air is dry, and the plant relies solely on the normal rainfall which its roots can pick up. These roots, like those of so many members of the Ericaceae, are fine, mat-forming and close to the

surface of the soil. During a summer such as 1959, when for weeks on end the sun blazed down with almost tropical intensity, it was easy to see that a lot of thought must be given to providing conditions in which Cassiopes would thrive without continuous attention. *Without continuous attention.* This phrase is repeated, because so often this is a factor which is overlooked when providing a home for a plant. Too often do we select a site which will show the plant off to advantage but without thought to the time when we may be away on business, on holiday, or even laid low by illness. Then it is that the plant has to fend for itself, and unless the conditions are such that it has a fair chance of survival, irreparable damage may be done. An extreme case was that of a *Cassiope lycopodioides* which I observed planted on the topmost point of a small rock garden in an industrial town in the Midlands. When the owner was asked why it had been planted in such a position, the reply was, " I thought the flowers would look so lovely with the sun behind them." Undoubtedly they would have done if the plant ever survived to produce flowers.

When the garden was visited again after an interval of eighteen months and comment was made that the Cassiope had disappeared, the owner explained, " Well, I did give it plenty of water as you recommended, but when I got back from my annual holiday, which happened to coincide with a very hot spell, it was just a brown mat and never recovered." Of course it did not recover; it was only because it was planted during a particularly wet period that it became established at all.

So often the cultivation of difficult Alpines becomes a matter of compromise, but always one must bear in mind the local conditions which may influence the extent of the compromise one adopts. For instance, in the industrial Midlands over the past decade there has always been a " smog blanket " which has reduced the strength of the sun's rays, thus enabling growers to give their plants more sun than could be given to the same plants in a district where the air is pure and clean. This doubtful advantage is fortunately disappearing with the introduction of more and more " smokeless zones." A garden on a hilltop is exposed to far more wind than one in a sheltered hollow, and one only has to note how soon a hanging flower basket dries out, even when there is no sun, to realise the drying effect wind can have on plants in an exposed position. Factors such as these, and many more, must be borne in mind when cultivating plants which are designed by nature to exist under certain conditions which in their native habitat do not vary to any great degree, from one season to the next.

The most important point to remember in the cultivation of the genus Cassiope, is to ensure that the roots never dry out. How

the problem is overcome depends to a large degree on the climatic conditions prevailing in the particular district in which the plant is grown, and either the availability of a continuous supply of moisture to the roots, or one's own availability to pour water on the plant just when it needs it. One should provide a moisture retentive soil bearing in mind that whilst most Cassiopes in cultivation today are tolerant of a little lime, they are much better without it. My ideal compost is a mixture of a good heavy lime-free loam, peat, lime-free leaf-mould and coarse sand, all in equal parts. There is little need to be precise with the quantities as experience would seem to indicate that the genus is not greedy in its demands for food. One Japanese cultivator advises sand with a little peat as the growing medium; another sand only, and an occasional watering with a weak liquid fertiliser. Both recommendations would seem to support the theory that a rich compost is not as important a factor in the successful cultivation of Cassiopes as water. If we examine the conditions under which they grow successfully in this country and compare them with those under which they grow in their native habitat, it will be found that the factor common to both is an abundance of water during the growing season. Bearing this in mind it can be readily understood why it is impossible to give them too much water during Spring, Summer and early Autumn. In the Midlands, water is poured on them copiously, and during dry periods the plants are also sprayed night and morning; they are never allowed to dry out. In the South this practice would be even more necessary, but the North is fortunate in that it has so much more moisture in the air, and its cold winters provide a longer resting period.

I find that the best way of growing Cassiopes is in raised beds. Dr. Giuseppi's " Billiard Table " (a structure made from old railway sleepers) was a typical example, crude, but most effective as many of his friends would testify, for on it grew a large mat of *C. lycopodioides* in perfect health. There are many advantages in this method of cultivation; a raised bed is quite easy to construct, and can be sited in one's garden in the position that will best suit the type of plants one wishes to grow in it; in the case of Cassiope, this would be a position with some protection from the mid-day sun. Excellent results can be obtained by building the retaining walls with sandstone, using the dry wall principle. The raised bed at the Savill Gardens, Windsor Great Park, is built in this way but with the added advantage of underground watering through sunken pipes. Healthy plants have even been seen growing in a bed encased by four corrugated iron sheets supported by stakes driven into the ground. Another advantage of the raised bed is that one can fill it with the compost best suited to the type of plants

one wishes to grow in it; once made and planted, they require very little attention other than a good top dressing each year.

The pot culture of Cassiopes can be undertaken quite successfully provided one remembers that they are not plants which take kindly to Alpine House treatment, and it is far better to plunge the pots outside and only give them glass protection when the flower buds are beginning to swell. Come rain, gale, or snow, they will be far happier exposed to all the vagaries of the weather than if cosseted under glass.

Drought and frost are their only enemies; the first for reasons already explained, the second because a late Spring frost can damage flower buds that may have been encouraged to start into growth by an early warm spell, such as we often experience in the South. This is a danger that can quite easily be guarded against. A close examination of the plant during the winter will show the flower bud tucked well down in the leaf axil and protected by the leaf. At the first sign of Spring, whether premature or not, the bud will begin to swell and push out from the protection of the leaf; this is the danger time, for a sudden frost can wipe out every bud. Therefore, if one wishes to grow the perfect plant for exhibition purposes, watch for the tell-tale signs and then take the plant into the Alpine House or make sure it has the protection of glass or polythene. With the low growing, mat forming type, such as *C. lycopodioides,* it is far better to use pans than pots; by so doing, one gives the plant room in which to creep out across the surface of the soil, without the excess of soil beneath the roots that would result if one used a full pot. Most of the mat-forming type root down as they grow, but only if they are in contact with the soil, which is another reason for using a pan with more surface area than depth.

The same applies, but to a lesser degree, when potting up the fastigiate or shrubby types, such as *CC. fastigiata, tetragona,* or *selaginoides;* with these it is better to use a half pot, plant fairly deep and leave room for top dressing. Quite often the lower stems become bare and brown; if this inadvertently happens, one should top dress to cover part of the lower stems; the use of chippings as final top dressing is not desirable because the natural habit of Cassiopes is to root down, and the use of chippings prevents this. All Cassiopes appreciate top dressing once a year, and the best time is after flowering. With the mat-forming types a fine mixture of peat and sand should be well worked into the mat by hand, afterwards syringed with a coarse spray to consolidate the top dressing.

Propagation of most of the mat-forming types is best carried out by division, especially when the plant has previously been top dressed, as this encourages it to form good root growth. Some of the

Cassiope fastigiata.
(*See p.* 81)

Reprinted from
A.G.S. Bulletin, Vol. 12

Cassiope selaginoides.
(*See p.* 85)

Photo: Amateur Gardening

shrubby types increase by underground runners, and when this happens it is possible to sever the runner fairly close to the main plant, leave for a few weeks to settle down and then remove the small plant complete with its own root-mass. All Cassiopes can be propagated by removing green cuttings in August or September and rooting in a mixture of sand and peat. Various methods have been tried out but by far the best is to use a mist-spray frame with gentle bottom heat; cuttings in this type of frame have rooted in six weeks whereas in the more conventional propagating frame, they may take anything up to three or even six months.

Having done my best to give the cultural requirements of the genus as a whole, the following notes give details of the various species which comprise the genus.

At the Conference, Mr. Lilley only had time to deal with the first part of his Paper—that on cultivation. Discussion was limited to a single question, owing to shortage of time, and the balance of Mr. Lilley's paper is published on the following pages.

Discussion

Mr. Esslemont: I want to grow Cassiope for show; I should like to ask Mr. Lilley, does he plunge the pots outside? Does he grow the plants and then pot them up, and bring them inside for protection against the frost for showing?

Mr. Lilley: The plants are grown in pots from about the usual nurseryman's size. Those I want to use as exhibition plants are plunged outside in the raised beds. The pot is fully plunged to the rim. The plants are left there throughout the winter, fully exposed to snow and frost. They have no protection whatsoever; they never go into Mr. Hammer's pet abomination, the heated alpine house; they never go under cover till about a fortnight before the show, to keep the flowers in perfect condition. I do not like growing them under glass in any circumstances.

C. ericoides (Pall) D. Don

Arctic Russia, not in cultivation. The name means resembling heather. Farrer describes it as having fine foliage like that of a heath, finely fringed and bristly, the flowers having only three lobes to the bell. In this species the leaves are not very closely imbricated and have long reddish hairs on the margins and apices.

C. fastigiata D. Don. Syn. *Andromeda fastigiata* Wallich. F.C.C. 1865. (Illustration p. 79).

A native of the Himalayas at heights of over 10,000 ft. Erect and up to twelve inches in height. Tiny sessile, deeply furrowed leaves, closely set and so imbricate as completely to hide the stems with their four parallel columns; fine hairs on the margins and

apices of the leaves give them the appearance of being set in silvery sheafs. The flowers which form in the leaf axils in August are large for the size of the plant; cream to pure white, with the lobes slightly reflexed, they hang from short pedicels mainly at the tips of the foliage. There are two forms, one with the pedicel and calyx red, the other green. Quite hardy, it increases slowly, sometimes by underground runners. Not an easy plant for pot cultivation as it appears to resent disturbance.

Cassiope fastigiata L.S. 17451.
A very fine dwarf form with exceptionally large flowers.

C. hypnoides. Don. Syn. *Harrimanella hypnoides* Corville, *Andromeda hypnoides* Linnaeus.
F.C.C. 1865. Ill. A.G.S. BULLETIN, Vol. 5, p. 134.
Arctic and Sub-Arctic regions of Europe and America. *C. hypnoides* differs from most other species in that the foliage is not imbricated but stands out almost at right angles to the stem. It makes a minute and filmy mass of fine green moss with large white bells hanging from thread-like pedicels mainly from the ends of the shoots. In the A.G.S. *Bulletin,* Vol. 7, S. G. Fiedler writes of finding it growing in peaty soil, the whole plant looking exactly like a tuft of moss, the white bell-shaped flowers backed by a lacquer-red calyx and held on a short stem of the same colour. The lobes of the petals, unlike those of other species do not recurve at all.
What a pity it is that this plant should be so intractable in cultivation, for so it has proved to be; it is grown with indifferent success in the British Isles, but seldom is it seen below the Border.

C. lycopodioides (Pallas) D. Don.
AM 1937 (Illustration p. 74).
The distribution of C. lycopodioides is from the Aleutian Islands, along the south coast of Alaska and from Kamchatka southwards to Japan. The plants from Japan are said to be far easier in cultivation than those from Alaska. It forms a close, almost tangled mat no more than two inches high, with the unfurrowed leaves closely adpressed to the stem. The white hanging bell-shaped flowers, formed in the leaf axils in July-August, are carried on one-inch high, slender scarlet pedicels; the calyx also is scarlet and helps to emphasize the purity of the flower. The plant is perfectly hardy but requires far more attention to cultivation in the South than it would in the North. A good plant for pot cultivation.
C. lycopodioides major. Syn. *C. rigida* of horticulture A.M. 1938, when shown as *C. rigida* (Wada). Japan. This form

of *C. lycopodioides* has slightly larger foliage than the type, much darker and more rigid. It is a poor form as it is difficult to keep in good condition and the flowers, no bigger than the type, are sparse.

Cassiope mertensiana. Don. Syn. *Andromeda cupressina* Hooker. A.M. 1927. Ill. A.G.S. BULLETIN, Vol. 61, p 202.

Mainly confined to N. America, from California to Alaska; in its native habitat *C. mertensiana* grows in profusion. Sallie D. Allen, writing in the *American Rock Garden Society Bulletin, Vol.* 17, *No.* 3, describes finding it at 5,000 ft. in the sub-alpine meadows of Mt. Baker in the Cascade Mountains of Washington. There it grows in huge drifts intermingled with *Phyllodoce empetriformis.* The foliage is a sombre green with the tiny unfurrowed leaves closely imbricated. The creamy white bells appear singly on pedicels towards the end of the six-inch high branches. She reports finding two distinct forms, one with a flower which had a four-parted corolla, green pedicel and calyx, whilst the other had a five-parted corolla and an almost mahogany coloured pedicel and calyx.

As recently as 1960, Margaret Williams, (*A.R.G.S. Bulletin, Vol.* 18, *No.* 3) reports finding it at 9,250 ft. growing along the shore of Star Lake in the Sierra Nevadas. It is interesting to note that the plant grew along the lake shore and then followed the rocks up the steep hillside for several hundred feet and that water from the melting snow banks on the crags above was trickling down slowly over the rocks. This again bears out the theory that it is almost impossible to give these plants too much water during their growing period.

Cassiope mertensiana var gracilis.

From N.W. America, this variety makes a large loose clump and when well suited, smothers itself with quite large white bells. The flowers have a four-parted corolla, constricted at the mouth but with the tips splayed out and are held on shortish red pedicels with a calyx of the same colour, although in cultivation, this may not be constant and may vary between red and green. The flowers appear freely down the stems. On the whole it is easier than the type and more free flowering.

Cassiope mertensiana var californica.

A slightly superior variety, but not in general cultivation.

Cassiope myosuroides W. W. Smith.

Upper Burma and W. Yunnan. Mat forming with large flowers. Has been collected by both Kingdon Ward, No. 1788, and Forrest, but is not in cultivation now. The leaves are small, imbricated,

swollen at the base and with a broad hyaline margin edged with short hairs.

Cassiope palpebrata W. W. Smith.
F. Kingdon Ward. No. 583 in Herb. Edinburgh.

Burma and China. Not unlike *C. hypnoides* it is another of the genus which awaits introduction to cultivation. The leaves are said to be small, elliptic and flat, not imbricated but lying at right angles to the stem.

Cassiope pectinata Stapf.

Upper Burma and S. E. Tibet. Intermediate between *CC. wardii* and *fastigiata* it is of robust habit with large leaves fringed with hairs. Dr. G. Taylor describes finding it in the company of *C. fastigiata* at Sang La in S.E. Tibet. In an article published in Vol. 75 of the *R.H.S. Journal,* he states that in 1938 four species of Cassiope were collected, *CC. fastigiata, selaginoides, wardii* and *pectinata.* Seed was obtained of all except *C. pectinata.* Apparently only a few plants of *C. wardii* survived that collection and as *C. pectinata* has not been introduced since then we must still await what is obviously one of the gems of the genus.

Cassiope redowskii G. Don.

Siberia. Not in cultivation. Farrer describes it as having shining masses of dark foliage with a darker margin and four-lobed flower bells. The leaves are actually hollow with a conical central cavity but this characteristic is not indicated externally. The plant has little value, but is of botanical interest due to its unusual leaf formation.

Cassiope saximontana. Sinall. syn. *C. tetragona saximontana.*

N. America, mainly confined to the Rocky Mountains. In the manner of growth it is very much like *C. mertensiana* but can be identified by the grooves on the leaves similar to those of the Arctic species, *C. tetragona,* although the leaves are longer and narrower. The foliage is a light green with the leaves closely imbricated; the lower stems have the unfortunate habit of becoming bare and brown. The white flowers are held on shorter pedicels than those of *C. tetragona* and very rarely overtip the branch tips. The pedicel and calyx are invariably green. Easier to grow and flower than Arctic *C. tetragona* but still cannot be regarded as free-flowering.

Many authorities consider that *C. saximontana* should only be classed as a sub-species of *C. tetragona.*

Cassiope selaginoides Hooker Syn. *C. canescens* Thomas. A.M. 1928. (Illustration p. 80).

S.E. Tibet. Erect, fastigiate, much branched stems, clothed with closely imbricated, deeply furrowed leaves which are fringed with hairs. The large white bells hang on rather long, hairy green pedicels, mainly towards the tips of the stems with the calyx shading to red on the tips and almost completely red on the fully formed flower, which is shallower and does not reflex at the tips as does *C. fastigiata.* It increases by underground runners.

A stout robust looking plant which in the Midlands grows to a height of four to five inches.

Cassiope sp. aff. selaginoides. L.S. 13284.

A.M. 1954. Ill. A.G.S. BULLETIN, Vol. 22, p. 338. Bhutan.

A fine form of *C. selaginoides,* dwarf, growing no more than three to four inches. An erect stiff little bush with whipcord-like branches covered with closely adpressed doubly concave leaves of bright translucent green and fringed with white hairs. White bell-shaped flowers on rather long pedicels appear mainly towards the ends of the branches and are almost strikingly large for so diminutive a plant. A fine specimen of this plant was observed growing in Captain G. K. Mooney's garden at Sevenoaks, Kent, which would indicate that it is more tolerant of hot, dry conditions than many others of the genus.

Cassiope stelleriana (Pallas) De Candolle. Syn. *Harrimanella stelleriana* (Pallas) Corville. A.M. 1937. Japanese form.

Cassiope stelleriana occurs along the Pacific coast of North America, north to the Aleutian Islands and Alaska and in Eastern Asia from Kamchatka south to Japan. Like C. hypnoides, the leaves are not adpressed but stand almost at right angles to the stem. A small matted shrub with one to two inch stems from which the minute, medium green leaves, one-eighth-inch long, protrude. The flower buds appear singly at the tip of each stem, red at first, they open up into ivory bells slightly rolled back at the tips and backed by a red calyx. In their natural habitat they bloom twice in the year, as indeed they do in cultivation.

Cassiope tetragona Don. syn. *Andromeda tetragona* Linnaeus.

Ill. *Scottish Rock Garden Club Journal.* Vol. VI, Part 1, p. 32.

Arctic and sub-arctic Europe and America, *Cassiope tetragona* is circumpolar in its distribution. The Swedish and Norwegian forms have vertical, strictly quadrangular shoots with flowers ranging from white to ivory. The dark-green leaves with a deep groove on the reverse are closely imbricated. The flowers, slightly constricted at the mouth and held on rather long pedicels are normally carried well above the branch tips. It is reported that in nature the mats

appear mostly to be composed of half-dead branches and that the whole sodden mat is a thoroughly untidy and unattractive sight. Not easy to grow or flower.

Cassiope wardii Marquand. A.M. 1949. Ill. *A.G.S.* BULLETIN. Vol. 12, p. 135. (Reprinted on p. 89).

Cassiope wardii is a native of S.E. Tibet where it grows in profusion covering loose gravel banks, rock shelves, avalanche slopes and seeping screes. A low evergreen shrub with upright, little branched stems, packed with loosely imbricated leaves in four columns giving the stems the typical squared look so characteristic of the genus. The leaves are larger than that of any other species, approximately one quarter of an inch long and one sixteenth at the base; deeply furrowed with the margins and apices fringed with long silvery hairs. The flowers, white in colour, are produced from the axils of the leaves and appear on quite short pedicels mainly towards the tips of the branches. Increases by underground runners.

HYBRIDS

It is perhaps fortunate that, although Cassiopes hybridise fairly freely in cultivation, the nomenclature is not plagued with cultivars as are so many other genera. The following are the only named hybrids in general cultivation at the time of writing.

Cassiope 'Muirhead' (*wardii* x *lycopodioides*). A.M. 1953.

Raised by Mr. R. B. Cooke from seed of *C. wardii* pollinated by *C. lycopodioides*. A rather unusual cross in that *C. wardii* has deeply furrowed leaves, whilst *C. lycopodioides* belongs to the group which lacks this characteristic. In C. 'Muirhead' the groove or furrow extends approximately three-quarters of the distance up the leaf.

C. 'Muirhead' makes a loose bush of upright habit with spreading stems, (intermediate between *CC. wardii* and *lycopodioides*) which branch repeatedly; the leaves are not so hairy as those of *C. wardii* but are closely imbricated in the manner of *C. lycopodioides* and are a lighter shade of green. White flowers, very slightly larger than those of *C. lycopodioides* are held on short, hairy, coral pink pedicels with the calyx fading to light green. Unlike *C. wardii* where the flowers appear mainly at the tips of the branches, *C.* 'Muirhead' has the characteristic of its other parent in that the flowers appear along the length of the stem. Perfectly hardy, it has proved a good plant for pot culture.

A prostrate form of 'Muirhead' exists, no more than two inches high, but otherwise with the same characeristics as the type. At

first sight it would appear to flower more freely than the type, but I feel this is an illusion created by the fact that the flowers are more closely grouped together due to the prostrate habit. (Illustration p. 153).

Cassiope 'Edinburgh' (*C. fastigiata x tetragona*) *A.M.* 1957. Ill. A.G.S. BULLETIN, Vol. 25, p. 327.

This hybrid occurred spontaneously in the Royal Botanic Garden at Edinburgh. It forms a compact bush up to one foot in height composed of upright stems not much branched. The bright green leaves are closely imbricated and lined with bristly white hairs, but unlike those of *C. fastigiata,* they are only lightly furrowed on the reverse.

The white flowers, which are crowded and borne towards the tips of the branches in racemes over two inches in length, hang from pale green, hairy pedicels. The calyx is greenish-brown edged with red. The corolla is campanulate, with reflexed lobes and, like *C. tetragona,* slightly constricted at the mouth.

Two other hybrids as yet un-named are as follows.

Cassiope x. (*fastigiata x lycopodioides*).

Raised from seed of *C. fastigiata* supplied by Mr. R. B. Cooke to Mr. T. C. Thacker of Knowle Nurseries,it has made a loose shrub some six inches high and twelve inches across. The foliage, intermediate between *CC. fastigiata* and *lycopodioides,* is medium green and closely imbricated, with the leaves deeply grooved at the base, but the groove only extending half way up the leaf. Fine hairs on the margins and apices appear to be more pronounced on the new foliage than the old. The flower buds, tucked well down in the leaf axils, appear freely down the stems as in the manner of *C. lycopodioides.* The flowers, slightly larger than those of *C. lycopodioides,* are campanulate, white in colour with the tips of the corolla slightly splayed out. When fully formed they hang from short red pedicels with a red calyx shading to green at the tips. The plant has proved to be perfectly hardy in the Midlands, and subject to approval, it is hoped to name it after Mr. R. B. Cooke.

Cassiope x (*fastigiata* large form x *wardii*). Ill. *S.R.C.G. Journal,* Vol. VI, p. 64.

A hybrid raised by Mr. R. B. Cooke which also occurs in nature, as material collected by Dr. George Taylor matches Mr. Cooke's garden hybrid. The illustration shows it to have rather more the characteristics of *C. wardii* than of *C. fastigiata* as the foliage is only loosely imbricated and very hairy. Mr. Cooke informs me that it is a very fine hybrid and that he would like to call it *C x tayloriana.*

THE GENUS CELMISIA

By DAVID SHACKLETON

(*Chairman Mr. E. B. Anderson*)

I do not profess to have mastered the art of cultivating all the various species of the genus *Celmisia,* but I have had practical experience for a number of years of some of the better known species. This experience may possibly be of service to others, and prevent them from making mistakes which one can ill afford with plants that are so rarely cultivated in the British Isles.

Celmisias are endemic to New Zealand and a few of the surrounding islands, and as far as I know there are some sixty odd species. They are quite distinctive, like so much of New Zealand's flora. The flowers are typical of the Compositae, and are invariably white (with the exception of *C. vernicosa* which has a violet disc and pink-flushed petals, and which I believe is one of the most difficult to grow in cultivation, even in New Zealand). It is surprising how seldom one comes across Celmisias among collections in Britain, and I think it is simply because growers are unfamiliar with them. It is noticeable that only one or two nurserymen offer them, and so the gardening public have little chance to see them at Shows. It seems to be generally thought that Celmisias are difficult to cultivate, but I would suggest that the silvery foliage, which is a feature of so many of them, has led the grower astray, as we all know that the majority of plants and shrubs with silver or tomentose foliage invariably require a dry sunny situation.

Let us now consider Celmisias in their native habitat, and the climatic conditions prevailing there, because the growth of plants in any land is chiefly influenced by temperature, rainfall, sunshine and soil. We shall then see if these conditions can be approximately reproduced over here. In New Zealand most of the Celmisias are high mountain plants, growing at elevations up to 3,000 to 5,000 feet, and are therefore exposed to a good deal of sunshine, though they may sometimes have to withstand severe frost and a very high rainfall. The soil generally is a stony peat, and drainage is rapid.

My experience is that if they are grown where there is the necessary rainfall, or an abundance of moisture combined with good drainage, the majority of species are easily cultivated and

Cassiope wardii.
(*See p.* 86)

Reprinted from
A.G.S. Bulletin, Vol. 12

are on the whole long-lived; unless the rainfall is below 30 inches, serious consideration need not be given to the type of soil as long as it has a high humus content. In fact some of the best plants I have seen at home in Ireland, where they were subjected to a rainfall of up to 60 inches, were often growing in ordinary border soil—but a soil that is nearly always very rich in humus, from the continual manuring and working over the years. Pure peat too will produce good plants, but it lacks nourishment unless renewed or top-dressed fairly frequently. Opposite you will see a fine plant of *C. coriacea* growing and flowering well by the edge of a pond. Whether the soil is acid or alkaline appears to make little difference, and I have seen good plants in soils ranging from pH 5.6 to pH 7.5 but on the whole I think it is probably advisable to err on the acid side. I grow about twenty species in my garden, all out of doors and with no winter cover, and they are growing in what approximates to the John Innes seed mixture with sometimes a little extra peat added but with no fertiliser: this being my standard mixture for all plants. Celmisias will not thrive under trees, probably because of the lack of sunlight, and also because they may get smothered by falling leaves in the autumn.

During 1958 and 1960, two unusually wet summers, self-sown seedlings of *CC. hookeri* and *coriacea* appeared round my parent plants, and a number of seedlings also germinated while still in the scape. The percentage of fertile seed always seems to be low even in the wild; with some seed, such as that of Primulas, the fresher the seed sown, the higher the germination to be expected. When germination takes place, the young plants are slow to mature, and unless moved in spring—when growth is most active —they seem to resent disturbance. Vegetative propagation appears to me to be far the most satisfactory means of increase, and nearly any offset or cutting will be found to root quite quickly in a frame containing sandy peat during summer or autumn.

As regards nomenclature, this is a very difficult group of plants and obviously a great deal of confusion exists. This is possibly because quite a number of the species differ little in appearance. There are not many natural hybrids, and as far as I know very little, if any, hybridizing has been done. Among the different species there is great variation in the size, shape and colour of the foliage, and for convenience in describing them, they may be divided into four groups.

The first group contains the larger plants with very large flower heads, such as *CC. coriacea, hookeri, verbascifolia, rigida, mackaui* and *spectabilis* with leaves sometimes from 12 to 18 inches long

and up to 2 inches broad. Among these *C. coriacea* is probably the most striking, the foliage having an intensely silvery appearance; it is a free flowering plant and is the only one I know that sometimes has two flowers to a stem, which I believe only happens in cultivation. In *CC. hookeri* and *verbascifolia,* the leaves are a dull sage green above and downy beneath, the former being one of the few Celmisias which I have found to be frost tender. *C. rigida* is a free flowering plant, and will soon make large clumps of stiff, thick, shiny green leaves, grey beneath. *C. mackaui* is probably the only large-leafed species where the foliage is entirely denuded of all tomentum; it is a soft green both above and below. *C. spectabilis* is similar in appearance to *C. coriacea,* but the foliage is much shorter and narrower.

In the second group we have *CC. lindsayi, discolor* and *haastii.* Here the flowers and rosettes are small, and the leaves are more rounded, generally greenish in appearance, sticky to the touch, and sometimes toothed. The plants eventually form a mound or shrub, rather than a clump of rosettes as in the previous group, and although the foliage is not so striking, these species all appear to flower freely.

In the third group, we come to the really small cushion or mat-forming plants, *CC. sessiliflora, argentea, bellidioides* and *walkeri.* Of these *C. sessiliflora,* which makes small rosettes of silvery needle-shaped leaves about one inch long, has the reputation of being difficult to grow, but if left out of doors and grown in the ordinary way it will not present any difficulty. *C. argentea* I have so far not succeeded in growing satisfactorily, and I think it is the only one that has presented me with a problem. It is similar in appearance to *C. sessiliflora* but much smaller in all its parts and reminiscent of a Kabschia saxifrage. *C. walkeri* should make a good plant for a trough or similar position, having neat flattish star-shaped rosettes, and growing some two inches high. *C. bellidioides* is a very small leafy mat-forming plant and the only species I know with really glabrous, shining green leaves. This is a plant which definitely needs a great deal of moisture, and in the wild it grows, I believe, over water-soaked rocks. Finally there are the Celmisias that form mounds or tufts of long grassy foliage, silvery above and below, such as *CC. longifolia* and *gracilenta;* in the latter, the leaves are spotted with black, and both plants appear to require a dry and sunny situation. In New Zealand they are found growing in stony ground, and on dry sunny mountain slopes.

A serious problem, which I did not touch on when discussing points of cultivation, is one which faces those who have their gar-

dens in industrial areas where soot and deleterious matter from the atmosphere are deposited. This is particularly important because, as I have pointed out, very few Celmisias have shiny foliage, and therefore the majority will have to be given some means of protection, for even if the soot that coats the leaves does not actually kill the plants, their appearance will be so marred that they will not be worth growing at all. With careful attention to watering and overhead syringing, I suppose many Celmisias can be adapted to alpine house treatment, but I have not yet seen this successfully achieved.

Discussion:

THE CHAIRMAN: We now come to discuss Mr. David Shackleton's paper, and I can support all he said about cultivation in a wettish climate.

MISS SCHLESINGER (Australia): Do our friends in Ireland grow any Australian species? We have two—*C. longifolia* and *C. sericophylla.**

C. sericophylla grows where the snow lies last, at 5-6,000 ft. and nearer to 6,000 ft. On two occasions I have seen it when the snow has still been lying in the valleys. As the snow melts, the new flowers come. It is a very velvety species, and the daisies are compact. It grows under waterfalls or right in the creeks.

The other variety, *C. longifolia,* has a pleated leaf. We have brought them down to our level, 1,600 ft. *C. sericophylla* has flowered in our garden in water, whereas in the wild it seemed to grow completely where the water was flowing. It is very lovely.

MR. SHACKLETON: The only one of those that I do well is *C. longifolia,* which forms mounds, and seems to like dry conditions. The leaves are quite unspotted.

MISS SCHLESINGER: It grows by stones: it has unspotted leaves.

* EDITOR'S NOTE:

C. sericophylla is a little-known species from the Bogong High Plains in Victoria. A good description and illustration are published by J. H. Willis in the *Victorian Naturalist 70,* 223 (1954).

A DECADE OF PLANT INTRODUCTIONS

By W. R. SYKES

Although the past ten years cannot compare with the early decades of this century for the introduction of plants to cultivation, a considerable amount has nevertheless been achieved. As a result, a number of plants have been introduced for the first time, some being new species, others reintroduced. Politics even affect plant collecting, and this is especially true of eastern Asia, and during the past decade the rich areas of South-East Tibet and West China have been closed to western collectors. On the positive side the most important event has been the opening up of Nepal for scientific purposes. Since this last country occupies a large portion of the Himalaya and was very little known prior to 1960, it was almost certain to yield new species.

Collecting has continued at either end of the great Himalayan range, in Assam and Upper Burma on the one hand, and in Kashmir, Chitral, etc. on the other. The other major sphere of operations has been the Middle East region. This is principally due to the intensive work carried out by Dr. Peter H. Davis and his colleagues in Turkey. Other collectors have been further east into Iraq and Persian Kurdistan. Very little introduction of plants has taken place from other regions of the world, apart from a few collectings in the Andes, and one always feels that there ought to be many more. From time to time a good newcomer arrives from the Pacific mountain ranges of North America, but one cannot hope to find a great number of new plants from such a well botanised area.

It is worth considering very briefly any changes or developments in methods of plant introduction during the last decade. One obvious factor is that faster modes of transport enable living plants to be despatched to a distant country much more swiftly. An instance of this is the use by Himalayan expeditions of jet aircraft to fly their specimens home, thus reducing the time spent in an unfavourably hot environment. An important change in plant collecting technique was brought about by the advent of the polythene bag. The advantage of wrapping growing plants in a bag which retains moisture is obvious, although polythene needs

Primula griffithii.
(See p. 97)

Reprinted from
A.G.S. Bulletin, Vol. 21

Primula eburnea.
(*See p.* 98)

Reprinted from
A.G.S. Bulletin, Vol. 23

to be used with care. At the receiving end, scientific improvements in cultivation, especially under glass, have helped to ensure success; but I should very much like to see a glasshouse where the temperature could be constantly maintained at freezing point or thereabouts, and not only the quantity but the quality of the light be controlled as well.

It will be readily appreciated that it takes several years to assess with accuracy the contributions made by any one expedition. Thus someone writing on the introductions of the 1950 to 1960 period at some future time, may well have a somewhat different story to tell from the present writer. The delay in appreciating the real worth of an expedition is illustrated by the introductions of Mr. F. Ludlow, Major G. Sherriff and Mr. M. S. H. Hicks on their last expedition to Bhutan in 1949. It is probably only now that one can correctly assess the importance of this very successful collecting trip. Thus our story really opens with these plants raised under the now famous L. & S. numbers.

The genus Primula featured most prominently in their collectings. Probably the most spectacular species was the petiolarid, *Primula griffithii* (illustration p. 95), which has proved to be very successful in cultivation. From the large winter resting-buds dusted with yellow farina, arise the ovate leaves and thick flower scape; the large umbels are many-flowered, each flower being a rich violet-blue with a golden eye. After flowering the leaves develop to enormous size—a feature seen in a less marked degree in other petiolarids. Some confusion has arisen in the past over *P. petiolaris* itself, but Ludlow, Sherriff and Hicks' material from Bhutan has been identified by Dr. H. R. Fletcher as belonging to this species, whereas it was originally thought to be endemic to Nepal. Actually L. & S. 19856 is the first introduction of this Primula to cultivation. It is allied to the much better known *P. gracilipes;* leaves and flower buds are farinose and exannulate, and the flowers are reddish purple, i.e. much deeper than *P. gracilipes. P. petiolaris* ought to become as commonly cultivated as this other species. A third petiolarid which seems to be permanent in cultivation from the Ludlow, Sherriff and Hicks reintroduction in 1949 is *Primula tsariensis,* a variable species, with pale to deep purple or even white flowers.

As a result of the 1949 Expedition, *Primula dickieana* was raised and flowered successfully for the first time in cultivation. This member of the Section Amethystina is also very variable in colour, yellow, white and many shades of mauve and purple having been recorded. The attractive *P. kingii* is also a member of this Section, and was successfully reintroduced in 1949. Its nodding port-wine

coloured flowers are very handsome when grown *en masse*. It grows well in Scotland and it seems that a moist place in the bog garden or near a pond is most suitable, provided that it is kept as dry as possible in the winter.

Another Primula collected on this expedition, roots of which were flown home, was *Primula xanthopa*, a species only known from West Bhutan where it grows on dry cliff ledges. This rhizomatous plant, belonging to the Section Souliei, with narrow toothed leaves, farinose beneath, has four inch scapes bearing small purplish-pink flowers with yellow eyes. The gathering L. and S. 21230 from the Dongbo La at 12,000 feet was successfully raised by a number of people. *P. eburnea* (illustration p. 96) is native to South East Tibet and West Bhutan, and in the latter country was collected (L.S.H. 21329) on cliffs and steep slopes at 14,000 feet. This species belongs to the Section Soldanelloides and resembles a white-flowered *P. nutans*. From the centre of the rosettes of light green, softly hairy leaves about eight inches long, develop twelve-inch farinose scapes bearing up to twenty nodding, campanulate, creamy-white flowers. The outer surface of the corolla and the calyx lobes are powdered with white farina, and the delightfully fragrant flowers are three quarters of an inch across. Another Soldanelloid sent home was *P. umbratilis*. The dried-up buds looked quite dead when they arrived, but after moistening they flowered in a few weeks. In nature they complete their vegetative growth in a few weeks, and remain completely dry all through the long winter.

Primula tenella, a small Minutissimae, was also found in Western Bhutan, where it grows in the clefts of rocks, and often forms large colonies. The leaves are so heavily farinose that they appear silvery. The scapes, barely two inches high, bear large solitary violet-blue flowers with white eyes. *P. normaniana* was collected in the Trashiyangsi Chu in East Bhutan, growing in moss or leaf mould in wet forest at 9,000 feet. It is a floriferous species with numerous reddish-pink flowers borne well clear of the leaves on stout pedicels to form compact umbels. It was originally found in Assam by the late Mr. F. Kingdon-Ward, and is a member of the Cortusoides Section.

Among species of other genera which are outstanding is *Meconopsis sherriffii* which was first introduced in 1939. The plants in cultivation now however are from the reintroduction made in 1949 under No. 17231 from the Nangole Chu at 13,800 feet. Here the field notes record that it grew in a flat valley bed where Lonicera, Potentilla, Salix and dwarf Rhododendrons flourished among boulders and grass, whereas No. 17253 from the

Gaffoo La grew in boulder scree at 13,500 to 15,000 feet. The rosy flowers were said to be a glorious sight when growing in profusion, and seemingly the species should be polycarpic. A very different plant is *Delphinium muscosum,* discovered in Bhutan in 1949, growing in sandy screes at 15,500 feet. This delightful little species is only three to four inches high in cultivation. The hairy leaves are finely divided, and the flowers vary from light to dark violet-blue. It is quite hardy and has been grown successfully—especially in Scotland. Following on from Delphinium are the monkshoods, and *Aconitum fletcherianum* introduced under L. and S. 17198 has the usual late-flowering habit. It is a fibrous-rooted species and is also recorded from S.E. Tibet and Assam. Rock crevices and steep grassy banks at 15,000 feet are the typical habitats. The flowers are deep purplish-violet with white tips to the lateral segments. In the north of Britain it has flowered and set seed. A rather similar plant is *Aconitum pulchellum* but the deep violet flowers are smaller. The Bhutan gatherings were made at 14,000 feet.

One of the most beautiful members of this family (Ranunculaceae) is *Paraquilegia grandiflora* (Syn. *P. anemonoides*) but how difficult it is to grow! L. and S. 16356 is a reintroduction, and as usual the habitat is stated as cliff faces, where its woody rootstock grows wedged into crannies in the rock. The attractive glaucous divided leaves provide a very acceptable foil to the lilac flowers. *Thalictrum chelidonii* belongs to the *T. dipterocarpum* group, i.e. the flowers have handsome mauve petals. The former species is a woodland or forest plant in the Himalayas and may reach a considerable height. Bulbils also may be borne on the stem. The last member of the family, which I want to mention, is *Anemone rupicola,* reintroduced under No. 19135 from Bhutan. The gathering is a small form but has the typical white chalices which make it so handsome a plant. It is commonly found around 13,000 feet in rock crevices. It can be somewhat temperamental in cultivation and seems to need a cool position with plenty of water in the growing season. It should not be put in too rich a compost because of the danger of promoting excessive leaf growth. Further introductions were made from Nepal in 1952 and 1954.

Gentiana No. 19721 appears to be a new species and is a very attractive plant found growing between 15,000 and 16,000 feet on the Shinje La. The rich violet flowers (Sherriff noted them as wine-purple in the field) appear above the silvery-edged leaves, closely imbricated in four rows. A quite different plant is *Wardaster lanuginosus* which is a very attractive composite related

to Aster. The generic name commemorates the original finding by Kingdon-Ward in S.W. Szechwan. From this second introduction, plants were flowered and seed set, in the garden of Mr. R. B. Cooke of Corbridge, but it is undoubtedly a really difficult alpine. The flannel-like leaves, pleasantly aromatic when bruised, offset the blue-violet flowers which are surrounded by loose woolly tomentum.

An unusual plant reintroduced by Ludlow, Sherriff and Hicks was *Euphorbia griffithii,* a perennial species attaining a height of two and half feet and which is now a popular garden plant. The glabrous dark green lanceolate leaves have pinkish midribs and petioles. Rather surprisingly for a hardy species, the ovate bracts are orange or reddish, and thus when growing well in a peaty loam the plants are very attractive. Also with the same specific epithet is *Polygonum griffithii,* whose dark crimson drooping spikes are seen in a few gardens as a result of the 1949 Bhutan Expedition. *Bryocarpum himalaicum* is allied to Soldanella and is found from East Nepal to Bhutan. It has pendent yellow flowers arising on a scape from the long sheathing ovate leaves. The corolla is one inch long, narrow campanulate, and with seven to eight notched lobes. Found in evergreen forest between 8,000 and 10,000 feet, this monotypic genus has proved very difficult to cultivate, but the reintroduction under L. and S. 19613 has given greater success.

Lilium sherriffae, in honour of Mrs. G. Sherriff, is an unusual species with dark maroon flowers two inches long, and tessellated with gold markings inside like a Fritillaria. This condition is apparently unique in the genus Lilium. It was found at 9,000 feet in sandy soil among low willows on stream banks, and also at 12,000 feet. It is not an easy plant to grow, but a well-drained compost of leaf mould, loam and sharp sand is suggested. *Streptopus simplex* grew in soil pockets amongst mossy boulders at streamsides. The pendant ivory-white flowers are speckled with carmine inside, and it is usually treated as a woodland plant in cultivation.

One could describe many more good plants brought back from Bhutan on this occasion, but reluctantly, I will only mention one more. *Saussurea stella* received a Preliminary Commendation in 1957 although first discovered in 1881, and first introduced in 1912. This starfish-like plant has a rosette of tapering linear leaves which at flowering time lie flat on the ground, thus showing the reddish-purple leaf bases. At the centre of this rosette is a cluster of reddish-purple capitula, and the whole rosette may be twelve inches in diameter. Unfortunately, it is monocarpic, but

can be propagated from seed. It needs good drainage and an open position. Growing at altitudes of about 11,000 feet it occurs from Bhutan to Western China.

In 1950 the late Col. D. G. Lowndes, who was an enthusiastic and knowledgeable grower of alpines, visited the Marsiandi Valley area of Central Nepal. Over a short period he made a considerable collection of plants, including some very rare ones, and quite a few new species. Thus it seems appropriate that his first plant which I should like to mention is the little *Rhododendron lowndesii*, which was named in his honour. He found this in rock crevices on steep cliff faces at 14,000 feet, where it forms a prostrate shrublet with pale green deciduous leaves. The pale yellow flowers are about half in inch long and there are one or two in an inflorescence. In addition there are reddish marks and scales on the outside of the corolla. The species seems to belong to the Series Lepidotum, in spite of the deciduous nature of the leaves.

Another new species named after Col. Lowndes is *Saxifraga lowndesii*. Described by the collectors as having flowers like a "glorified *S. oppositifolia*", their brilliant rose-lilac colour, in conjunction with the size (half an inch in diameter), combine to make a very attractive plant. It forms mats among the wet rocks on steep hillsides at 13,500 feet. Unfortunately, it seems to be an extremely difficult plant to grow, and Col. Lowndes was unable to bring back much living material. Although not entirely unknown previously, he also introduced a very fine form of *Polygonum affine* which was thought at first to be a different species. The flower spike is broader, and the colour of the flowers themselves is much deeper. Examination of the type specimen of *P. affine* has shown that Lowndes' plant is much nearer to it than the plant commonly cultivated,* and it seems that in Nepal the usual form is this more attractive, although rather less vigorous, plant. Probably the commonly cultivated form of *P. affine* is a more western form, since there seems to be a tendency for the flowers to get paler and the inflorescences taller and narrower as one goes towards Kashmir.

In 1952 and 1954, botanical expeditions jointly sponsored by the Royal Horticultural Society and the British Museum (Natural

* It seems appropriate at this point to quote Dr. H. R. Fletcher writing of this plant in the A.G.S. *Bulletin*, Vol. 29, p. 38) "The Award of Merit plant (the Lowndes form) is so distinct from what has been grown as *P. affine* for so long, that Major and Mrs. Knox Finlay were absolutely correct to have exhibited the plant under a cultivar name—and it is to be hoped that the name 'Donald Lowndes' will always be associated with this striking plant."—EDITOR.

History), made large collections in West and Central Nepal. The first expedition to West Nepal, in which Messrs. Polunin, Sykes and Williams were the collectors, is known to cultivators by the letters P.S. and W. prefixed to the numbers of the gatherings, whilst the second expedition to Central Nepal is similarly known by the letters S.S. and W., after the collectors, Stainton, Sykes and Williams. Although the many reintroductions far outweighed the new ones a few of the latter are noteworthy.

In the opinion of some people the best plant to come from these expeditions was *Primula reidii* var. *williamsii* named after the leader of the expeditions. This is a beautiful Soldanelloid which also seems to be reasonably easy to grow, especially in Scotland and Northern England. This variety has a limited distribution in nature, seemingly being confined to the neighbourhood of the Dhaulagiri range. It is recorded as growing plentifully in certain areas, especially among boulders in open forest at altitudes of about 12,000 feet. It also grows in the shade of overhanging rocks, on earth banks in evergreen oak forest, or out in the open. Perhaps this diversity provides a clue to its surprising ease of cultivation, for it has become a regular feature at the Chelsea Flower Show. The plant itself has hairy leaves, and the scapes rise to about five inches or so high, carrying one to eight nodding flowers. A notable character of the broad campanulate calyx is the heavy coating of white farina within. The corolla is blue with varying degrees of white towards the base, indeed S.S. and W. 9003 which gained the A.M. in 1956 had more white than blue. Finally, a pleasant scent is an added attraction. Protection against winter wet is needed in cultivation, and a compost of peat, leaf mould and sand seems preferable. It is illustrated on p. 113.

Primula ramzanae is a very different plant and is probably lost to cultivation now. It is a member of the Rotundifolia Section, and appears to be confined to a small area of high alpine country around Lake Phoksumdo Tal, north west of Mount Dhaulagiri. There, on stony exposed slopes at 15,000 feet, it was found by the Kashmiri collector Ramzana Mir, and subsequently named in his honour. A dwarf plant, only one inch or so high, with pale to deep purple flowers, always with a yellow eye surrounded by a white ring. The crenulate leaves, farinose beneath, are borne on long petioles. *Primula aureata,* a Petiolarid with deep yellow flowers, was introduced by means of living plants for the first time, and thus the mystery of its exact home has been solved, for the story of how it first appeared in a packet of Swertia seed sent from Sikkim in 1935 is well known. It is endemic to Nepal and seems to go as far east as the Katmandu region. In addition to

the new plants, substantial collectings of such rarely cultivated species as P. *wigramiana* (illus. p. 114), *P. reidii* var. *reidii, P. strumosa,* etc. were made.

Although Meconopsis species are often far too large for the rock garden, they are such typical inhabitants of the alpine Himalaya that one feels compelled to include them. Good examples are the variants of *Meconopsis regia, M. paniculata* and *M. napaulensis* introduced under S.S. and W. numbers. They are mostly tall monocarpic plants which were found by L. H. J. Williams on a few knife-edged grassy ridges south of the Annapurna range. The taxonomy is so difficult that it seems very likely that in their restricted habitats a great deal of hybridisation has been going on: certainly, it is very difficult to assign some of the collections to any definite species.

A few numbers deserve special mention although they do not come absolutely true from seed. S.S. and W. 8620 is best described as a red *M. regia,* but seedlings have given rise to plants with flowers of any colour between red and yellow. At its finest, and as illustrated in the *R.H.S. Journal,* Vol. 81. January 1956, it is an outstanding plant. S.S. and W. 8621 was an obvious intermediate with apricot flowers. Another very fine plant is S.S. and W. 7943 which may be a form of *M. napaulensis.* It has beautiful pink flowers with the buds often a bright rosy-pink. It was found by J. D. A. Stainton in open grassland at 12,000 feet between the Dhaulagiri and Annapurna ranges. A grower on Vancouver Island reports that it is almost perennial. The buds and leaves are covered with golden hairs, and thus are attractive at all seasons. The winter rosettes of most of these large Meconopsis are very handsome, and the S.S. and W. numbers show a great variation in leaf lobing and hairiness, another indication of probable hybridisation. The winter is the most difficult period for their cultivation and it is very important that the crowns do not then get too wet. In the colder Scottish climate these plants grow best with a peaty loam as a growing medium.

Turning to other herbaceous plants we find that there were very few striking new introductions. An attractive scarlet form of the nodding yellow *Geum elatum* is being grown in several gardens now, which was introduced from a grassy ridge at 12,500 to 13,000 feet under No. 9020. I think that it gives the best results in a fairly rich loam. Not far removed, taxonomically, is *Potentilla argyrophylla,* a very variable aggregate in the Himalaya. I can recall forms with the flower colour ranging from yellow, through orange and scarlet to deep crimson. But the finest member of this aggregate species is *Potentilla atrosanguinea*

var. *cataclines*, which was given an Award of Merit under the number S.S. and W. 7760 (afterwards corrected to 7768) in 1956. Found in the Kali Gandaki valley growing in similar habitats to the above-named Geum, it has several attractive features. The leaves are so deeply pubescent as to give a silvery appearance, and the flowers are bright yellow with an orange eye. Again, since it is a plant of the alpine meadows, and may reach as much as two feet in height, it is not an ideal rock garden plant. A very dissimilar species, which has more the status of an alpine is *Potentilla coriandrifolia*. It had a fleeting introduction to cultivation before, and I fear that this will prove to be the case again. The specific epithet aptly describes the nearly glabrous, deeply cut leaves. The flowers are borne on slender pedicels and have petals which are white with a dark crimson blotch at the base.

One usually thinks of Androsaces as mat-forming plants, and there are certainly a number of such species common in the Himalaya. *Androsace strigillosa* however, has quite a different habit, with distinct rosettes of large leaves. The pink or white flowers are well-spaced on slender scapes about six inches high. I think that it must have been introduced previously, but as a result of these expeditions it looks as if it has now come to stay. I am also doubtful whether *Polygonum milletii* has been successfully cultivated before, but pieces of turf containing its dormant crowns were flown home to England and the species is still growing at Wisley. It grows naturally in fairly level boggy meadows, and is a member of the Bistorta Section with handsome large spikes of deep crimson-magenta.

Codonopsis convolvulacea was introduced in quantity by Ludlow, Sherriff and Hicks from Bhutan as well as from the Nepal expeditions, and should become as well known as its Chinese relative *C. vincaeflora*. They are very similar, but an obvious difference is the red ring in the flower of the Himalayan species. S.S. and W. 9084 is *Codonopsis dicentrifolia* one of the most beautiful species in the genus, with large deep-blue scentless corollas chequered white within. It grows in ledges and crevices on steep cliffs, exposed to the full force of the heavy monsoon, and is a difficult species to cultivate. Other fine dwarf herbaceous plants reintroduced included the purple-flowered labiate *Dracocephalum speciosum*, the purple *Aconitum hookeri*, *Pterocephalus hookeri* a white-flowered scabious, and the beautiful pale blue, almost translucent *Delphinium brunonianum*.

Dwarf shrubs often form the dominant vegetation above the tree line, and in exposed dry positions on grassy and rocky hillsides around 14,000 feet, a new species of Berberis was found. *Berberis*

mucrifolia is only 10-24 inches high, and has small narrow mucronate leaves. From the solitary flowers develop globose orange fruits, containing the red seed. The very small *Rhododendron lowndesii* which was mentioned earlier, was collected in 1952 and again in much larger quantities in 1954. It has flowered in cultivation and is apparently flourishing in several places, mostly in the north. It seems to thrive best on a north-facing peat bed. In very different habitats grew the deciduous *Rhododendron cowanianum,* discovered in Central Nepal by Oleg Polunin in 1949. This cannot be assigned to a known Series, and forms a small shrub. The relatively unattractive purplish flowers are followed by handsome orange and red leaves in the autumn. The bottom of a deep, wet, tree-covered gorge at 10,000 feet is the only place where I saw it growing. *Potentilla fruticosa arbuscula* seems to be a rather difficult species to define taxonomically but S.S. and W. 4651, identified as this species, is a quite different plant from some forms already in cultivation. In Nepal it forms a low rather flat-topped shrub with deep chestnut-brown hairy twigs. The large erect flowers are a bright buttercup-yellow.

The last decade saw the final plant expedition of that great collector Mr. F. Kingdon-Ward. The letters K.W., often followed by a very large number, must be familiar to anyone who has had experience of raising new plants. Unfortunately, his last two or three journeys yielded little of interest to the alpine gardener, since he was mainly working at lower altitudes in Upper Burma. Indeed, he himself remarked about the mountain-top vegetation in an area known as the Triangle, being strangely lacking in a number of well-known genera of Himalayan alpines. One plant which is worthy of mention, if only because it was such an unexpected find, was an epiphytic lily—an apparently unique condition for a member of this genus. *Lilium arboricola* was only found near Hkinlum in 1953, growing high up on trees, and Kingdon-Ward said that it seemed to be rare. The reflexed perianth lobes are "Nile green", contrasting with the bright orange anthers, whilst in addition there is a very attractive scent. This plant has been cultivated from seeds and bulbs sent back, but is unfortunately not hardy and probably requires, as its discoverer suggests, similar conditions to cool-house orchids.

Before leaving the Himalayan region I feel that the genus Pleione deserves mention. Although it seems that there have been no new introductions during the last ten years, this period has coincided with their great rise in popularity as alpine house plants. There has been a certain amount of reintroduction of the Himalayan species, such as *Pleione humilis, P. praecox* and *P.*

hookeriana, but mainly it has been a question of increasing existing stocks and importing pseudo-bulbs from nurserymen in the Orient.

The intensive studies of the Turkish flora during the past decade have been accompanied by the introduction of a number of excellent alpines to cultivation. The Middle East generally has long been famous for bulbous and other plants with fleshy storage organs, and as was to be expected, many of the collected plants were reintroductions. Thus the most noteworthy new introductions of Dr. Peter Davis and his colleagues on several expeditions have been small dicotyledonous plants, often with more or less woody stems and rootstocks. Unlike the Himalayan plants the Middle Eastern flora usually grows better in southern England. I think that the most successful of these plants are the two little perennial Verbascum species, *V. pestalozzae* and *V. dumulosum.* They are quite closely related but *V. pestalozzae* is a little dwarfer and has rather larger flowers, as well as several more precise botanical distinguishing features in the inflorescence. The attractive leaves are grey and tomentose. Both species were collected in the Lycian Taurus near Antalya, and although *V. pestalozzae* was discovered in 1946, it seems that it has not been cultivated until recently. It was found in crevices of limestone rocks, whereas *V. dumulosum* was collected in the walls of old temples. In the British Isles they are grown in the alpine house or in a sunny position on the rock garden in well-drained soil. Propagation is effected by seed or cuttings.

Another little member of the Scrophulariaceae introduced from the Taurus mountains, was *Wulfenia orientalis.* Wulfenia is a small genus with five species, having a relict distribution extending from the Alps to the Himalaya, and the above-named species forms the central link in the chain. *W. orientalis* is generally similar in appearance to the others, with handsome showy spikes of tubular lilac-blue flowers and purplish-brown calyces, which rise from rosettes of light green, shiny leaves.

The flora of the Anatolian plateau is really a continuation of the Steppe flora of Central Asia, because a dry continental climate is characteristic of both areas, and it is therefore not surprising that a large number of semi-shrubby labiates thrive there. Several of these have been introduced during the 1950's and make welcome additions to the alpine house or rock garden. In 1950 *Origanum amanum* was collected in the Taurus mountains by Dr. Davis. This attractive dwarf marjoram, introduced under No. 419, makes a small compact shrublet about three inches high closely beset with tiny pale green decussate leaves. The ornamental flowers make it quite distinct from other cultivated species of Origanum, whose

beauty lies in the showy bracts. The persistent inflorescence of one to four flowers has pink bracts subtending each flower, and the calyx lobes are also flushed with pink. The bright lilac-pink flowers have a corolla tube one and a half inches long, and a small limb composed of a trilobed hood and a bilobed lip, above which protrudes the conspicuous style.

In 1954, another marjoram was introduced from the northern Amanus mountains. This was *Origanum laevigatum* with a woody rootstock and aerial stems about 12 inches high. The glabrous, glaucous leaves are borne on mahogany-red stems, the latter bearing the long tubular pink flowers for over half their length. The reddish-purple bracts offset the flowers, of which there are about eight to each whorl. The species is hardy and has a useful late-flowering habit.

Although not alpine in stature, I feel that two Salvias deserve a mention. They are *Salvia candidissima,* collected by Davis on Bozburun Dag in Western Anatolia in 1949, and the allied *S. cyanescens* (a new species) found by Davis and Hedge in 1957 in central Anatolia. *S. cyanescens* is the more slender plant, and the leaves of both species are attractive with their felty covering of silvery-white hairs. The flowers of *S. candidissima* are white with a yellow trace, whereas those of the other are tinged with blue on the corolla hood. Both plants have a long flowering period and dry scree conditions seem to suit them best; Edinburgh's Royal Botanic Garden is one place where they are successfully cultivated. There are several attractive Scutellarias in the Middle East, and Davis and Polunin found several on their expedition to Turkish Kurdistan in 1954. *Scutellaria virens* has been known for a long time, but seemingly has not been introduced to cultivation before. The inch-long flowers are yellow and are borne in dense spikes on the upright stems. The crenate leaves are markedly lacking in hair for an alpine species, hence the trivial name. A related skull-cap, with pretty purple flowers, was found on this expedition, but is not in cultivation as far as I can ascertain.

Although collected in 1947, *Thymus cilicicus* was not exhibited until 1957, when it gained a P.C. A native of dry gravelly plains in western Anatolia, it is stated that it ranks as one of the finest cultivated thymes. The three inch shrublets form a mass of interlacing branches, on which are borne the rosette of bristly grey leaves. The bright pinkish flowers are in terminal racemes two inches long and are freely produced above the subtending ovate bracts. *Thymus cilicicus* usually requires some protection, if only a sheet of glass over the scree in which it is growing, but it is safer in the alpine house. Although not a Turkish plant, this seems a

suitable place to mention yet another labiate, collected by Davis on the nearby Greek island of Karpathos. It is *Stachys spinosa* which forms a tight mat of spiny stems clothed with silky hairs. Since the leaves are similarly clothed, the whole plant has a shining silvery appearance. The flowers are white and sometimes suffused with pink and veined with brown.

Campanula ephesia is a very attractive species collected by Davis on sunbaked rocks at Priene and Ephesus near the south west of Turkey. It is, unfortunately, monocarpic, but the large velvety leaves are themselves very attractive. The flowering stems are about fifteen inches high and clothed with long soft hairs. There are five to eight large axillary mauve-blue flowers, each being about two inches across. This species received an Award of Merit in 1956, but is not an easy plant to grow. Another member of the Campanula family collected by Davis in the Lycian Taurus under No. 14192 proved to be *Asyneuma lycium.* This saxatile plant has dense tufts of tiny spathulate leaves on long petioles, from which arise the delicate three inch high stems with greyish-blue flowers at the apex. The protruding red stigmas are prominent.

Another recipient of the Award of Merit in 1956 was *Inula heterolepis,* a dwarf shrubby composite from Turkey. It is most suitable as a foliage plant for the alpine house, since the leaves are covered with a white felty tomentum. The shrub is about eight inches high and the chrome-yellow flower heads have no ray florets. Very different is *Linum olympicum* from the Bithynian Olympus which forms a prostrate mat with downy bluish-green leaves. The prostrate flowering stems are six to nine inches long, and at the apex of each are several large pinkish-lilac or white flowers, with darker veins and measuring about one and a quarter inches across. *Ricotia davisiana* is an unusual crucifer collected by Davis on summit screes in Western Anatolia. From the woody stock arise fleshy brittle stems, bearing thick bluish trifoliate leaves. The pink flowers are in rounded heads about three inches high and the plant blooms for a long time. Apparently the soil can be calcareous or acid so long as it has perfect drainage, but it must be admitted that *Ricotia davisiana* is a very difficult plant to grow.

Primula davisiana, named in honour of its collector, was an unexpected discovery in the Cil Dagh massif of Turkish Kurdistan in 1954. A member of the Section Floribundae it grows in crevices of limestone cliffs at about 6,000 feet. It is the dwarfest member of this Section, with a scape barely an inch tall, and bearing a few-flowered umbel of deep yellow flowers. Plants raised from seed were flowered at the Royal Botanic Garden, Edinburgh in 1955. A compost of light sandy loam overlaid with limestone chips was given

and cool greenhouse conditions maintained. The altitude of *P. davisiana* suggests a much hardier plant than *P. floribunda,* or the other herbaceous members of the Section.

A noteworthy re-introduction from the Primulaceae was *Cyclamen pseudibericum.* The collecting by Davis and Polunin in the Amanus mountains of southern Turkey was a satisfactory conclusion to the long search for the precise habitat of this species. It was first introduced in 1897 by Messrs. Van Tubergen from a Turkish importation, but in spite of many attempts it had never actually been found growing wild. The plants were growing in the peaty soil of a beech forest. *Cyclamen pseudibericum* has leaves marbled like *C. orbiculatum;* beneath they are purple-red and glossy, whilst the margin is crenulate. The flowers are larger than those of the better known species and are ' Phlox Purple ', according to the *Horticultural Colour Chart.*

As already mentioned, the collectings of bulbous and similar types of plant have been mainly reintroductions, because of the extensive collectings over the past hundred years or so in the various countries of the Middle East. However, *Iris persica* var. *mardinensis* is a handsome new variety of this polymorphic species, and the collecting at 3,000 feet suggests that it may be hardier than the type, although it will still no doubt require hot, dry conditions during its summer dormancy. The varietal epithet denotes the province in Kurdistan where Davis found it.

Oleg Polunin has probably done as much as anyone during the last decade in collecting these showy monocotyledons from this region. In 1958 whilst in Iraq Kurdistan he found and brought back bulbs of the beautiful *Tulipa stapfii,* a species allied to *T. montana,* and featured in *Curtis's Botanical Magazine* (No. 9356). The bright scarlet flowers have a very short peduncle and there is a black base to each tepal. The slightly glaucous leaves are often twisted. In the spring of 1959 Polunin collected in the Lebanon, where he was primarily concerned with introducing bulbs. *Colchicum brachyphyllum* was introduced early in the century but had died out, so that his reintroduction of this handsome species was very welcome. The flowers vary from rosy-purple through pink to white, and the leaves lie flat on the ground. It grows at 5,000 to 6,000 feet in meadows saturated by the melting snows, but later becoming baked hard in the hot dry summer. Another bulbous plant collected was *Sternbergia clusiana,* growing on steep earth slopes facing west, at varying altitudes up to 8,000 feet. Like other Sternbergias the flowering period is October and November. The golden-yellow flowers sometimes exhibit a greenish shading towards the base, and the greyish-green leaves are twisted.

Turning to Europe—the least likely continent for new introductions—there are nevertheless a few plants from the Mediterranean lands worthy of mention. *Crocus goulimyi* is a recently described species from the southern Peloponnese of Greece. The autumn-produced flowers are bluish-mauve and the habitat is stated to be regions of mixed stones and red clay. Be that as it may, the Crocus has succeeded in a well-drained light loam in the alpine house. Another species *Crocus carpetanus,* was collected by Patrick Synge in Spain during 1956. The stock raised by the late E. A. Bowles had died out, so its reintroduction was timely. A rather rare species, confined to high altitudes in a few localities in Spain and Portugal, *Crocus carpetanus* has done well in at least one alpine house in south-east England. The soft tunic is unusually thick and the leaves have seemingly reduced blades, being semi-cylindrical in section. The smallish flowers are lilac to white, with grey-blue veins. Another plant reintroduced on this trip was *Ranunculus acetosellaefolius,* a plant which is very difficult to propagate. It was collected at 9,000 feet in the Sierra Nevada. There are basal rosettes of blue-green, arrow-shaped leaves, with fleshy petioles. The purplish-brown peduncles are four inches long, and on them are borne the cup-shaped flowers; the petals are pure white, and each flower is about one inch across. A cool damp position is recommended for its cultivation.

I must confess that it was a surprise to find that the now popular and easily grown *Geranium dalmaticum* almost comes within the scope of this article. It was exhibited in 1949 and at once gained an Award of Merit, but it was actually introduced from the garden of King Boris of Bulgaria by the late Mr. W. E. Th. Ingwersen, a year or two previously. The species has slender rhizomes above the ground, and from them arise the glabrous five-lobed leaves. The delicate pink flowers are one and a quarter inches across with entire petals, and are produced over a considerable period in the summer. The whole plant is only a few inches high.

The alpine gardener seldom looks to Africa to provide many suitable plants. Nevertheless, several species from the Atlas mountains (botanically, hardly considered as part of Africa) and South Africa are very welcome additions. Dealing with the north first, a plant which—as far as I can ascertain—has not been in cultivation before, is a curious dwarf thistle collected by Mrs. R. Lukin in the Lower Atlas mountains. It is called *Carduncellus rhaponticoides* and grows in lush meadows which may be submerged in the winter for a time. There is a prostrate rosette of prickly leaves surrounding a Carlina-like, but blue, inflorescence. It has been grown successfully in south-east England, particularly at Wisley, A certain amount

of mystery seems to surround the origin of cultivated material of a small North African Narcissus, identified by Dr. A. Fernandes as *Narcissus cantabricus* ssp. *cantabricus* var. *petunioides*. This rather formidable string of epithets belongs to a charming little member of the Bulbocodium group. The specimens in cultivation have all arisen from among bulbs of dwarf narcissus, imported from Holland soon after the war. It was not until 1956 that they were exhibited, but an Award of Merit was given at once. The remarkable feature of this little white-flowered variety is that the corona is quite flat, or even reflexed, hence the aptness of the varietal epithet.

From the Drakensburg mountains of South Africa has recently come a little shrubby composite, *Euryops evansii*. It is only about nine inches high and the branched stems bear many silvery-grey leaves which increase in number towards the apex. The flat canary-yellow capitula are an inch across, and are borne on two inch peduncles. A very different introduction was made by Mrs. Garnett-Botfield from the coastal regions of the country. It was *Oxalis depressa*, and better known as *O. inops*, a more or less stemless species which rapidly increases by bulblets. It appears to be hardy in light sandy soil and might even become a nuisance in favoured localities. From the smooth blackish bulb arise the obtuse leaves and the longer flower scapes. The sepals are shorter than the attractive petals, the latter being rose with a yellow claw, whilst a white band runs between the two main colours.

An even more attractive Oxalis was collected on stony hillsides in Patagonia by Mrs. R. Tweedie and introduced in 1955. It was *O. laciniata*, which has proved hardy in the rock garden. The attractive leaves are glaucous-green and divided into about ten narrow leaflets, folded lengthwise to reveal more clearly the undulating purplish margins and the coral-pink petioles. The flowers are about an inch long, and the colour of the plant exhibited at Chelsea in 1960 was "Aster Violet" according to the *Horticultural Colour Chart*, but this was offset by the conspicuous green throat. It appears that the colour is very variable, with pink, crimson, blue, violet and white forms all occurring together. Within the last year or so several other Oxalis species have been introduced but have yet to prove their hardiness and worth. I think that it is very likely that more species will come in as their potentialities become more appreciated, but I need hardly add that the proclivity of some of them to take over the garden will have to be carefully watched.

Mrs. R. Tweedie also collected the beautiful *Ourisia magellanica* (syn. *O. ruelloides*) from Patagonia. It appears that this plant is being grown under the name *Ourisia rutaefolia*—almost certainly a

nomen nudum. The habitat of this plant at 3,200 feet is described as "in running water, in small streams with mossy rocks and fine sand and clay amongst them". It seems rather a strange habitat for this low straggling herb with its rather thin, broad ovate, crenate leaves. The inch-long tubular flowers are bright scarlet and have scalloped corolla lobes. From each of the large bracts a single flower is produced.

In North America, the Rockies have yielded a few worthwhile plants in the past decade, and as a result of the recent energetic collectings of Dr. Worth, more will soon become established in the British Isles. A very fine composite which he has sent over from Colorado is *Rydbergia grandiflora*. There it grows on exposed summit ridges at 12,000 to 13,000 feet. This must be a reintroduced plant, since Sampson Clay spares it a few lines in his well-known work, but its cultivation presents a problem. The plant is typically tufted with grey hairy leaves and the large yellow capitula are two to three inches across. Another difficult plant is *Oenothera crinita* (perhaps a variety of *O. caespitosa*). It comes from Nevada and one might expect that this little evening primrose would find our climate difficult to tolerate. Indeed, almost desert-like scree conditions are required, although, living at altitudes of 6,000 feet or so, it is reasonably tolerant of cold. However, success has been achieved in southern England—mainly under glass. The foliage appears silvery because of the numerous silky hairs, and the white flowers, fading to rose-pink, are about one and a half inches across and are produced throughout the summer. From the Mt. Rainier range in Washington State, Mrs. Padavich has collected a pretty primrose-yellow form of *Erigeron aureus* which has been named 'Canary Bird'.

Finally, from the opposite side of the world has come *Helichrysum coralloides*, a small New Zealand shrub which first attracted attention when it received a Preliminary Commendation in 1956, although it was introduced some twenty years earlier. (Ill. p. 131). In 1958 it received the Award of Merit and its position now seems established.

Although this concludes my account I must emphasize that amongst the great amount of plant material brought into cultivation during the last decade there may well be other alpines of equal merit which have not yet showed their true worth. As already mentioned, a plant may take several years to become established, and unfortunately it may not be always possible to deduce the garden value until a much longer period has elapsed.

Primula reidii var. williamsii. *Photo: Roy Elliott*

(*See p.* 102)

Primula wigramiana.
(*See p.* 103)

Reprinted from
A.G.S. Bulletin, Vol. 22

THE GENUS DIONYSIA

By DORIS E. SAUNDERS

(*Chairman* : *Mr. E. B. Anderson*)

The genus *Dionysia* belongs to the Natural Order Primulaceae, and is almost exclusively confined to Persia, with one species occurring in Irak and another in Afghanistan. Some twenty odd species are known—a list can be found in Sampson Clay's *Present-Day Rock Garden*—but it is possible that more await discovery, not only in Persia itself, but in the countries adjacent to it. The plants tend to exhibit local endemism, one species (occasionally two or three) being confined to one particular mountain or mountain range. This peculiarity renders the search for the plants a toilsome one, involving as it does, much travelling, and the constant ascent and descent of lofty peaks—many of which are isolated and rise abruptly from the plains.

Dionysia species may be roughly divided into two classes: those which are of shrubby or loose open growth, and those which form hard compact cushions. The foliage is generally aromatic. The flowers are either pink or yellow, and are shaped like those of a small Primula, but are characterised by a very long corolla tube which has a curious swelling near its base.

The plants are severely saxatile and are found at considerable elevations, from about 5,500-13,000 feet according to the species. They grow on vertical cliffs, sometimes in an overhung position, or on the flat on the tops of the mountains. On the whole they seem to prefer shade but may also be found in the sun particularly near the summits. The mountains consist of sheer rock without any soil and have almost vertical strata. They are mostly composed of limestone but some, like Schir Kuh, the home of *D. curviflora,* are of volcanic origin.

In 1932, Dr. P. L. Giuseppi made an expedition to Persia to study and collect *Dionysias* and found the following species:

D. revoluta	on Sabst-i-Puschom	S. of Shiraz	flowers yellow
D. michauxii	on Kuh-i-Bamu	N.E. of Shiraz	flowers yellow
*D. straussii**	on Kuh-i-Ajub	N. of Shiraz	flowers yellow
D. bryoides	on Kuh-i-Ajub	N. of Shiraz	flowers pink
D. rhaptodes	on Kuh-i-Jupar	near Kirman	flowers yellow
D. oreodoxa	on Kuh-i-Jupar	near Kirman	flowers yellow
D. heterochroa	on Kuh-i-Jupar	near Kirman	flowers yellow
D. curviflora	on Schir Kuh	near Yezd	flowers pink

* There seems to be some doubt about the identity of this plant. Dr. Giuseppi later stated that the species from Kuh-i-Ajub was actually *D. kotschyii* while the true *D. straussii* occurs on Kuh Gerru. See A.G.S. *Bulletin,* Vol. XII, p. 85.

Seed of *DD. straussii, michauxii, curviflora* and *bryoides* was collected, and plants were raised but *D. straussii* failed to thrive and soon disappeared.

In the same year E. K. Balls also visited Persia and found most of the above species. Both he and Dr. Giuseppi agreed that *D. revoluta,* a wiry heath-like shrub over 1½ feet high with small yellow flowers looked consistently miserable and seemed to be a dying species.

In 1939 Peter Davis sent home seed of *DD. straussii, curviflora, bryoides* and *michauxii.* Again the first mentioned species failed to become established but the other three species were successfully brought to flowering stage and are figured in A.G.S. *Bulletin* Vol. XXVII, p. 137 and Vol. XII p. 80. Unfortunately the beautiful yellow-flowered *D. michauxii* did not long persist in cultivation but *DD. curviflora* and *bryoides* proved fairly good doers until the latter became a war casualty.

In 1959 Polunin found *D. odora* on top of Piramagrun near Suliamaniya in Irak. It was growing at about 8,000 feet on north-facing perpendicular cliffs. The plant made large compact cushions composed of small, toothed, silvery grey leaves, which gave off a strong aromatic smell when crushed. The flowers were deep yellow. No seed could be found and collected plants did not survive.

As far as I know, *D. curviflora* is now the sole species remaining in cultivation. It is a great pity that *D. bryoides* was eventually lost, for it was easier and more repaying than *D. curviflora,* and each year covered itself with flowers. This may possibly have been due to the fact that the flower buds do not form until early spring and then develop rapidly. *D. curviflora* may, and often does, produce numbers of buds, but most of these appear prematurely in early winter and usually wither away. Buds, however, which form in spring develop successfully. The same phenomenon occurs in some of the high alpine Androsaces and Primulas, and seems to be associated with the unnaturally high winter temperatures at lowland levels. For the ordinary grower, temperature is difficult to control, but other methods may be found of preventing the premature formation of flower buds or, alternatively, of encouraging those which do form to reach maturity. Research on this subject is needed and would form an interesting and repaying study.

Shading. Because of the intense heat to which Dionysias are exposed in their native land, it was naturally assumed that they would not fear the sun of more northerly latitudes. Unfortunately

this was far from being the case, and it was only after a number of the plants originally raised had been scorched that the need for shading was realised. The power of the English sun to burn plants may be due to the much greater moisture content of the atmosphere, compared with that of Persia. At the higher latitudes, too, sunlight is much more prolonged, and plants which in summer are accustomed to a twelve-hour night—accompanied by a very sharp drop in temperature—often do not take kindly to the long hot evenings of southern Britain. At all events, Dionysias definitely need protecting from the sun, and this fact cannot be too strongly emphasised. Where the plants are kept in an Alpine house the outside of the glass should be shaded by slats or blinds, and in very hot weather the plants themselves will benefit from a light covering of thin muslin which can be stretched above them during the hottest part of the day and removed each evening.

Watering. During the growing season Dionysias require plenty of water, but it must be given at regular intervals and only when really needed. This can be ascertained by feeling the cushions, which should be firm to the touch. Any suspicion of limpness indicates the need for water, and this is best given by standing the plants in a bucket of water until the top of the compost starts to darken. If the pots are kept sunk in moist sand, they will probably only require water once a fortnight at the most. Over-watering causes yellowing of the foliage, and sometimes damping-off of individual rosettes. Should this occur the plants must be stood in an airy position to help them dry off, and any mouldy rosettes must be pulled out with a pair of blunt-nosed forceps. In hot weather a light spraying will not hurt the plants, but on cold damp days any moisture which inadvertently falls on them must be immediately removed with blotting paper. If this is cut into thin strips and then rolled like a spill it can be inserted between the individual rosettes to soak up any water which has actually penetrated the cushion.

During the winter Dionysias undergo a long resting period and become almost dormant. The foliage is not shed, but gradually dies back from the outside of each rosette until only the centre may be left alive and green. The amount of die back varies in individual plants and is influenced by the severity of the winter. At the approach of the dormant period in late autumn, water must be gradually decreased until it is withheld entirely. Should the plants become very limp they can be stood for a few minutes in about 2 inches of water. Fresh growth begins again in February or March, and during this critical time of re-awakening, very careful watering is needed or the plants may damp off.

Repotting. Owing to the nature of its growth, *D. curviflora* is not an easy plant to repot and the process is one which it greatly resents. Examination will show that in spite of its cushion-like appearance the plant is in reality a sub-shrub. The rootstock is thick and woody, and divides into numerous fine branches which may be several inches long and entirely covered with the dead leaves of old rosettes. These branches subdivide towards their tips into a number of tiny branchlets bearing very small imbricated rosettes of green leaves. The rosettes are pressed tightly together forming a hard compact dome, which in nature may be over two feet across. Once, however, the plant is removed from its pot, or native rocks, the whole cushion collapses and is very difficult to reset. Some form of collar should be made so that the branches may be held together, otherwise it is impossible to repot the plant so that it is central, at the right depth and horizontal. Fortunately *Dionysias* can remain happily in the same compost for several years, but once they have grown over the edge of their container they *must* be repotted, and this is best done in the spring. After repotting, which is indeed a major operation calling for as much courage as skill, the plants should be kept in a shady place for at least a week. After this period they will either begin to go back rapidly, and eventually die, or they will start to make fresh growth and regain a healthy appearance.

Compost. *D. curviflora* seems to succeed in a number of different composts (See A.G.S. *Bulletin,* Vol. XXVI, p. 149). Here it has grown well and flowered moderately in a mixture consisting of one part each of loam, leaf mould, peat and sand. A poorer mixture of 50 per cent. leaf mould and 50 per cent. fine chippings with the addition of a small amount of the first mentioned compost is also successful. The plants are set high enough in their pots to allow for an inch or so of medium Cornish sand to be placed round the collars. Some growers prefer pieces of tufa but I find that more marginal growth is made in the Cornish sand. Any holes formed in the cushion by the removal of unhealthy rosettes should be filled in with fine Cornish sand which serves to keep the cushion compact and to encourage new growth.

Control of Pests. Dionysias are occasionally invaded by thrips, or by a small aphis similar in type to that which attacks the Aretian Androsaces. These pests are fairly easy to detect and can be destroyed by suitable insecticides. The dreaded root aphis is much more difficult to combat and where possible Dionysias should not be kept in the same house as Primulas and Androsaces

since these are almost certain to harbour the pest. Where segregation is impracticable, every effort must be made to rid the above mentioned plants of the aphis. The insecticide Sybol is claimed to be effective against root aphis if watered round infected plants at a strength of 1 part in 200 for Primulas and 1 in 400 for Androsaces. 3 per cent. Nicotine dust kills root aphis if it comes directly in contact with the insects and should be dusted among the rosettes and round the collars of any plants suspected of infection. The crystalline substance, Paradichlorbenzene which gives off a vapour heavier than air is also toxic to root aphis, and if a few crystals are placed round the backs of the plants and beneath the drainage holes they will act as a deterrent and slow poison; but the chemical must not be used too frequently, or it may poison the plants themselves. In Dionysia a sure sign of an attack by root aphis is the appearance of yellow rosettes on an otherwise healthy plant. When these rosettes are removed with forceps, pulling out as much of the stems as possible, the aphis can frequently be seen clustered round the bases of the stems. Suitable treatment should at once be given and if carried out at regular, but not too frequent, intervals, the plants can be kept reasonably healthy.

Propagation. To the best of my knowledge no *Dionysia* seed has been set in cultivation. Certainly none of my own attempts to fertilise the flowers has met with success. The houseflies and bluebottles which so readily pollinate the flowers of Aretian Androsaces are not attracted to those of Dionysia and it may be that the latter are adapted for pollination by some particular insect. On the other hand failure may be due to insufficient summer heat. Dionysias, however, may be increased by cuttings. Possibly through lack of sufficient material I was unable to propagate *D. bryoides,* but *D. curviflora* is not particularly difficult to strike. Single branchlets consisting of several rosettes should be detached in spring, not later than May, and placed separately in pots of very sandy compost, the pots being afterwards sunk in larger pots of moist sand. These cuttings should not be covered over but stood in full light and shaded by a piece of muslin. Rooting usually takes place in about a month, and the young plants may be either potted up in early autumn, or left till the next spring, by which time they will have made considerable growth. Because of the scarcity of the plant no rosettes inadvertently broken off should be thrown away, but should be used as cuttings whatever the time of year. There is always the chance that a few of them will take root and help to increase the stock of this rare and beautiful species.

Discussion

Mr. C. H. Hammer: Mrs. Saunders very kindly said I was quite good at growing Dionysias. I have grown a few, and I once possessed one that had a large number of flowers. It so happened it was one she was throwing out as dead: she gave it to me. I took it home and it grew in a year or two, to about six inches across and started to flower. There is no danger about over-watering: in the summer they want a great deal of watering. You cannot water Dionysia too much, particularly if you do not plunge the pots: I do not plunge mine. Mrs. Brough, who has travelled to Persia several times and who knows Dionysias well, says they always grow facing north in full shade. The reflected light from other mountains is still strong, but nevertheless they do not like the sun directly on them.

Mrs. Saunders: Mrs. Brough has been to Persia and says Dionysia grows in shade, but Dr. Giuseppi, Peter Davies and E. K. Balls, who collected widely, said many species were in full sun. Those on the tops of the mountain *must* be in full sun. Mr. Oleg Polunin found a very interesting species in Iraq on north faces. You cannot generalize that they should be in full shade; many species do grow in shade, and they prefer it in nature, but some are forced to grow in sun and they seem to do quite well there also.

Mr. S. E. Lilley: Mrs. Saunders' experience with Dionysias and my own are similar except in one respect—she flowers them, and I do not. I was interested in one suggestion she made, and that was extreme cold. I would ask Mrs. Saunders if she has tried putting a Dionysia in a refrigerator, and has that made it flower?

Mrs. Saunders: No, I have not tried that, but I am really wondering whether it would not develop mildew in a refrigerator, unless you had the temperature very low. I have no experience of that: it is a novel idea and I should be interested in the results, because Dionysias do need a long winter rest, as many alpine plants do, and it would prevent the buds forming prematurely.

INTERESTING PLANTS SEEN DURING MY TRAVELS

By ELIOT HODGKIN

This talk did not lend itself to the writing of a paper; instead, I have prepared brief notes on some of the more unusual plants of which transparencies were shown.

Adonis amurensis. This member of the Ranunculaceæ comes from Manchuria and Japan. It has always been a popular plant in Japan, where there is almost a cult of its various forms. I was shown colour slides of 37 of these; some of the doubles were attractive, but others were unbelievably distorted and ugly. I have never succeeded in growing it well, but some find it easy.

Alstrœmeria umbellata. The Alstrœmerias come from Chile and I saw this species growing in pure scree in the Andes at about 8,000 ft. Its cherry pink flowers and glaucous foliage make it an attractive plant. So far as I know it has never been in cultivation, but as seed of a number of species from this area has been received, it may turn out that we have it. These dwarf Alstrœmerias are not very easy as, coming from the Southern Hemisphere, they tend to start into growth in mid-winter, and are liable to be cut to the ground. They should be kept dry during this period in order to discourage them from growing till cold and frosts are over.

Crocus cancellatus. This was a particularly large form which I collected in Samos. *C. cancellatus* is a polymorphic plant, and this Greek form is sometimes known as *C. mazziaricus.* All the forms can be identified by the coarsely reticulated tunic of the large corms. In Damascus they are made up into small bundles, and sold in the market for food. I tried one; it has an unexciting nutty flavour.

Crocus carpetanus. We found this in the Sierra de Gredos flowering with *Narcissus bulbocodium* where the snow had just melted. The flowers are a pleasing shade of lavender and white, but there is much variation even in one patch. It is a difficult plant which never seems to remain in cultivation for more than a few years, and is restricted to a few high mountains in Spain and Portugal.

Crocus clusii. This crocus is common almost all over Portugal, and it spreads into western Spain, but is hardly ever seen in our gardens. It has deep lilac flowers, and with me is often the earliest

of the autumn crocuses to bloom. Bowles suggests it should be grown in a frame, but it has survived outside in my heavy clay soil for over 10 years. It should be more widely grown.

Cypella peruviana. This is a bulbous plant belonging to the Iris family, which I found flowering among the ruins of the Inca city of Machu Picchu at 8,500 ft. in the Peruvian Andes. I believe it is in cultivation and it should succeed in the alpine house, but would not be reliably hardy outside.

Fritillaria hispanica. We found this in the Sierra Nevada at about 7,000 feet in the *Erinacea pungens* area. It is about a foot high with one to three drooping maroon flowers. Almost the only ones in flower were in among the Erinacea and other spiny plants: the rest had been eaten off by goats. It is probably hardy in a sheltered place; in a pot it is quite safe.

Galanthus fosteri. It was first introduced from Amasia in Turkey by Sir Michael Foster in 1899, and during the heyday of growing snowdrop species and forms in the early years of this century, it was looked upon as one of the very finest. But it was difficult to keep and had almost died out of cultivation by 1939. In 1943 Dr. Peter Davis found it growing in the Lebanon, an entirely new habitat, and after the war he reintroduced it from its original home in Amasia. In 1958, thanks to the kindness of Professor West, I received bulbs from the Lebanon. It now appears to be re-established in cultivation and so far has not proved intractable. But equally it has not shown itself to be particularly fine, except for one or two isolated forms. It flowers in early February.

Iris histrio. This is a bulbous Iris of the Reticulata section and comes from Asia Minor. It was readily available before the war, but has since become scarce. It is variable both in its colour, which is usually blue or pale blue but can be mauve or purple, and in the concentration of spots on the falls. It is not as hardy as *I. reticulata,* and if grown out of doors, a pane of glass should be laid flat on the ground over it as soon as it has died down, so as to keep it dry, and help its baking. I received bulbs from Professor West in the Lebanon and they have shown considerable variation.

Iris palæstina. This is one of the dwarf Junos and is closely allied to *I. alata,* which grows in the western part of the Mediterranean, while this plant comes from Syria, Lebanon and Israel, at the eastern end. I found it in February in the hills of Lebanon, almost prostrate, with creamy, scented flowers nestling among brightly shining leaves. The bulbs lay just below the surface and so must get well baked in summer. This may be the key to success with this rather fickle but attractive plant.

Lilium carniolicum. Parkinson called this plant the 'bright red Martagon of Hungarie,' though reddish-orange would perhaps be more accurate. This was found growing in the Julian Alps in Yugoslavia on the lower slopes of Triglav in rough scree, which made it difficult to collect. For some reason it has always been a scarce plant in gardens, although it does not seem difficult and sets an abundance of seed which germinates easily.

Narcissus pallidiflorus. Although known to Parkinson in the early 17th Century and called by him the " Early Strawe-coloured Bastard Daffodil," it disappeared from cultivation until 1882 when Peter Barr re-discovered it in the Pyrenees, where Parkinson said it came from. It ranges from the Asturias in northern Spain, where my plant was collected, through the Pyrenees to the Mediterranean, but it is very local. There are variations in colour—though it is always pale—and in the shape of the flower, but in any form it is beautiful. It is not a strong grower in most gardens and is slow of increase.

Pæonia broteri. This is too big for any but the largest rock gardens; still it is a true mountain plant. It comes from Portugal and Spain where we saw it in flower on the Sierra Nevada at 4,000/5,000 ft. It is a lovely sight with the sun glistening through its crimson flowers, set off by its shining leaves and red stems. Collected plants are slow to establish and several years may pass before they bloom, but is is not difficult to grow.

Primula reinii. This is one of the four primulas constituting the Reinii section. All come from Japan, but this is probably the only one in cultivation. Towards the end of April it was just coming into bloom in the Hakone mountains, the clear pink flowers pushing up from the crinkled, rounded hairy leaves. It was growing in full sun, but protected by the dwarf bamboo which takes the place of grass in these mountains. Its companions were *Tsusiophyllum tanakæ,* which is a dwarf rock-hugging Rhododendron, and *Schizocodon soldanelloides alpina,* but neither was yet in bloom. The soil was dark, peat-like loam, and once through the mat of bamboo the plants could almost be dug up with the fingers alone. It will almost certainly require a well drained soil, rich in peat or leaf-mould and some shade.

Primula spectabilis. This magnificent Primula is endemic to the Judicarian Alps in North Italy where it covers some of the mountain tops with a carpet of true pink flowers in May or early June. It is not a difficult plant to grow, but almost impossible to flower; in gardens it is a pale and almost worthless shadow of its glory in its own home.

Ranunculus acetosellæfolius. Farrer says that it grows only in

the Sierra Nevada in the south of Spain. We saw it in bloom there at about 8,500 feet in soggy ground from which the snow had just melted. It has a white buttercup flower, pinkish in bud and very distinct leaves, shaped like a barbed spearhead, which lie flat on the ground. It has survived and flowered both outside and in a pot, but is not an easy plant. It probably needs a sunny scree with plenty of water in spring, but dry in summer.

Rhodothamnus chamæcistus. A delightful shrublet which only escapes from being a Rhododendron by small botanical differences. It is quite common in the Eastern Alps where it grows either in mats on loose scree or between blocks of white limestone. It likes lime, but this is not essential to it; what it loves is humus, drainage and sun. It is worth a little trouble to give it what it wants, as its pink flowers smothering the foliage are a glad sight. Collected plants are difficult to re-establish, and seeds are probably the best means of propagation.

Rosa glutinosa. This rambles about the summit screes of Mount Kerketevs on the Greek island of Samos, but seems to be happy in ordinary soil. It is neat and compact in habit, with sticky, shining dark green leaves and pale pink flowers, which in the autumn turn into little round bristly hips.

Tropæolum polyphyllum. This well known plant is quite hardy, and in crossing the Andes from Chile to Argentina I found it as high as 11,500 feet, growing on both sides of the frontier. Some people find it difficult, but it grows well with me in full sun, with its tuberous roots tucked under a lavender bush. It is said to dislike lime.

Tulipa sharonensis. It belongs to the Oculus-solis group, and grows only on the coast of Israel. I saw it flowering in February this year on the sand-dunes there. It was difficult to collect as the bulbs were deep in the pure sand. The leaves lie flat on the ground with a curly, undulating edge. The scarlet flowers sit close to the ground, or are carried on a very short stem.

* * *

Many people with a sunny garden deny themselves the delight of growing plants which are reputedly shade-loving, imagining that such cannot be a success with them. I have yet to discover the shade-loving plant which will not thrive in the sun granted that its roots are kept well moist, and flat stones over those roots produce almost ideal conditions.

F. W. MILLARD.

(*From the Report of the First International Conference*)

THE GENUS DAPHNE

By ING. HUBERT MARTIN

(*Chairman: Mr. E. B. Anderson*)

This paper was translated and read by Dr. Kiesenhofer, of Linz-Donau. Mr. Martin was in charge of the Belvedere Alpengarten in Vienna for almost thirty years, and after the war created the garden at Frohnleiten, Styria—one of the finest rock gardens in Austria—in which was incorporated the famous plant collection of the late Dr. Lemperg at Hatzendorf.

In this paper it is not proposed to deal with all the known species of Daphne but rather to give some details about the hardier sorts which are most likely to succeed in our gardens.

As is generally known there are two main groups of Daphne; the first includes the evergreen type, and the second group includes those that lose their leaves. The most valuable for our rock gardens are no doubt the evergreen species, even though some of them are more difficult and slower growing than the deciduous types.

Let us first consider the best-known evergreen species, the much loved but temperamental *Daphne cneorum.* This plant has a very wide distribution in Europe, and occurs not only at low levels —where it makes a prostrate rambling shrub—but is also found in the high mountains where its growth is more compact. This beautiful plant with its rose-pink flowers is definitely tricky, and it is difficult to explain why it should flourish in one garden and yet die in the garden next door. In my view this is due, not so much to the soil conditions, but to the situation. The two best plants I have grown were planted facing due South in a clay soil, with sand and peat added. Both plants were situated in well drained clefts where they have grown to perfection for the past eight years. They make runners in every direction covering an area of about six square feet, and are smothered in flowers. Both these plantings prove that *D. cneorum* can be grown successfully in the open. This species has quite a number of forms: the first I want to mention is the very rare *D. cneorum* var. *alba:* it is smaller in habit than the type. Other forms are *D. cneorum* var. *major, D. cneorum* var. *eximia, D. cneorum* var. *verlotii,* the very lowly *D. cneorum* var. *humifusa* and *D. cneorum* var. *variegata,* which has yellow spotted leaves. I have grouped all these together

as they are so similar in growth and freedom of flower, and have a long span of life. Likewise, their requirements are the same, namely, plenty of humus in the form of peat or peaty soil (moor-earth), good drainage and a position in full sun.

A constant danger to all Daphnes is "damping-off", for this is fatal to the strongest of plants and will kill them in a very short time. There seems to be no ready remedy for this except to provide the best possible drainage and encourage layering to renew the plant. In the wild this occurs naturally, as all the lower branches form roots whenever they come in contact with the soil. In the garden we can aid this process by layering the longer shoots which, in all forms, attain about 12 inches in length. This too is a good method of propagating many of the species, as one can cut off the rooted parts and treat them as individuals. One can even treat whole plants in this way by filling in the centre with about 4-6 inches of suitable soil. The following year the plants may be taken up and cut into as many parts as there are rooted pieces. This method is the best and safest way for the amateur to practise propagation and he will find that *DD. blagayana, philippi, arbuscula, striata* and all forms of *D. cneorum,* respond readily to this method of increase.

Coming now to *D. arbuscula,* this species is a native of Siebenbuergen (Roumania) and it forms dense shrubs of about eight inches in height, with spreading branches. It is an excellent flowerer, and grows very well. The colour of the flowers is rosy-pink. I have grown it in a peaty soil as well as in a mixture of clay, sand and peat, in full sun.

It is a pity that this comparatively easily grown plant is so difficult to acquire through the trade when it is so easy to propagate from summer cuttings.

The high alpine forms of Daphne include some of the gems of the genus. *D. striata* occurs on both limestone and granite in the European Alps, and resembles a small slender form of *D. cneorum.* In nature it grows in clefts or on screes and ascends to 6,500 feet. It is rather difficult to grow as it requires a lime-free but rather heavy soil. Young seedlings prove the easiest to establish but seed, collected in the wild, can also be used. Its close relation is *D. petraea,* which grows on limestone rocks around L. Garda; it somewhat resembles a small *D. arbuscula,* and like so many lime-loving plants is easy to cultivate. This species must be planted in cracks or in tufa, where it will grow slowly but steadily. It forms small shrublets with rose-pink flowers which are very sweetly scented.

The third of the high alpine species, *D. retusa,* I hesitate to mention as I do not recommend it very highly. It comes from

Western China, and grows rather tall, producing pale (pinkish-purple) flowers : it is not widely grown. Rather would I recommend *D. tangutica,* from China. It, too, grows tall reaching three feet in height and makes a beautiful evergreen shrub which is well worth growing for its rich dark green foliage alone. The flowers are very attractive, rosy-purple in colour and freely produced. The plant is a good doer, and easily raised from seeds or cuttings—the latter will flower in two years. This plant wants a northerly position but in an open site which gives the plant protection from the winter sun. Where this is not possible, shading is advisable.

Daphne blagayana (the Krainian Kingflower), occurs in the higher mountain woods of S.E. Europe. It has a creeping habit and the long prostrate shoots have crowded towards their tips, the 1-1½ inch long light-green, obovate leaves. The flowers are creamy white in colour, and are very sweetly scented. In nature the long creeping branches readily root into the natural woodland humus, but the plant has rather a straggly appearance. If the lower branches are constantly pinned down to encourage them to root the plant can then be grown as a dense bush in the garden reaching some twelve inches in height. *D. blagayana* is a strong grower and requires plenty of room to develop, and although it enjoys a half-shaded position it should not be placed under trees. It enjoys being planted in a peaty soil, and to increase its growth and the abundance of its flowers, the soil may be further enriched with a liberal dose of diluted cow manure applied once or twice each year. *D. blagayana* can be increased readily by layering, which takes about a year to root.

Somewhat stiffer in habit is *D. pontica,* from Eastern Europe. The leaves are a darker green, the habit more erect, and the flowers are a pale yellow colour. It requires the same treatment as *D. blagayana* but is less robust and not such a good garden plant as *D. blagayana.* The easiest way to propagate it is by layering or cuttings.

D. laureola occurs not only in Europe, but also in Asia, and when well suited it will reach a height of three feet and makes a handsome shrub with its 4 inch long, dark green leaves. The sessile flowers are yellowish-green in colour, and are followed by attractive blue-black berries. This plant also prefers soil rich in humus, just as you find it in the woods. It can be successfully grown in a damp position in the light shade of trees. Seed is the best method of increase, and for stock purposes it is used for the grafting of evergreen Daphnes, such as *D. philippi* (*D.laureola* var. *philippi*) from the Pyrenees. This has the same flower and the same rich dark coloured leaves but only grows to a height of nine to twelve inches.

Being dwarfer, it is best suited for the smaller rock garden, whereas *D. laureola,* being taller, is best used for the bolder plantings of the larger rock garden. It likes a peaty soil but good drainage is essential to overcome its tendency to "damp-off."

The last of the reliable hardy evergreen Daphnes to be mentioned is *D. oleoides;* in appearance it is somewhat like the deciduous *D. alpina.* It is a very handsome dwarf shrub about twelve inches high with an erect much-branched habit. The leaves are bluish-green in colour, and the flowers vary from white to rose-pink, often with a yellowish tinge. The fruits are yellowish-red. It enjoys a northerly situation, and is best planted in a cleft or scree. When well sited it is easily maintained by the self-sown seedlings which appear. Although requiring the same treatment as *D. oleoides,* the variety *buxifolia* is stouter in habit.

There are a number of hybrids of which perhaps *D. x thauma* (*petraea* x *striata*) is the most interesting, as it has the habit and size of *D. petraea* but is rather more slender in growth. It is one of the gems of our gardens. Another hybrid worthy of our attention is *D. x houtteana* (*mezereum* x *laureola*), which has inherited the evergreen habit of the parent *D. laureola.* Two less hardy species which require protection in winter are *D. collina* and *D. sericea* as they come from further south. In Frohnleiten, *D. sericea* has now become a dense globular shrub, but rarely gets through the winter without suffering frost damage. It is a very decorative species with rose coloured flowers and the typical hairy leaves. It can be easily propagated by cuttings.

Two species which are not hardy with us are *D. acutiloba* and *D. odora* but they can be grown in pots and wintered in the cold frame or alpine house.

Daphne mezereum, which occurs in both Europe and Asia, is the best known and most widely grown of the deciduous species and can be planted in most gardens. It is easily raised from seed. Varieties of it are *D. mezereum alba,* which is interesting because of its yellow fruits and the fact that it comes true from seed, *D. mezereum* var. *atrorubra,* and the variety *grandiflora,* with dark-red flowers. One of the most valuable of the garden hybrids is *D. x burkwoodii* (*caucasica x cneorum*) a fast but compact growing, beautiful free-flowering shrub, which grows to a height of three feet. Similar to it, but with yellow flowers, is *D. giraldii* from N.W. China. A special beauty is *D. altaica* from Siberia, which reaches a height of one to three feet and has large white flowers, which often appear again in the autumn. It needs to be grown in full sun in a well drained, stony soil. Like *D.* x *burkwoodii* it can be readily propagated by cuttings.

Another white-flowered Daphne is *D. caucasica,* but it is rather taller than *D. altaica* and produces long runners. In Frohnleiten it has entirely covered a rock bank of about 15 square yards. Again it likes to be planted in full sun, but prefers a heavier soil. When planted in shade the growth produced is less strong, but it survives and flowers. Both the seeds of *D. caucasica* and *D. altaica* take a long time to mature and the collecting of the seed is extended over a long period. The most convenient method of propagation is by seed, but it can also be propagated by removing the rooted runners.

I have already given some hints on propagation by seed, cuttings and grafting, but the last does not produce such long-lived plants. Now I should like to relate some of my experiences in the growing of Daphnes. There are two very important points when raising from seed :—

(*a*) Remove from the seed all traces of the outer coat.

(*b*) Sow as soon as possible after harvesting.

The berries contain a poisonous substance which prevents germination, so not only must all traces of this be removed, but care in washing your hands after handling the berries is also important.

To obtain clean and good seed for sowing, the berries should be placed in a container full of water and allowed to soak for about a week, and the water changed at intervals throughout the week. Following this thorough soaking, the seed can easily be squeezed out with the fingers and all the good seed will be found in the bottom of the container—while the poor seed, together with the remains of the berries, will rise to the surface of the water. The good seed should then be spread out to air and dry before sowing. Where large numbers of seedlings are required they can be sown into drills in the cold frame, while smaller quantities can be sown into either pots or pans, and then exposed to the winter cold. In this way you will obtain a 100% germination. As a suitable seed mixture I always use a combination of loam, peat and sand, but for the more delicate species, such as the evergreens, I add a liberal quantity of peaty soil.

Most species of Daphne can be successfully propagated vegetatively, and I always prefer heel cuttings from laterals, as I never found the terminal shoots so successful. Care to remove all remnants of bark with a sharp knife from the heel cuttings before inserting, is important. A mixture of sharp sand and sifted peat is best for your cuttings, and into this the cuttings may be placed direct, or they can be dibbled round the rim of the pot—the pots being filled with the same mixture and plunged in the propagating frame. Rare species such *D. x thauma* or *D. petraea* should be

placed sufficiently deep in the pots to allow for covering with a pane of glass and the glass turned daily to prevent condensation and drips. I have had 100% success with most kinds of Daphne, but the time taken for the actual rooting varies considerably. Sometimes I could pot 1/3—3/4 of the cuttings by the autumn, while the rest would not root until the spring. It is advisable to grow the plants on in pots until they are well rooted and ready to plant out into their permanent positions.

Pruning is a matter of experience, but it must not be done too early or too late, only when the wood is half-ripened—about July. Likewise, cuttings taken from too-soft wood tend to damp-off, whereas too-hard wood is slow and difficult to callus—if indeed it forms a callus at all.

Only experience, patience, and love of our hobby will help us to cope with the difficulties of growing these beautiful plants, and the better we understand their wants, the more we will be repaid by their improved growth and increased flowering.

Discussion

Mr. Eliot Hodgkin : I was particularly interested in the methods of propagation and cultivation, and I was also interested to hear that *D. blagayana* would not grow under trees. If I remember rightly, Miss Davenport Jones grew hers under a tree and it was two to three yards across. Mr. Martin was a little hard on *D. retusa:* he dismissed it as a worthless species. I think it is a matter of taste as to whether you prefer *D. retusa* or *D. tangutica,* but I think both are lovely plants.

Mr. Hammer : How is it some growers manage to get flowers on *D. petraea* so soon? They have never flowered for me except in the autumn.

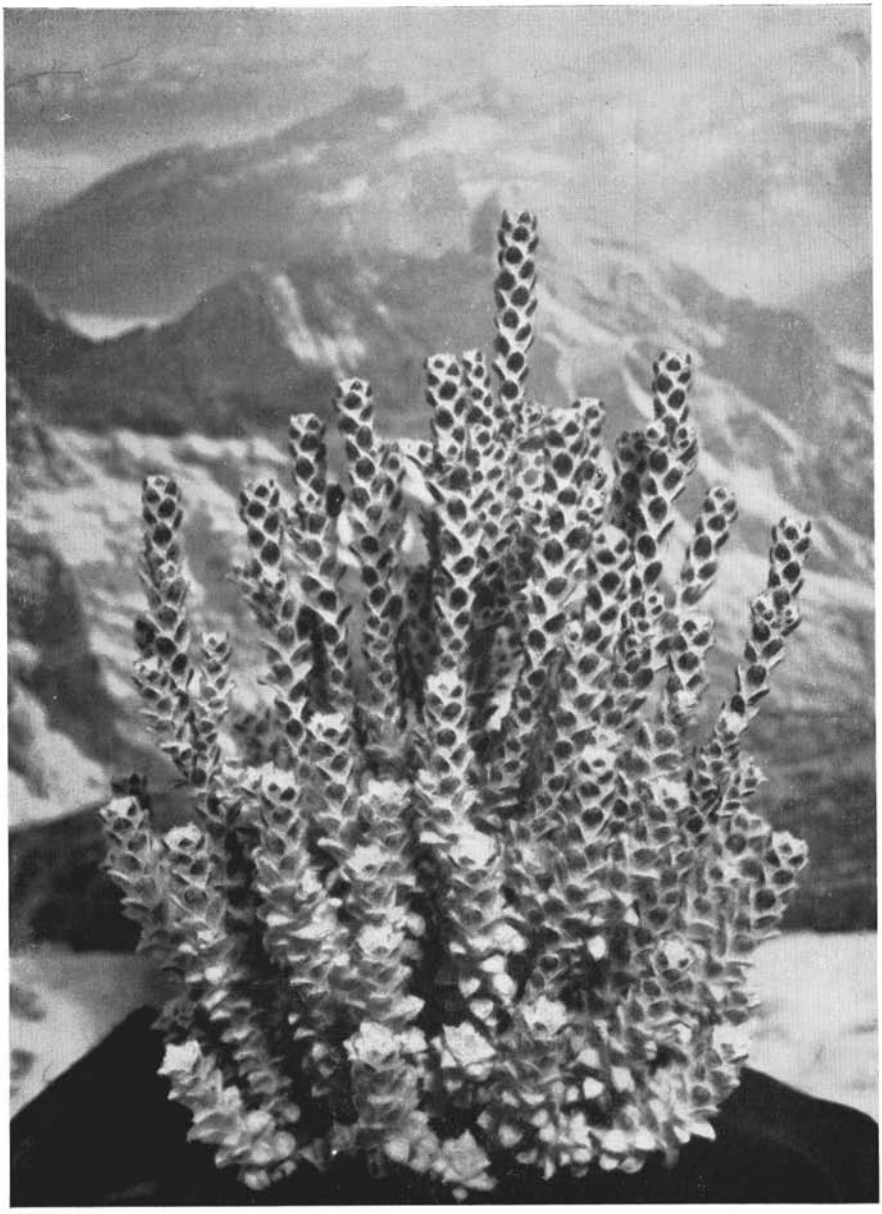
Dr. Kiesenhofer : I have been talking to Mr. Martin about *D. petraea,* he says the only way to grow it is in sunny places.

Mr. Hammer : The buds seem to form and die off with us.

Dr. Kiesenhofer : With us, it flowers freely, and we never have any trouble with buds dying off. Maybe it is too moist with you.

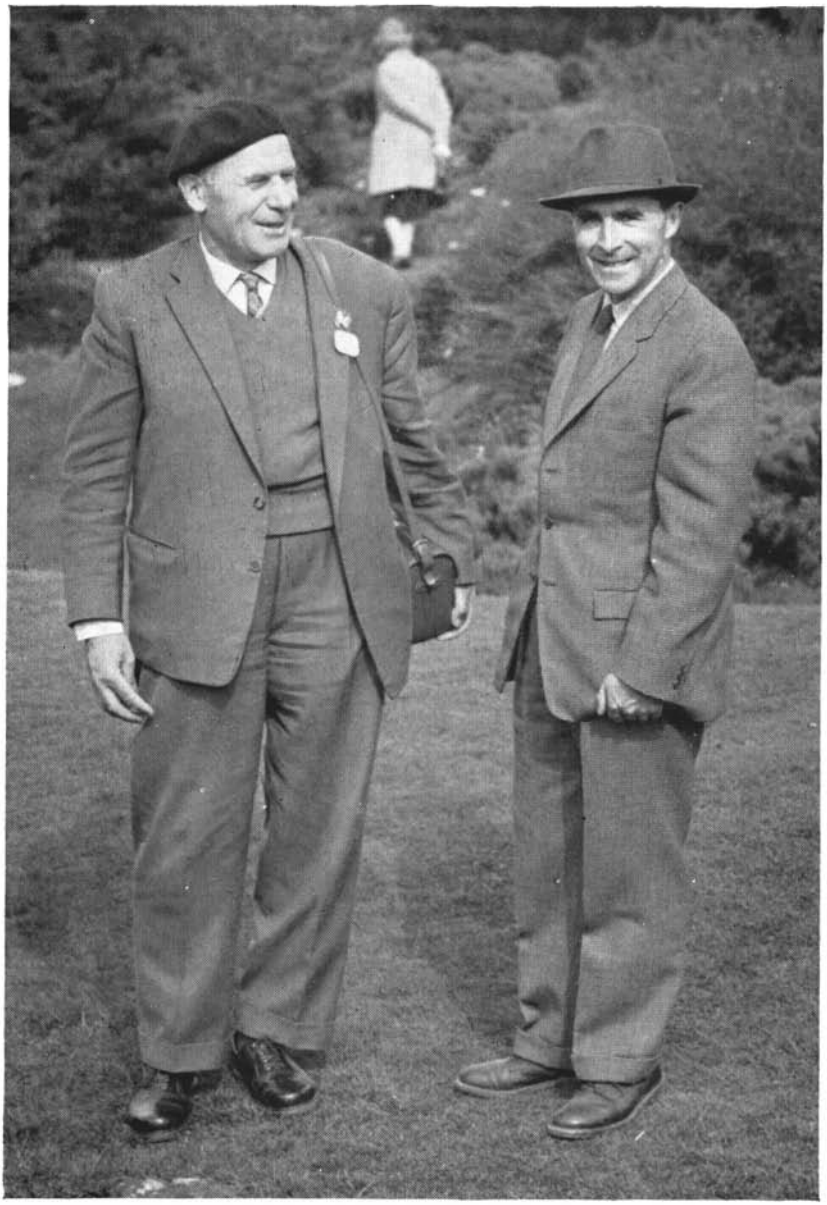
Mr. Logan (U.S.A.): Has *D. genkwa* been mentioned? It is a deciduous one, of a fine lavender colour. With us it is a little on the tender side. I have had mine two years, and I shall be interested to see what condition it is in when I am home again. It grows in full sun, on a slope in a stone crevice, it has done ideally there. We have temperatures of 12° and 15° below, and there may be a little snow cover, but not too much.

Dr. Kiesenhofer : It is not hardy with us in Austria.



Helichrysum coralloides. *Photo: Roy Elliott*

(*See p.* 112)



Herr Wm. Schacht and Mr. E. E. Kemp. *Photo: Roy Elliott*

THE CONFERENCE – PART II

Introductory Remarks by Professor J. R. Matthews, C.B.E., LL.D., M.A., F.L.S., F.R.S.E.

I have the honour and privilege to open the second week of the Third International Rock Garden Plant Conference, and before we embark upon its more strenuous and important proceedings, I wish to take this opportunity to extend a warm welcome to all who are attending the Conference I am sure it is the wish of members of the Scottish Rock Garden Club, under whose auspices we meet in Edinburgh, that a very special welcome be given to those who have come a distance—some from across the Border and some from overseas, representatives of many different countries. We hope they will find the Conference not only interesting and enjoyable but also stimulating, and that their sojourn in Edinburgh may be pleasant.

As you all know, the Conference has been arranged jointly by the Alpine Garden Society and the Scottish Rock Garden Club. Both are flourishing Societies, and despite the difference in nomenclature, their functions and objectives are essentially similar. For all practical purposes and at least during the period of the Conference, we may be permitted to regard the 'Alpine Garden' and the 'Rock Garden' as synonymous.

As a botanist, however, with a life-long interest in the hill plants of Scotland and their habitats, I confess to a difficulty in finding a satisfactory definition of an alpine, nor is it much easier to define a rock garden plant. Altitude and topography do not help very much, for some of our native alpines are to be found not only on the higher hills but at sea level. It is with special interest, therefore, that we look forward to Herr Schacht's paper on "The Habitats of some rare Rock Garden Plants." Yet in studying these plants as they occur in nature, sometimes apparently in inhospitable situations, it is difficult to escape the conclusion that they grow not where they will, but where they must. It is for the cultivator to discover what is the 'must', the essential requirements and conditions for their successful cultivation. Fortunately, many have a relatively wide ecological amplitude, as the ecologist would tell you, and are not too difficult, but there are others less readily responsive described in the programme as 'tricky,' and some of these are to be discussed on Friday by Mrs. Boyd Harvey and other speakers.

The programme suggests, and it is equally apparent in the

contributions to our *Bulletin* and *Journal,* that a generous interpretation may now be given to the term alpine and rock garden plant. When, for instance, blocks of peat take the place of rock, a different assemblage of plants may be catered for more successfully, as Mr. Kemp will tell us this morning, yet the species or some of them may still be alpine. The peat garden, however, is not the competitor of the rock garden, and the same is true of the heather garden with which Mr. Knight is to deal. Rather they should both be regarded as complementary, and the extension of the term rock garden as originally conceived is all to the good. It gives increased scope to the cultivator and adds diversity to his craft.

The steady growth in membership of the Scottish Rock Garden Club since the time of the last International Conference, together with its varied activities throughout the country, are witness to the interest which rock garden plants hold for large numbers of people, be their gardens large or small. I have seen enthusiastic growers with little more than a trough or two in which to tend their treasures, while on a grand scale we have in Edinburgh the magnificent five-acre rock garden in the Royal Botanic Garden, to be visited this afternoon. The question as to whether the rock garden has a place in the modern garden I shall leave Mr. Elliott and Mr. Esslemont to answer, but if the papers, discussions and excursions planned for the second week of the Conference lead to a lively exchange of views and the extension of knowledge about plants and plant behaviour, the Conference will have achieved one of its most important aims.

I cannot, of course, mention by name all who are participating, but I wish to thank all of them for their contributions to the interesting and varied programme which is before us. Thanks are due also to all those who have, in many different ways, assisted with the arrangements, and in particular we are greatly indebted to our President and Convener, Dr. Henry Tod, upon whose shoulders much of the burden has fallen. Finally, we are grateful to Professor Watson and Dr. Gordon of the School of Agriculture for the facilities they have provided, including the use of this splendid lecture hall. If their students have been displaced temporarily, I do not think they will be unduly perturbed. And may we not claim that the culture of the garden is the oldest of the Arts? But whether we be students of horticulture or agriculture, we are alike in seeking to solve some of the problems presented in the cultivation of those remarkable and, indeed, unique organisms we call plants, interposed as they are between soil and air to their own advantage and to man's enjoyment.

THE CONFERENCE PROGRAMME

PART II THE WEEK IN EDINBURGH

MONDAY, APRIL 24TH

10.00 a.m. The Hon. President of the Scottish Rock Garden Club, Prof. J. R. Matthews, C.B.E., LL.D., M.A., F.L.S., F.R.S.E., opened the second week of the Conference.

10.15 a.m. Paper:
"The Peat Garden," by Mr. E. E. Kemp, Edinburgh.

11.30 a.m. Paper:
"The Habitats of some Rare Rock-garden Plants," by Herr W. Schacht, Munich.

2.15 p.m. Paper:
"The Heather Garden," by Mr. F. P. Knight, F.L.S., V.M.H., Wisley.

3.30 p.m. Visit to the Royal Botanic Garden.

8.00 p.m. Reception to Conference Members by the City and Royal Burgh of Edinburgh.

TUESDAY, APRIL 25TH

10.15 a.m. Discussion "Has the Rock Garden a place in the Modern Garden?" Mr. Joe Elliott, Moreton in Marsh; Mr. H. Esslemont, Aberdeen.

11.30 a.m. Paper:
"Dwarf Conifers," by Mr. H. G. Hillier, F.L.S., V.M.H., Winchester.

1.00 p.m. Luncheon to Judges and Overseas Delegates by the Scottish Rock Garden Club.

2.00 p.m. The Lord Provost opened the Conference Show and presented the Awards.

2.45 p.m. Meeting of Joint Rock Garden Plant Committee.

8.30 p.m. Discussion. "Plants in the Show." Mr. W. Ingwersen.

WEDNESDAY, APRIL 26TH

9.15 a.m. Visit to Major and Mrs. Knox Finlay's garden at Keillour Castle, Methven.

2.15 p.m. Visit to Mr. and Mrs. J. T. Renton's garden at Branklyn, Perth.

8.30 p.m. Two colour films—
"Plant Hunting in Nepal," by Major George Sherriff.
"Mountain Flowers," by Mr. R. C. Elliott.

The Conference Show was open from 10 a.m. to 9 p.m.

THURSDAY, APRIL 27TH

10.00 a.m. Paper:
"Bulbs for the Rock Garden and Alpine House." Mr. E. B. Anderson, V.M.H., and Mr. T. H. Hoog.

11.30 a.m. Paper:
"Some Rock Garden Plants from Patagonia," by Mrs. Ruth Tweedie.

2.30 p.m. Paper:
"Some Dwarf Rhododendrons," by Mr. H. H. Davidian, Edinburgh.

6.00 p.m. The Conference Show closed.

8.30 p.m. Symposium. "Shows, Showing and Judging"
Mr. E. B. Anderson, Dr. H. Tod,
Mr. W. Ingwersen, Mr. J. L. Mowat.

FRIDAY, APRIL 28TH

10.00 a.m. Symposium. "Tricky Rock Plants and their Cultivation."
Mr. Jack Drake, Dr. C. R. Worth,
Mrs. Boyd-Harvey, Mr. R. C. Elliott.

1.00 p.m. Scottish Rock Garden Club's Conference Luncheon.

2.00 p.m. Conference closed.

Onobrychis cornuta on Achr-Dagh.
(*See p.* 139)

Photo: Wm. Schacht

THE HABITATS OF SOME RARE ALPINES

By W. SCHACHT

(Chairman : Mr. C. H. Hammer)

Nothing brings me more joy than to visit the homes of our friends the mountain plants, and to get to know the surroundings in which they grow. I have made many journeys for this purpose and I should like to tell you here about some of them.

My longest journey was to Asia Minor. From Istanbul, that picturesque town on the Bosphorus, I went on to the Bithynian Olympus which is known in Turkey as Ulu Dagh. This was at the end of May and the summit, at 2,500 m., was well covered with snow; but near the tree line, where the last plants of *Abies bornmuellerliana* were growing, appeared golden yellow *Crocus gargaricus* and violet blue *Crocus chrysanthus coerulescens,* gleaming in the moist ground at the edge of melting snow. It was an unforgettable and charming picture.

On the Amanus Mountains, above Iskenderon, it was possible to gather *Iris persica sieheana* with bulbs hidden deep in the stony ground. I also brought home *Iris histrio aintabensis,* another enchanting bulbous species which grows on the Anatolian High Steppe near the town of Gaziantep, not far from the River Euphrates. Very characteristic plants of this mountain world in Asia Minor are the Acantholimons which grow all over the sun-drenched rocky ground like green hedgehogs. But the biggest "vegetable hedgehog" I ever found was *Onobrychis cornuta* growing on Achr-Dagh in the Anti-Taurus; its huge hemispherical cushion was thickly covered with red flowers (Illustration p. 137).

The Cilician Taurus, where majestic old Cedars of Lebanon embellish some of the mountain ridges, is especially rich in plants. (opposite) Here on shaded rocks are dense cushions of *Saxifraga kotschyi* as well as *Pelargonium endlicherianum, Cyclamen cilicium, Stachys lavandulifolia, Onosma* species, *Sedum sempervivoides,* which are also to be found.

Now let us turn to Europe. I recall many mountains walks in the Balkans, especially in Bulgaria, where *Primula deorum* growing in damp meadows, has its only station. On the Rhodope Mountains in May, I saw *Haberlea rhodopensis* covering shady limestone cliffs.

On the Pirin Mountains I admired the snow-white stars of *Leontopodium nivale,* and on Ali Butusch in Macedonia, I was overjoyed to find *Dianthus simulans* and *Fritillaria drenovskii.* The hours I have spent on Mt. Athos in Greece are unforgettable. Here in crevices in the marble cliffs grow *Helichrysum virgineum* and *Saxifraga sancta* and from where they grow on the mountain one can look far away across the Aegean Sea. Just as impressive is the Thessalonian Olympus, south of Salonika, with its precipitous limestone cliffs where *Jankae heldreichii, Viola delphinantha* (illustration p. 147), and Omphalodes live. The scree here is also covered with *Saxifraga porophylla* and *S. scardica,* and on grassy slopes under mighty specimens of *Pinus heldreichii, Fritillaria messanensis* is to be found.

The Pyrenees are also beautiful mountains. In the early summer Mt. Canigou, in the East Pyrenees, is gilded with the flowers of *Cytisus purgans* and among them glows the red of *Rhododendron ferrugineum.* But the finest and most wonderful flower in the Pyrenees is undoubtedly *Saxifraga longifolia* (illustration p. 148), which in June, near Gavarnie, adorns the imposing circle of rocks there with its long white inflorescences like bursting rockets. *Ramonda myconi* inhabits the shady rocks in great colonies, and from the limestone scree appears the lovely *Aquilegia pyrenaica.* But the Alps are infinitely beautiful and rich in plants, especially the southern Alps, and in particular the mountains around Lake Garda. At the end of May, Monte Tombea is enchantingly beautiful, covered as it is that that time with *Primula spectabilis,* while *Melandrium elizabethae* also grows on the rocky ground. Here also sits *Daphne petraea,* firmly anchored to the limestone rock, and in summer, *Phyteuma comosum* covers steep cliffs. The Seiser Alps are famous for their beauty and altitude as well as their rich carpets of flowers, and wonderful also are the spectacular pinnacles of the Dolomites, reminiscent of romantic castles. Here *Androsace helvetica* and *Potentilla nitida* come welling out from precipitous cliffs and those who are in luck will find, in solitary places, the "King of the Alps," *Eritrichium nanum,* an encounter which is the dream of many alpine plant enthusiasts.

On the rocks of the Schlern, the wonderful Saxifrage, *S. burseriana,* is to be found. This noble plant also occurs near Berchtesgaden in Bavaria—low down in the valley. As early as March it clothes the shady rocks with white flowers, overhanging many a rushing mountain stream, while in the woods around, between snow fields, flowers the Christmas Rose *Helleborus niger.*

In closing I express the wish that you, too, may have the pleasure of finding many of these beautiful plants in their native habitat.

THE PEAT GARDEN

By E. E. KEMP., M.B.E., N.D.H.

(Chairman: Professor J. R. Matthews)

Unlike the rock garden, the peat garden in its present form is a comparatively modern development, and during the forty years or so of its existence it has obtained but meagre reference in horticultural literature. It is appropriate, therefore, that this Conference should consider its construction, its value as a landscape feature in the garden, and as an additional environment to extend the range of the plants we grow.

A peat garden has more in common with a rock garden than any other layout—accommodating, as it often does, the same species of plants, mainly those of dwarf stature from high altitudes. But those who embark upon the construction of a peat garden soon become aware of one great difference. It is possible to create with rock and turf an eminently acceptable feature in which plants may play only a minor role, or even where they are completely excluded. Indeed as any practitioner in the field of garden construction knows, in the making of rock gardens, there is invariably a conflict of aims between perfecting the formation and providing accommodation for plants. Peat gardens, on the other hand, are made to accommodate plants; this is their *raison d'être*.

It is necessary here to distinguish the modern peat garden from an earlier feature in which peat was extensively used, namely, the "American Garden" which figures prominently in horticultural literature of the 19th century. The purpose of this garden was to provide suitable accommodation for the many American acid soil plants such as deciduous Azaleas, Rhododendrons, Kalmia, and Pieris, which were being assimilated into the British garden flora at that time. In the "American Garden" no attempt was made to vary the soil level; the treatment was essentially that of a specially prepared shrub border.

The earliest version of the modern peat garden known to the writer was constructed at Logan House Garden in the Mull of Galloway, Wigtownshire. Kenneth McDouall* discussed it in 1927 in these words: "On a terrace built with peat the dwarf high-alpine Rhododendrons from China grow . . . They seem to like sunshine, so long as the roots are kept cool and moist. The peat terrace was made specially for these brilliant-flowered little Rhododendrons, so

* *Journal R.H.S.* LII (1927) p. 2

that they may be seen and appreciated. There are six terraces, with walls 18 inches high, built of peat cut from a bog in large slabs and placed one on top of the other when wet. A walk leads up through the centre of the terraces, dividing them into two portions, with a small path at the foot of each peat wall." What this layout looked like when built is not known to the writer, but in the late 30's the terrace was very regular and artificial in appearance, at least what could still be seen of it through the plants, many of which had merged with each other and had considerably mellowed the entire scene.

The first section of the Edinburgh peat garden to be built in the winter of 1938-39, was the part that now occupies the low site along the northern fringe of woodland. The present layout, has been considerably modified since that time. Originally the walls were higher, and by the end of the war, when replacement was impossible, many of them had collapsed—except where various supporting materials such as iron rods, even wire netting and sometimes an occasional stone, had been introduced in an attempt to support them. All these structural remains were swept away in the autumn of 1950 when the layout in its present form was devised. The undertaking would hardly have been possible as a first attempt; the earlier experiment provided valuable experience. The upper section of peat garden, which merges with the woodland garden, was constructed on the remains of a dilapidated rootery in 1952. It was necessary to make two grass paths through this layout, so that we might provide adequate access and space for the visiting public, and to achieve unity in composition by linking the feature to the landscape on each side of it. This design necessitated the construction of a section of peat garden on an island site surrounded by lawn, but even this treatment, in the circumstances, proved visually acceptable. Although the two Edinburgh gardens occupy northern slopes, a great many of the plants grown there flourish equally well when facing south. The northern slope, however, makes management easier by conserving water; but despite the 24 inch annual rainfall, and the cool Edinburgh summers, frequent irrigation is still often required. In the south east of the country the provision of a northern slope is more important, if not actually necessary.

The peat used in construction consists of irregularly shaped turves cut from the top layer, open and spongy in texture and light brown in colour. It is derived mainly from Bog Cotton, *Eriophorum vaginatum,* a little Deer Grass, *Scirpus caespitosus,* some Sphagnum, and a trace of Calluna. The reaction is from pH 3.5 to 3.8 but this rises to just over pH 4 after a few years. Another type of peat

often encountered in peat garden construction is the dark amorphous material from the lower layers of the deposit. This is the peat often cut for fuel, which smears like cheese when wet but when once dried, owing to irreversible colloid effect, becomes hard and brittle, weathers with difficulty and cannot again become thoroughly wetted by normal means. The peat blocks used in the original Logan peat terraces were mostly of this type and some of them were still recognizable in 1947 although by then the surfaces had weathered sufficiently to support self-sown Rhododendron seedlings and sporelings of neighbouring Tree Ferns, *Dicksonia antarctica.* Compared with irregularly cut turves of surface peat, these blocks have a highly artificial appearance, are more restricting in use, and they cannot readily be colonised by plants. The basis of the Edinburgh construction is a series of raised borders, the widths of which are related to the scale of layout and size of the plants used. These borders are irregularly shaped in the horizontal plane, but their surfaces are level; the retaining peat walls being built like level-topped rock outcrops as in rock gardening. The walls do not terminate abruptly; but their ends are returned back into the slope thus making it possible to taper them away. But even where a level island site has to be made, there would be no visual objection to having terraces raised in a series of rings provided the building was skilfully done and rigid concentricity avoided. In the first Edinburgh construction some of the retaining walls were as much as two feet high with the inevitable result that they soon collapsed, but walls of about a foot at the most have proved stable and quite high enough to create an interesting terrain. In the references to "American Gardens" already mentioned, peat was evidently considered an essential ingredient of soil preparation, but the absence of lime rather than the presence of peat was the important point and this also applies to the modern peat garden. Where the soil is already acid and the reaction about pH 5.5, peat is not required unless for soil conditioning or moisture retention.

In constructing a peat garden along an existing woodland margin, it may be necessary to plant shrubs as a background, but a uniformly sloping arrangement should be avoided, not only here, but also in the planting of the peat garden itself. In these miniature landscaping activities there is unlimited scope for the placing of shrubs to emphasize interesting outlines, textures, and colours; an eye for composition is probably more essential in this kind of planting than any other. The peat garden, properly furnished, has appeal at all times of year and in winter as much as any other. It is important that a fair proportion of the shrubs should be evergreen to keep out frost and provide sheltered winter accommodation for the many dwarf herbaceous species that will flourish there.

"HAS THE ROCK GARDEN A PLACE IN THE MODERN GARDEN?"

(Chairman: R. C. Elliott)

PART 1

By JOE ELLIOTT

When I was first asked to give this talk, my brief was to say something about growing alpines out-of-doors under the general heading "Has the Rock Garden a place in the Modern Garden?" Before starting I would like to make it clear that I do not intend to enter into any sort of debate with Mr. Esslemont as to whether alpines are better grown in the open or under glass. Mr. Esslemont, as you know, is one of the most successful growers and exhibitors of alpines in the country; even in the backwoods of the Sassenach country where I come from his name is a legend. I have no doubt that most or all the plants he exhibits are grown in his alpine house and frames, but as he has told you, he also grows a wide variety of plants out of doors. I have a similarly split personality, and though the great majority of my plants are grown outdoors, I also have an alpine house and grow many of my alpines there in pots and pans, and get a tremendous amount of enjoyment from doing so. It is not so much a question of which method is best but which is most suitable for the plants you want to grow. Even that division is in no way rigid for there are many plants which can be grown both ways with equal success. Personally I would never advise a keen alpine gardener to restrict himself to either method, but if he can possibly manage it, to widen his scope by growing his alpines both outdoors *and* in an alpine house or frame.

As to whether there is a place for the rock garden in the modern garden, the answer is undoubtedly yes. Once you have a collection of any size you will find that alpines require such a wide range of soil and situation that a rock garden becomes the obvious place to bring that variety of environments within a reasonably small area. But a rock garden can run you into considerable expense and it is not always easy to find the ideal situation in which to build it. I take it that any member of the A.G.S. or S.R.G.C. who is thinking of building a rock garden, will do so for the prime purpose of grow-

ing a wide variety of plants, and not merely to add to the scenic beauty of the garden with a slavish imitation of a rocky outcrop. Herein lies a problem, for the art of building a rock garden acceptable both to the plants and to the eye is one which needs some experience or experiment. If you are not a do-it-yourself man, the difficulty lies in the fact that most professional rock garden builders (though not quite all) are scenic artists with a smattering of geological knowledge first, and plantsmen second. I would therefore say that if you can overcome these difficulties a rock garden is the best of all places to grow your alpines.

It is a great mistake however to think that you cannot grow alpines outdoors unless you have a rock garden. I am in the curious position of growing alpines and rock plants for my living and yet not being the owner of a rock garden. I would like to have one, of course, but this lack has not in any way inhibited my love for the plants, or I think, my ability to grow them. Apart from the plants I grow for sale in pots (and out of doors of course), all the alpines I grow, both in the Nursery and for my own pleasure, are either in old stone troughs or raised beds, and all the plants I propose talking about are grown by this method. I am fortunate enough to live in the Cotswolds so that both stone troughs and walling stone are relatively easy to come by.

The great advantage of a raised bed over a rock garden proper is that it can be put almost anywhere in the garden, except under trees or where too much shadow is cast by them. My own largest bed divides a lawn into two and is approximately 25 feet long, 4 feet wide and a little more than 2 feet high; but they can be made any convenient size, shape or height which fits the particular position you choose. If you do not happen to live where local stone is available, they can be made of peat blocks. This is a method most of you will be seeing during the week at the Royal Botanic Gardens where the idea originated, so I will not enlarge upon it, except to add that by using peat blocks those enthusiasts living in limestone districts are able to grow some of the lime-hating plants. Being raised above the surrounding soil, seepage of fatal lime-charged water is avoided much more effectively than with pits dug into the ground and filled with lime-free soil. Failing stone or peat blocks, alternative materials for building your raised beds are brick, breeze-blocks or even old railway sleepers, though these lack the natural beauty of the other materials; nor will they give the innumerable crevices in both sun and shade which can be one of the chief attractions. Built two feet high, drainage is automatic and the soil to fill in the body of the bed can be made up in as many mixtures as will suit the particular plants you want to grow. If the bed is made much less than two feet high it is wise to dig out

the soil below and fill it with gravel or other drainage material to ensure that surplus moisture drains away quickly.

When the bed is finally built and filled with soil, unkind friends may ask why you have built a billiard table in the garden. This effect soon disappears at the end of a year or so, especially if good use has been made of dwarf shrubs. But it is quite a good plan to use a few rocks that are not too large or out of proportion, built into small outcrops, both to relieve the initial flatness and to give extra crevices.

With stone troughs, size and shape are dictated by what you can find. They are becoming so popular that demand has far exceeded supply, and fancy prices are being asked for them by some folk. Ideally they should be not less than six inches deep, but even the humble old stone kitchen sink, with a depth of only two inches or so, can be used successfully, provided it is remembered that the shallower they are the more quickly will they dry out—so that watering may become a daily necessity in summer. Whatever the depth of soil, a drainage hole is essential, otherwise what was made as a scree or semi-scree, will quickly become a bog garden when it rains, When choosing the rocks to put in a trough garden, do not be afraid of using large ones. Far too many trough gardens have a few very small pieces sunk almost flush with the soil. One or two larger pieces can be formed into a good outcrop and will give crevices for those plants that like these conditions—and how many of them there are. Except in the smallest troughs, you need never be afraid of raising the crevice nine inches or a foot above the edges of the trough.

I will not say anything more about trough gardening or raised beds—most of you are probably old hands at the game anyway; but here are a few of the plants I grow by these methods, and of which I show slides.

Phyteuma comosum
Potentilla nitida rubra
Viola delphinantha
Hypericum cuneatum
Wahlenbergia serpyllifolia major
„ *pumilio*
Dianthus boydii
Euryops evansii
Erinacea anthyllis
Alyssum serpyllifolium
Saponaria ocymoides rubra compacta
Androsace lanuginosa
Rhodothamnus chamaecistus
Daphne blagayana
„ *retusa*
„ *arbuscula*
Gentiana saxosa
„ *dinarica*
Viola gracilis
Chrysanthemum haradjanii
Helichrysum marginatum
Platycodon 'Apoyana'
Potentilla arbuscula

Viola delphinantha. *Photo: Wm. Schacht*

(*See p.* 140)

Saxifraga longifolia, near Gavarnie, Pyrenees.
(See p. 140)

Photo: Wm. Schacht

"HAS THE ROCK GARDEN A PLACE IN THE MODERN GARDEN?"

PART 2

By H. ESSLEMONT

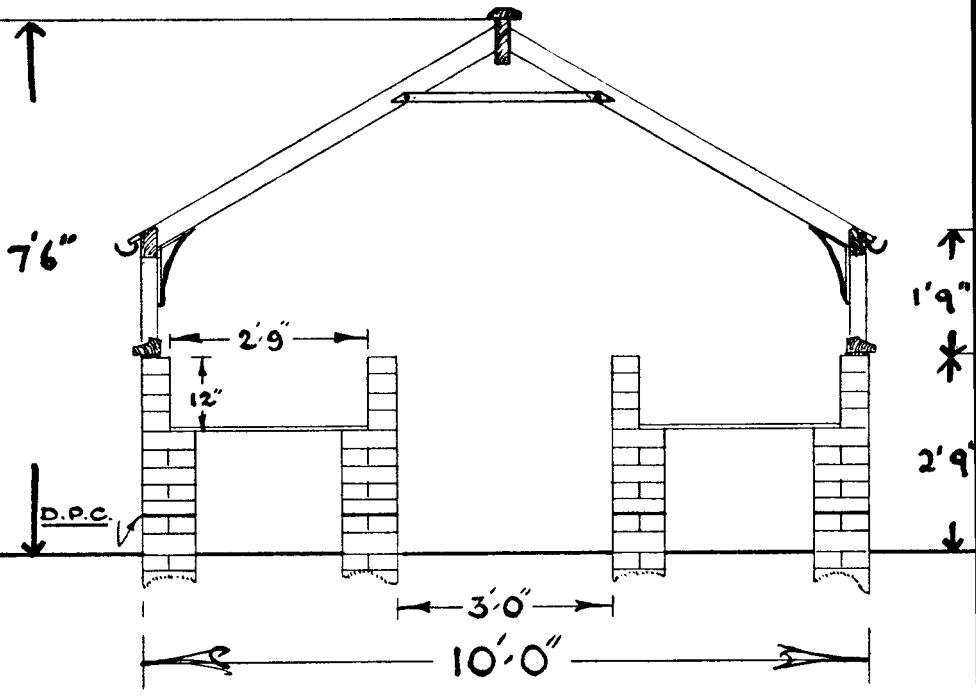
Before attempting to answer the question "Has the Rock Garden a Place in the Modern Garden?" I feel that I must first try to define "The Modern Garden."

Many of you, in the course of this week, will have the opportunity of visiting two notable Scottish rock gardens and I shall not be surprised if you come away from them feeling a little envious. Few of us today, however, find we can afford the time or the labour to maintain a large garden and we would readily agree with Farrer that "But a little garden, the littler the better, is the richest chance of happiness and success."

If this can be accepted as a responsible definition of "The Modern Garden," mine is a typical one. It is situated in the heart of Aberdeen, and measures only one hundred and thirty feet long by forty feet wide. A lawn divides the herbaceous border from a peat border for Azaleas and Primulas, and the single path is flagged for ease of upkeep. There appeared to be no space for a rock garden, and in 1950, when my interest in alpines increased, a small twelve foot greenhouse and a frame to house them were erected behind a trellis at the end of the garden.

Ten years later, in 1960, I decided to build a new eighteen feet long alpine house, and frames for my growing collection of some five hundred alpines in pots (see overleaf). The house, as you see, is of conventional design, with full side and top ventilation and outside lath blinds. It has, however, one special feature, all the pots are plunged, as experience has shown that most alpines appreciate a cool, deep root-run. The plunge bed consists of a staging of brick on reinforced concrete. It is bottomed with keyed cement slabs, and filled with twelve inches of sharp sand.

The frames contain a foundation of ashes, a layer of reversed turves and eighteen inches of sand. A further advantage of plunging is the saving of time spent on watering. During the past winter, for example, the watering can was not required for a period of several months. I believe, too, that the root systems appreciate some protection from frost in a house where there is no heating. In summer, wire mesh frame lights give protection from birds, and a wire mesh door gives additional ventilation.



"STRAWSON" ALPINE HOUSE

The choice of pots is important. In nature, roots of alpines go deep, and for many plants I prefer to use long pots in place of pans. *Ranunculus calandrinioides* is a plant with a strong root system, which illustrates my point. This Ranunculus appreciates a rich diet, but on the other hand *Asphodelus acaulis,* which requires the same deep potting and summer baking, should be starved to give of its best.

There are many plants that I should like to discuss with you today, but I am to confine myself to one group, the real rock-dwellers, with whose cultivation I have had a measure of success. Those of you who have tried, perhaps vainly, to extract with hammer and chisel *Campanula morettiana* from the rocks of the Rosetta, or *Daphne petraea* from its fastness at Riva, will know the type of plant I refer to.

It was at Chelsea 1951, on Messrs. Ingwersen's stand, that I first met *Daphne petraea,* a magnificent plant of some twenty years. I calculated that I might still have time, and ordered one. It is a grafted plant whose growth has been assisted by the removal of all flower buds, as soon as they were formed, for a period of six years. *Daphne petraea* is not generally considered easy to flower on its own roots, but after seeing Monsieur Correvon's plant in its tufa wall at Geneva, I feel that it should be possible.

Tufa is, I believe, the plantsman's answer to many problems. My four year plant of *Daphne petraea,* on its own roots, is planted in a half-inch hole bored through a solid tufa lump. It is quite at home already, and there are a few flower buds on it. I have an eight year old plant of *Kelseya uniflora,* with four hundred flowers, which has been grown in exactly the same manner. I may mention that, for the first six years, it scarcely flowered. It is obvious that this method of cultivation is essentially a long term one, and that we should be planting our Dionysias and Petrophytums now, in order to have some good plants for the next International Conference.

The second method is one I employ for Androsaces, Eritrichiums, saxatile Primulas, and others. Firstly, I provide ample crock drainage, covered with an inch of gravel. The soil mixture is 25% gravel, and the surface of the pot is filled with closely-packed pieces of tufa which are fitted snugly around the neck of the plant. The plants are then watered from below. I am also experimenting with the introduction of an artificial core of powdered tufa and fine grit to such plants as *Androsace arachnoidea,* and *Primula allionii* in place of the dead lower leaves which are removed. The aim is to reduce vulnerability to damping off at the neck and centre of the plant, and to encourage interior rooting.

There are two sets of frames, one attached to the house, and they face north and west respectively. The north frame houses Primulas and shade lovers; the west, those which prefer the sun, and dwarf bulbs which appreciate a summer baking.

This, briefly, is my answer to growing alpines in the modern garden, and I think it shows that a really representative collection of plants can be grown in very little space.

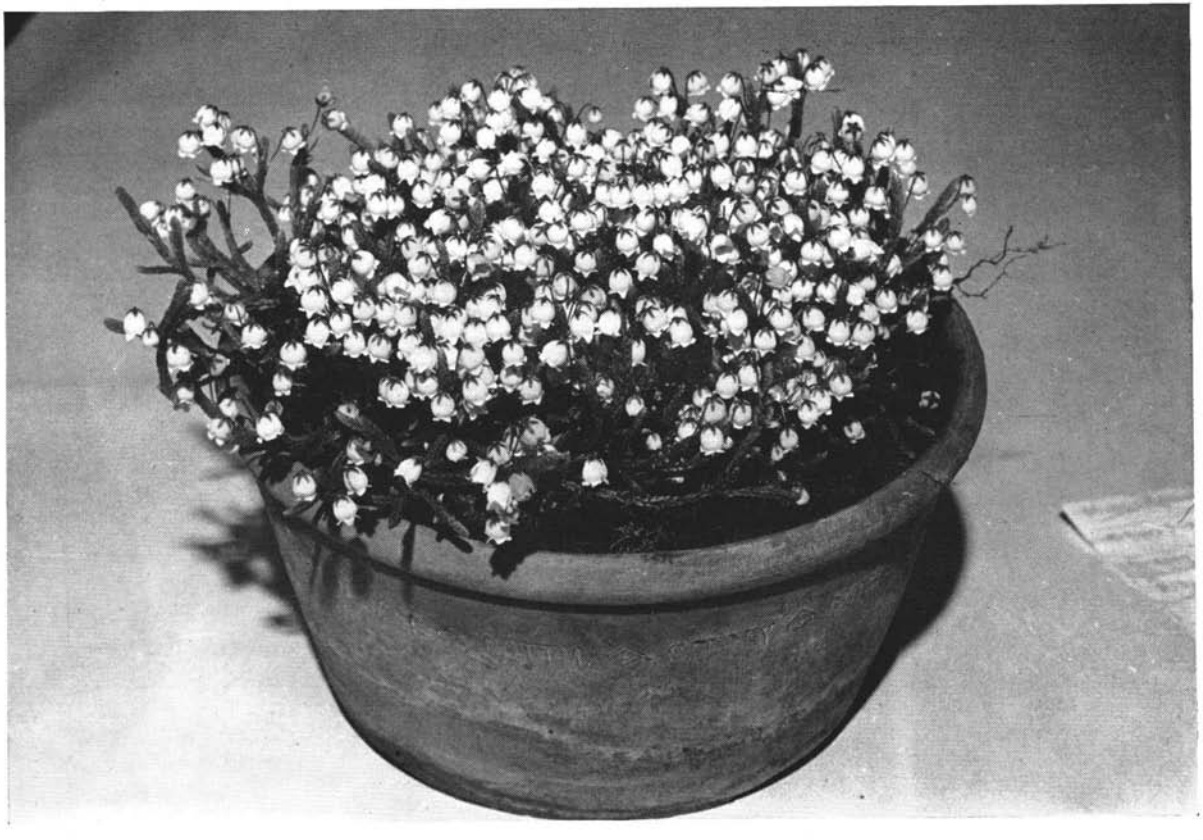
THE CONFERENCE SHOW EDINBURGH

The Conference Show, which opened on Tuesday 25th April, showed to some extent the effects of a most erratic spring, of high temperatures followed by a devastating frost at the beginning of April. A number of classes were weaker than usual, some having no entries at all. In many cases this was due to very early flowering brought on by the abnormal warmth of late February and March, and in other cases directly due to subsequent frost damage over the Easter week-end.

The premier award, the George Forrest Medal, went to a perfectly-grown plant of *Androsace imbricata* shown by H. Esslemont of Aberdeen; this plant has been seen at Shows in Scotland and England in previous years, but seems to go from strength to strength, and worthily received a Cultural Commendation. The K. C. Corsar Trophy for six pans (Class 1) went to W. Urie for pans of *Cassiope* 'Edinburgh,' *Celmisia webbii, Daphne petraea, Rhododendron cephalanthum, Dianthus strictus brachyanthus,* and *Rhodohypoxis,* and runner-up was S .E. Lilley whose six pans included *Cassiope fastigiata* x *lycopodioides, Leptospermum nanum prostratum, Helichrysum orientale* var. *pitchleri,* and *Saxifraga cebennensis.*

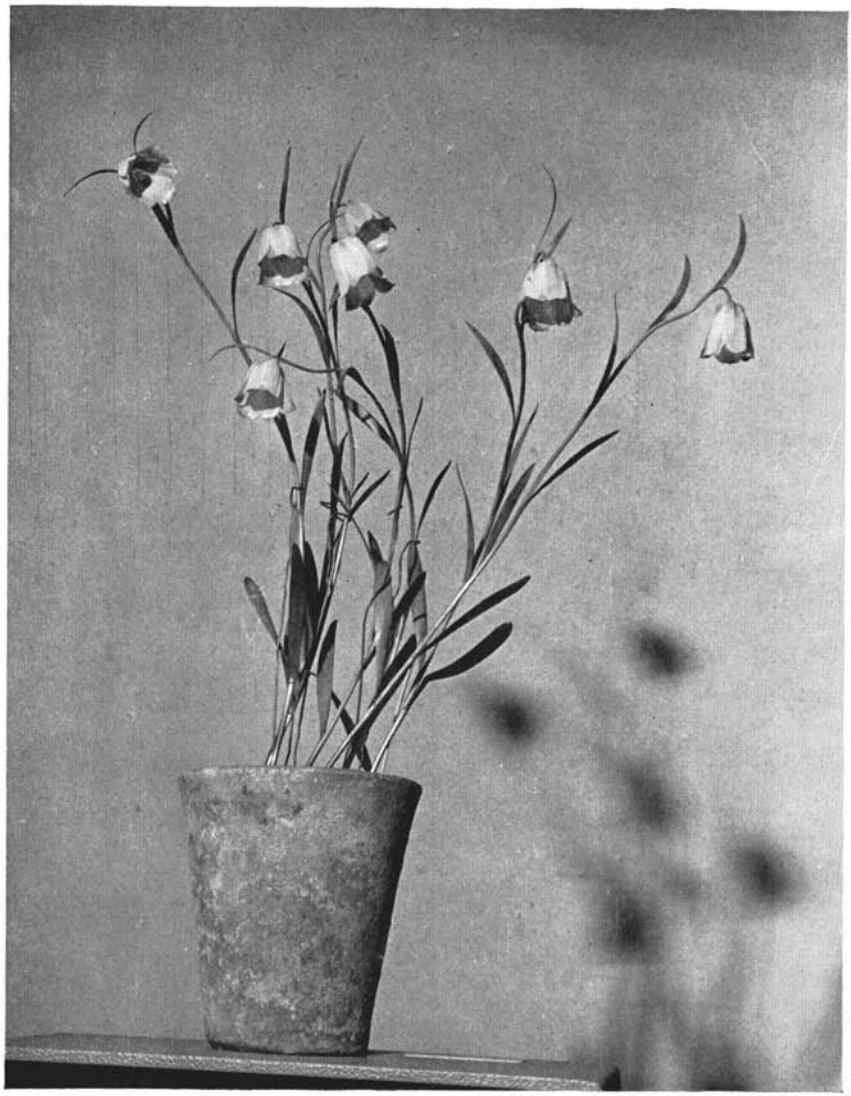
In Class 2 (for three pans) Mr. Urie was again first with *Rh.* 'Gloriseum,' *Dianthus subacaulis* and an excellent pan of *Rhodohypoxis* 'Pictus' (Ill. p. 156). Mr. R. B. Cooke showed a prostrate form of *Cassiope* x 'Muirhead' (opposite), the dwarf form of *Primula gracilipes* (Ill. p. 156), and *Adonis brevistyla.* Class 3 was very interesting, and adjudged best were *Nardophyllum bryoides, Rupicapnos africana,* and *Myosotis eximia* shown by H. Esslemont, while other plants to catch the eye were specimens of *Helichrysum coralloides* and *Dionysia curviflora,* shown by S. E. Lilley, *Ourisia ruellioides* shown by Mrs. Boyd-Harvey, and *Saxifraga florulenta* and *Veronica pulvinaris* shown by R. Elliott.

Noteworthy in Class 4 were *Eritrichium nanum* and *Lepidium nanum* by R. Elliott, and *Tristagma australe* by Mrs. R. Tweedie (which received a well-merited Preliminary Commendation). Class 5 brought out the usual judging problem as to whether a plant should be judged for its silver foliage or as a specimen, first place going to *Celmisia argentea,* followed by *Leucogenes grandiceps* and *Artemisia pedemontana. Gypsophila caucasica* was judged the best cushion plant, followed by two specimens of *Draba mollissima.* In



Cassiope ' Muirhead,' prostrate form.
(See pp. 86 *and* 152)

Photo: D. Murphy



Fritillaria pyrenaica lutea. *Photo: D. Murphy*

(*See p.* 157)

Meconopsis integrifolia.
(*See p.* 158)

Photo: Roy Elliott

Rhodohypoxis ' Pictus.'
(*See p.* 152)

Photo: D. Murphy

Primula gracilipes (dwarf form).
(*See p.* 152)

Photo: D. Murphy

Class 13 Mrs. Cormack showed an interesting plant of *Saxifraga* 'Carnival.' Mr. R. B. Cooke won the Bhutan Drinking Cup with a very fine plant of *Primula gracilipes* (dwarf form) (Illus. p. 156); while in the next class a plant of *P. calderiana* "form" was followed by two plants of *P. aureata.* Major-General and Mrs. D. M. Murray-Lyon's plant of *Primula pubescens* 'Rufus' in Class 18 received an Award of Merit. Class 19 produced Mr. Esslemont's wonderful *Androsace imbricata,* along with plants of *AA. arachnoidea superba, villosa,* and *watkinsii.*

In Class 23 Major Walmsley exhibited the North African *Anemone palmata* whose short stemmed, almost orbiculate, dark glossy leaves combine with large golden yellow flowers to make a most attractive plant, and in Class 27 an exceedingly good pan of *Narcissus juncifolius* was on display. Another interesting plant was *Anthericum boeticum* (*A. algeriense*), collected from Portugal but more commonly a native of Spain, with its graceful white flowers, and in Class 31 Mr. R. B. Cooke was first with a fine pot of *Fritillaria pyrenaica lutea* (Ill. p. 154) which also received an A.M., as did another exhibit of his—*Primula normaniana.* Class 35 contained a very successfully presented *Meconopsis integrifolia,* not an easy plant to show well, while a good pink form of *Lewisia tweedyi* caught the eye in Class 39. There were two fine pans of *Leucojum hiemale* in 42, and in 51 the competition was keen with good plants of *Rhododendron* "Hatsu-giri" and "Hi No Mayo." In 55 Cassiopes were plentiful and in 56 was a good pan of *Leiophyllum buxifolium.* The three pan class for conifers had five good entries and the single pan class eight entries, and there were many good plants, including the unusual *Dacrydium laxifolium,* from New Zealand.

The five Miniature Gardens were all good, and showed great improvement on the entries of only a few years ago in this class. Improvement is also very marked throughout another section of our Shows—Section 2, where in many cases entries might very well have held their own in Section 1; Bronze Medal for most points in this section went to Mr. and Mrs. J. T. Aitken. This is a good augury for the future, because as older members drop out, we can only maintain our standard if there is a steady flow stepping up from Section 2 to Section 1.

Among the Trade Stands a Large Gold Medal was awarded to Mr. Reginald Kaye for a fine built-up stand containing many good plants, among which a very fine specimen of *Daphne petraea grandiflora* received a Certificate of Merit. Runner up to him was Maryfield Nurseries, Leslie, who received a Gold Medal for a most attractive stand. Messrs. Jack Drake of Aviemore gained a

Large Gold Medal for a stand containing many good plants, a truly wonderful show after the havoc wrought by the hard frosts of Easter. Among many noteworthy plants on view were a *Cassiope* hybrid raised from *C. wardii* seed by W. C. Buchanan (illustration p. 175), *Cassiope* 'Muirhead,' quantities of *Primula calderiana,* a fine group of *Meconopsis integrifolia* (Illus. p. 155), and *Doronicum cordatum.* Col. Stitt's Gold Medal stand was noteworthy for its centrepiece—a large *Trillium grandiflorum*—and another plant to catch the eye was *Primula* 'Sunset.' A Gold Medal was also awarded to Airlie Flower Gardens, Cortachey Castle, Kirriemuir, while Frampton Plants showed some interesting plants not often seen; Messrs King and Paton had a very attractive stand of interesting plants, which included *Cassiope* L. & S. 13284. The thanks of all are due to those many loyal supporters of the show who put up trade stands and other displays and to the competitors who made the show the interesting occasion it was. Edinburgh Show Committee are to be congratulated on organizing the show so successfully and running it so smoothly under the difficulties attending on the meetings of the Conference.

* * *

Several years ago I was able to get some of those lovely American plants, *Castilleja coccinea.* They are vividly beautiful, but we always supposed them to be ungrowable. On at least two or three occasions a pan of this was raised in our nursery. During my absence, and that of my father, they were pricked out by one of our assistants and grown on in ordinary pots and put in the ordinary collection of plants. They were overlooked by everybody and they flowered magnificently. To our utter amazement there was a mass of scarlet, and we rushed over to see what it was, and it was the Castilleja. We have never since been able to repeat it.

WILL INGWERSEN.

(*From the Second International Conference Report*)

I am convinced that a great many alpine plants can be acclimatized in the open in this country, if only we can find the right soil and situation to suit them, and that we should regard the growng of alpines under glass rather as a means to an end instead of the ultimate goal.

MAJOR A. WALMSLEY.

(*From the Second International Conference Report*)

TRICKY ROCK PLANTS AND THEIR CULTIVATION

A SYMPOSIUM

(Chairman : Major General D. M. Murray Lyon, D.S.O., M.C.)

PART I—By L. C. BOYD-HARVEY

I have brought to this meeting a plant of *Nassauvia revoluta* (illustration p. 181), which comes from Patagonia. It is new to cultivation, so I could not draw on the experience of others to tell me whether it was likely to be easy or difficult in cultivation. It has certainly been " tricky." There were once two plants in this pot but one has played me the unkind trick of dying suddenly. I do not know why it died. Was the soil mixture wrong? Had I kept it too dry or made it too wet? Is the climate of East Lothian too cold or too hot for Patagonian plants? If my methods of cultivation have been at fault, why has this other plant managed to survive? The external conditions of the two plants were identical, so there must have been some internal differences between them. Are there good surviving forms and bad succumbing forms within a species?

Usually when we speak of good and bad forms we are referring to the size or colour of the corolla. Besides these obvious and structural differences between individuals of a species, there are other variations of a physiological nature which regulate plant behaviour from the cradle to the grave, or rather from the seed-pan to the compost heap. These physiological variations determine how long each seed will remain dormant, how quickly the seedling will grow, how many years it will take to reach flowering maturity, and how long its life will be.

As cultivators of " tricky " plants, we are chiefly interested in those variations which are of life or death importance to a plant, enabling it to survive an adverse environment. However hard we try to create a replica of natural conditions for difficult species, there must, of necessity, be gross differences arising out of changed altitude and latitude, besides the differences of soil and climate. Only those individuals blessed with a physiological constitution able to accept the different environment of a garden or flower pot will be able to survive to maturity. This is clearly demonstrated by these two specimens of Nassauvia. One has lived through some unknown adverse factor in the environment, which has resulted in the death of the other plant.

Fortunately most mountain plants revel in our gardens and present us with no problems. Why then are there just a few tricky plants which are reluctant to accept the best that we can offer them?

I believe that many of the plants which are difficult in cultivation are also rare in nature. Rarity in nature may be due to some inefficiency of seed production. At great altitudes there may be few pollinating insects to ensure cross-pollination, and self-pollination produces offspring almost exactly like their one and only parent. If the species also lacks an efficient method of long-distance seed-dispersal, the pressure between old and new generations will be intensified, and close inbreeding will produce a "pure line" with few variations. This "pure line" although so perfectly adapted to that particular site may not be able to endure through any big climatic changes which occur there, still less will it be able to endure transference to a distant rock garden or flower pot.

In nature, even in an inbred line, chance mutations may arise from time to time, enabling an occasional seedling, with greater adaptability, to become established at slightly different sites up or down the mountain slopes. When collectors visit the mountain, it is all too likely that they will select and dig up a plant from the site where the species is growing in dense profusion. I suggest that seeds or young seedlings from the scattered and more adventurous outlying colonies would be much more worth the trouble of collecting and cultivating. They have already accepted small changes of environment, and are much more likely than the inbred plants to accept the big change to garden or flower pot.

Sometimes a rare species occurs at different localities widely separated geographically, and each strain has become inbred for its own particular environment. The plants are too far distant for pollinating insects to fly, but could not plants from the two localities be brought together in the garden? This cross within the species might produce a more varied race of plants, some of which would be genetically equipped to accept garden conditions. May I suggest that if you are going to the Central Alps to collect seeds of *Eritrichium nanum* you should exchange half of them with a friend who has been collecting in the Dolomites? Members who live in Sutherland or Caithness might find it of interest to exchange a capsule of *Primula scotica* with friends in Orkney. I have received a generous supply of *Calceolaria darwinii* from the Argentine mainland, and I am wondering whether it might be possible to obtain some of the Falkland Island strain to grow beside them. I believe that the resultant diversity in physiological make-up among their descendants would produce a proportion of young seedlings, no longer

" tricky," but able to graduate up from Preliminary Commendation to Award of Merit, and even eventually to a First Class Certificate.

I ought not to belittle the importance of the skilled cultivator, and the environment which he provides. By careful study of the needs of each plant, he is able to bring out the best of that plant, but *only* up to the limits imposed by its genetic inheritance.

PART 2—By JACK DRAKE

Mr. Jack Drake took as his subject the Primulas of the Soldanelloid group, about which his remarks included the following :—

" The large majority of these lovely plants are native to high altitudes in the Himalayas, where they are covered in dry snow for the whole of a long winter, while the comparatively short summers are mostly cool and moist. These are the conditions which are so difficult to provide for them in this country, with its wet and sometimes mild winters, and often very hot dry springs and early summers. We have had a certain measure of success with a number of them, and find that the best method is to plant them out in frames or plunge them in pots where they can be kept completely protected from the rains and wet snows of the winter.

They must remain covered until growth has got well under way in the spring. It is then, and only then,, safe to remove the frame lights. When grown in this way they are almost all completely impervious to the severest frost. Many people consider that throughout the whole winter they should be kept absolutely bone dry, but I have found that this is not necessary, as long as no further moisture settles on the plants once they have been covered.

The average summer in the Scottish Highlands, with its comparatively high rainfall and humidity, seems to suit them pretty well. It is when we get hot, dry summers that the real test comes; and this is why these Primulas are usually much more difficult to grow in the south than in Scotland. They will not stand dry heat for any length of time, and no amount of watering will save them. In fact, I believe that too much watering is worse than too little. Light and frequent spraying of the boxes is the best way to combat heat.

A hot, dry spell will often weaken a plant so that it will not set seed no matter what artificial means are used, and that is why a large and increasing number of these lovely Primulas are going out of cultivation once more. The fearful drought of 1959 and the partial drought of 1960 have both accelerated this tendency, and it

is to be feared that further species will disappear from cultivation in the near future. If these Soldanelloid Primulas can be induced to set seed, this is fairly easily raised. It would be very interesting to hear of any suggestion as to how these Primulas can be induced to set seed even though weakened by heat."

Mr. Jack Drake's talk, finishing as it did on a questioning note, gave rise to a considerable amount of discussion, in which many keen growers of more or less difficult plants took part, and not a few suggestions were forthcoming.

Mr. Harold Epstein said that the same hot dry summer problem applied in eastern U.S.A., and he had seen used—in an effort to combat it—a 3 ft. fan drawing moist air into a greenhouse over a constantly saturated pad, with an exhaust fan extracting hot air at the other end. Another suggestion made to create a cool, damp atmosphere, was to cover a frame with cheese cloth, a corner of which was immersed in water. Herr Schacht emphasised the great importance of nurserymen and plantsmen being informed as to the type of locality conditions whence plants were collected so that they might have some idea of treatment most likely to prove suitable. In reply to a question Jack Drake stated that he had *Primula nutans* and *P. viali* from 7 to 10 years old to his knowledge, and had found the application of B.I.O. very helpful to the health of primulas.

These various suggestions finally brought us—by way of mist spray systems, automatic ventilation, and ideas for cooling—to what was ultimately agreed would be the ideal for Petiolarid Primulas, and other plants of similar requirements, including certain Ericaceae such as Cassiope—a Cool Humidity House with controlled heat (or should it be coolness?) and moisture.

PART 3—By ROY ELLIOTT

I have chosen for discussion six plants of widely different habitats, and widely different growing conditions.
Phlox nana var. *ensifolia* from Texas; *Lepidium nanum* from Nevada; *Trachelium* (*Diosphaera*) *asperuloides* from Greece; *Anchusa caespitosa* from Crete; *Origanum amanum* from Turkey; *Campanulu morettiana* from the Tyrol.

I have these as "tricky alpines" because I do not know what constitutes a "tricky alpine"; with the possible exception of *Anchusa caespitosa* I grow them all successfully in my alpine house, and it seems to follow that if one is successful in growing them, they

are no longer tricky. There are many plants, generally accepted as easy to grow, which I am wholly unsuccessful with, and therefore unqualified to discuss their cultivation, so I must compromise. Let us start therefore by considering what to my mind is one of the finest and at the same time the most frustrating of all alpines: a Phlox which masquerades under a variety of names such as *P. triovulata* and *P. mesoleuca,* but which is generally *P. nana var ensifolia.* It is difficult to acquire—as those who have tried to propagate it can well understand. The last time I risked it, and cut my only spare plant into a dozen or so root cuttings, I finished up the year as I had started it—with a single plant. Only it was a very small plant, and I had started with a large one! It is a beautifully coloured plant, and one that flowers throughout the late spring and early summer, and after long and bitter experience of its lanky and straggly top growth, I am firmly of the opinion that it should be treated like a vine, and pruned to within two eyes of the old hard wood in November; I pin the hard wood down to the soil on top of the pot, prune, and then cover with an inch of limestone chippings. Now I do not profess that this is the correct treatment, or that it will work for others—merely that it works successfully with me. I have been totally unsuccessful with this Phlox in the open rock garden, and equally unsuccessful in a raised scree frame which is closed in winter. It must, I think, be described as a difficult plant—though clearly there can be no such thing as a difficult plant. One thinks of *Corydalis cashmeriana* at Keillour, or of *Campanula zoysii* ramping through a trough in south London: Mr. and Mrs. Renton's Meconopsis, or the good lady from California in Lester Rowntree's book who scolded her child for picking bunches of *Silene hookeri* in the fields when she could not get rid of it from her garden. Difficulty is largely a matter of relativity and environment.

There was an acid letter last winter in the *Gardener's Chronicle* from a gentleman who appeared to resent Will Ingwersen growing unlovely plants like *Lepidium nanum.* Now admittedly beauty lies in the eye of the beholder, but this cress—which only narrowly escapes being a Draba—is a very pleasing and slow-growing cushion plant from the alkaline flats of Nevada, an area from which the seed of many attractive plants may still be collected for our gardens. Now I was once told—by Dr. Worth I believe—that he did not know how I managed to grow this plant; I certainly do not know myself, and can only give the usual vapid answer that "it grows itself": and so it does, and has been doing for seven years or so. I give it virtually no water in winter, and top dress it annually with dry sandy soil in spring—watering always from below. I have rooted cuttings of it, and one cutting is doing very well in a piece

of tufa. To those who—like the writer of the letter referred to—believe that we grow rarities just for the sake of rarity, I would point out that the knowledge we gain from growing such plants as this can be of immense value when trying new introductions. But enough of rarities! Let us consider another really superlative alpine which haunts the rocky damp sides of the gorge of the River Styx.

Most of us know this beautiful summer flowering plant as *Diosphaera asperuloides* — though possibly *Trachelium* is more correct. I think this plant is apt to be difficult when small, but I have never had any trouble with it as soon as the pot gets really full of roots. This is probably a characteristic of many tricky plants: providing the pot is full of roots, then any excess of water is quickly assimilated—and there is little doubt that watering is a key factor in cultivation. Now this Diosphaera may live happily in damp gorges in Greece, but it is far from happy in damp alpine houses in Britain. Like many of the Campanulaceæ the flowering stems die back half way, and the new growth forms in spring beneath the mass of brown, decayed leaves. I have found that if an half-inch to three-quarters of an inch is cut ruthlessly off the whole plant after flowering, then the new growth begins to appear in autumn, and rises clear of any decayed leaves which remain. It is quite impossible to clean the dead foliage in any other way, and I once killed an old specimen by trying to clean out the leaves and dead stems which lie within the cushion—the fragile growing stems can be three or four inches long, lying horizontally below the cushion, and it is these main stems which are easily damaged. I am certain that this ruthless "haircut," coupled with a powdering of sulphur dust in late September, is the secret of success with this plant. Propagation is easy from cuttings taken in mid-summer, though keeping the cuttings alive through the first winter is difficult. Division, of course, is almost as unthinkable as trying to grow *Diosphaera asperuloides* in the open rock garden.

My fourth "tricky alpine" was introduced from Crete by Dr. Peter Davis in 1936. It is *Anchusa caespitosa,* and it has a woody rootstock which is very apt to rot at soil level. The leaves are sessile, and the wonderful blue flowers are borne in the heart of the rosette. I do not really think I am qualified to speak about it: if I am successful with a tricky alpine, then I manage to raise a few to give away to others—but with this plant, it is always touch and go whether I manage to keep it myself. Yet I know of plants in the open garden which were raised from the 1936 seed collecting and which are still alive today—and I have been told that it prospers in the scree at the Royal Botanic Garden, Edinburgh. Now the reason *A. caespi-*

tosa is tricky is partly this danger of rotting at the collar and partly the extreme brittleness of the leaves, which makes it very difficult to remove rotting foliage in winter. I am certain of only two things about it; firstly that it wants very little water and a lot of repotting —generally twice a year. (Keen exhibitors might note that repotting invariably gives a spate of flowers some four to six weeks later). Secondly that it needs propagating in mid to late summer—for offsets are few and valuable, and I have seldom rooted them before August. Seed is sometimes set, but I have not so far succeeded with this method.

During the last decade we have seen the introduction of many beautiful plants, but I do not think that any of the alpine introductions can excel Dr. Peter Davis's lovely *Origanum amanum.* It is slightly tender, but General Murray Lyon tells me he grows it outside in the scree in Perthshire—certainly it flourishes in Dorset under similar conditions. I suspect that it is rather short-lived, and has a curious habit—like some of the Daphnes—of collapsing for no apparent reason. I think it needs cutting back after flowering, for exactly the same reasons as *Diosphaera asperuloides*—to prevent the tender new shoots being surrounded by decaying foliage in the damp days of winter. It makes tremendous root growth, and is fairly easy to propagate from cuttings taken in early summer.

The recurrent problem of decaying foliage brings me to my last choice of "tricky alpines"—*Campanulata morettiana* both in its blue form, and the rare and lovely white form. Here the foliage dies back almost to ground level—but not until after Christmas, by which time mildew may well have set in. In this case we give the plant a good dusting of green flowers of sulphur—in fact in late September we dust the whole of the alpine house with it. The plants look perfectly terrible, and I am always ashamed to take visitors into the alpine house at this time—but I am quite convinced that I suffer less losses in a damp and foggy autumn than do others who do not take this precaution. I think the growing of the more difficult Campanulas is essentially a matter for experiment as they do not adhere to a pattern. *CC. morettiana* and *piperi* seem to appreciate as little disturbance as possible, and limited root restriction. *Campanula cenisia,* which we manage to grow without any trouble at all, is grown in a very gritty mixture, and planted from a four or five-inch pan, straight into a twelve-inch pan, which it quickly fills, and we cut it to ground level after flowering.

These are just a few methods used for a few plants—I do not maintain they are correct methods, or that you will succeed by adopting them—I only describe them to you because they happen to succeed with me in my particular environment.

PART 4—By Dr. C. R. WORTH

Dr. Worth concentrated on those plants of the Rocky Mountains amongst which he has devoted so much of his leisure time over many years, and to which he has given so much study. He laid particular stress on the natural conditions encountered in those areas where he had done his collecting. Many of the plants grew in dry arid areas and he emphasised the importance, and also the difficulty, of imitating these conditions under cultivation. Quite understandably, most of them disliked excessively moist conditions, and were easily upset by winter wetness, thus making alpine house cultivation almost a necessity for the more extremely xerophytic of them. The majority of the plants collected by Dr. Worth were inhabitants of limestone screes or slides, while a number grew on or in crevices of volcanic cliff formations. Among the limestone lovers of either scree or cliff were many *Oxytropis* and *Phlox* spp., *Eritrichium* spp., *Kelseya uniflora, Petrophytum caespitosum,* and of course many Aquilegias. On the other hand some of the Drabas and Mertensias, *Polemonium confertum* and *Phlox caespitosa* were usually found on volcanic rock.

Following his talk, Dr. Worth answered a number of questions from members concerning the cultivation of plants introduced through his contributions to the Seed Distributions, and made suggestions on what he thought were probably methods most worth trying.

* * *

"Nobody can surpass me in admiration for Reginald Farrer, but I do think his praising the scree and defining what he means by a scree has been responsible for more losses in southern gardens than anything ever invented. He says 'Make up the scree with a mixture of six parts of chips and one of soil.' With a very few plants, that acts in the south; with ninety-nine out of a hundred this spells death, unless you have the most elaborate and expensive method of watering."

THE REV. PROF. LYTTEL.
(From the Report of the First International Conference)

The Pyxidanthera we used to establish in pans, too, in finely broken peat mixed with silver sand, and a liberal top dressing also of the sand. One can imagine it growing in its wild state in the sandy wastes between the pine groves such as occur, say, between Brockenhurst and Ringwood.

J. WOOD.
(From the Report of the First International Conference)

THE HEATHER GARDEN

By F. P. KNIGHT, F.L.S., V.M.H.

(Chairman: Mr. J. L. Mowat)

There is no doubt that in these days, when maintaining a garden is a major problem, extra care is required at the outset to ensure that the labour involved is kept at a minimum.

It is not, however, for reasons of economy that I would advocate that consideration be given to including a heather garden in a comprehensive new layout, nor altering an existing scheme to allow for this. The paramount factor in deciding to have a heather garden is simply that few other aspects of gardening are so satisfying.

Even in a comparatively few square yards, it is possible to plant many varieties, and having selected these carefully and arranged and spaced them to the best advantage and allowed them time to become established, that part of the garden will partly take care of itself for several years. The choice of a suitable site is of first importance, and to the beginner I would say that time spent in studying existing heather gardens which are the result of good initial planning and planting will prove of very great value. There are fine examples in gardens which are readily accessible to visitors in many parts of the country, and special mention must be made of the heather gardens in the Great Park at Windsor, the Royal Botanic Gardens at Kew and Edinburgh, at Wisley, and in private gardens such as that at Tremans, Horsted Keynes, in Sussex. There are many others, and there are also the stock beds maintained by nurserymen who make a speciality of propagating heathers for sale, and which are sometimes laid out to be attractive as well as productive of propagating material.

When making such visits, I would emphasise the importance of not being discouraged by the extent of the area planted, nor the quantity of plants used. It is all a question of scale; but more of this later, when I have dealt with what I consider to be the basic principles concerning selecting a suitable site. It is essential to select a position which is fully open and not over-shadowed by densely growing trees. I know there are countless acres of wild heather to be seen where the plants have spread under the tall stems of Silver Birches and Scots Pines, but I think the observant will notice that there are few low branches on the trees and these are usually so sparsely scattered that they do not prevent light reaching the ground. In any case it is seldom that a site sufficiently large to allow for birches or pines will be available except in a public park or very large garden.

I hesitate deliberately to lay down any dogmatic rule about the

aspect to be selected, but would generally avoid a northern slope. In saying this, I am conscious that not far from where I am writing, there are fine drifts of heathers on northern slopes in Wisley Gardens, both in the rock garden and on the steep north facing bank near the range of glasshouses. In a very hot garden with thin sandy soil, a western slope is desirable and within fifty yards of my house the disadvantages of a south facing site was made clear in the drought of 1959 when only varieties of *Erica cinerea* survived. On the other hand, a waterlogged soil thould be avoided or drained. Therefore, provided the site is open I would persevere, and if there is no alternative to a site facing north, be prepared for growth to be somewhat drawn up in such an exposure.

To provide the best effect an undulating surface is preferable, but not essential, and the great attraction provided by an undulating appearance can be achieved partly by artificially mounding the soil, and partly by skilfully planning the planting so that tall or intermediate growing varieties are planted in effective relationship to those of dwarf habit. This arrangement is clearly demonstrated on the very flat site of the heather garden at Wisley.

The use of suitable rocks to form attractive outcrops is largely a matter of personal taste, and I have seen satisfactory results both with and without this feature. The formation of suitable paths through and around the heather garden is very important, and the width of the paths and the material from which these are made will depend mainly on the size of the garden. If this is small, access may be provided by using stepping stones, whereas grass may be deemed best for larger schemes. In the latter case I feel that the tendency to try to keep the edges of the grass too tidy should be discouraged: and the paths should be made sufficiently wide to allow the the heather plants on the fringe to overlap. I remember many years ago being very impressed when I saw paths in the gardens at Windlesham Moor formed of *Calluna vulgaris*, and these were cut by using a hand lawn mower.

The unsuitability of existing soil need not, in my opinion, be such an insurmountable obstacle as the choice of site, because so much can be done to bring the soil into a suitable condition for growing heathers whereas altering a site may have to be ruled out on the score of trouble and expense. In fact, in considering the soil it is possible to grow many varieties of Ericas where this contains some lime.

I have planted heathers successfully on soils ranging from the very acid peat of gardens bounded by Chobham Common in Surrey, to the heavy clay-like soils of my native Devon, and in many soils which lie in between these extremes. I have grown many many thousands of heathers commercially, and have "lined these out"—

to use a nurseryman's term—in open fields on light sandy soil, to which very little in the way of peat or compost had been added. I would avoid heavy clay, especially where this lies flat and wet. But it is surprising what can be done in clay soil on a slope to which coarse peat has been added, particularly if, in the initial digging, the clay soil is mounded up so that the heather bed thus prepared is about a foot higher than the surrounding land, so that drainage is assisted. I can recall a fine planting of *Erica x darleyensis* on such a site.

I have had no personal experience of growing heathers on soil containing lime but I have consulted those who have, and as the result of inspecting such plantings I am quite convinced that anyone gardening on alkaline soils can include *Erica carnea* and its cultivars, *E. x darleyensis,* and particularly *Erica terminalis* which in Sir Frederick Stern's chalk garden at Highdown near Worthing increases from self-sown seeds. I would, however, advise adding liberal quantities of peat to the soil.

I recently inspected the beds of winter flowering heathers which have been planted for about six years in the Winter Garden at the University Botanic Garden at Cambridge. The soil there is alkaline and it appeared to me that the plants were rather yellow in appearance and will soon have to be replaced.

I know of no one who has carried out any experimental work on the amount of lime such plants will stand, but suggest there is an opportunity for someone to collect useful data and publish this for the benefit of others who hesitate to add heathers to their gardens.

Now to return to my previous remark "it is all a question of scale." I want to develop the theme that first class results can be obtained if a careful study is made between the relationship of size and shape of plot available, and the choice and arrangement of varieties to be planted; also the variation in the quantity of each variety to be used, dependent on the ultimate size which these will eventually attain.

This, I feel is the whole crux of the matter. Wonderful effects can be provided if the scale is right—it is all a question of balance. Too many large growing varieties in too small a space can completely spoil a scheme; for instance, using *Erica arborea* in a small garden where the maximum height should be that of *Erica mediterranea,* and planting a top-heavy group of say seven plants where three would suffice. On the other hand a scheme can be rendered very weak by planting, say, seven *Erica mediterranea* where seven *E. arborea* are clearly called for. The point I want to emphasise could obviously be more easily demonstrated on an

actual planting site than written about. To continue to develop this mind picture of balance and scale, let the imagination get to work on sizes of groups and heights and quantities of plants in relationship to the whole area of ground available, coupled with skilfully undulating the ground so that mounds and hollows are created. Then plant some of the mounds with tall varieties, and on others make hummocks by carrying the lower growing varieties up from the hollows and over the tops of the mounds. I feel that if a beginner could just see a successful scheme and then develop his personal preferences, he would get what he himself had in mind —and this surely is to be preferred to copying another person's ideas completely.

If a clear new site is being planted, it could be planned to scale on paper, but this may prove troublesome. Therefore the marking out on the ground of all the groups in relationship to each other to create a harmonious whole is quite practical. This requires a good knowledge of the habits of the plants being used, not only their height and spread of growth, but the colour of their flowers and foliage and the time of flowering. It has been said on many occasions that it is possible to find some variety of heather in flower on any day of the year and I have no reason to doubt this. To use the second method mentioned, the boundaries of each group should be clearly defined by means of shallow drill-like depressions, and the outlines should be irregular in shape and should allow for the merging of one variety into another. The groups should not have straight and regular lines. To provide the best effect, inter-planting groups of winter-flowering varieties among those which flower at other seasons should be kept in mind. Advantage should always be taken of those varieties such as *Erica cinerea* 'Golden Drop' and *Calluna vulgaris* 'multicolor' which have coloured foliage, and which form such an effective foil among the various greens of the majority of heathers.

It is not possible to give precise information about how many of each variety to plant nor how large each individual group should be, this must be based on the size of the site and the habit of growth of the varieties being used. The large growing tree heaths could be spaced at about four feet apart and the smaller species such as *E. carnea, cinerea,* etc., at about fifteen inches, and planted at this spacing good plants will unite in about three years to give a complete coverage and smother weed growth. It is wrong for the sake of economy to plant too far apart, as the effect will be that of so many individuals instead of a mass, and it will be necessary to carry out weeding among these. The roots of any perennial weeds seen during the preparation of the planting sites should, of course, be removed.

The time for planting depends partly on whether plants are supplied from pots or from the open ground. Pot grown plants can be planted at almost any time of the year, but those being transplanted from the open ground should be moved during suitable weather and ground conditions from the end of September to the end of April. The winter-flowering varieties can be planted in full flower. A word of caution is necessary about some of the tall heathers such as *E. lusitanica* and *E. x veitchii,* which should be pot grown and are best planted in the spring or early autumn, but not in the winter months.

It may prove desirable on the score of cutting down expense, to carry out the initial planting by filling up with the older more plentiful and therefore cheaper varieties, and gradually replacing these according to personal taste with some of the newer varieties. This may mean that whereas the trouble of raising one's own plants of the cheaper varieties is not justified, there will be an inclination to adopt a "do it yourself" technique when dealing with plants which may cost several shillings each. I am all for raising heathers from cuttings as a first choice of propagating methods and this may be done in different ways. I have raised thousands of a wide range of varieties by making cuttings in September and early October about one inch long, preferably of flowerless shoots pulled off with a heel, and dibbling these in sandy peat under a bell glass which stands in the open. Cuttings made thus will root by the following spring, when some are best potted, whereas others may be pricked out in a carefully prepared bed before being transplanted to their permanent site. For those who are concerned only with limited quantities it is better to dibble cuttings into pans of sandy peat in the late summer months and place the pans in a draughtproof cold frame or greenhouse. This method is described and illustrated in an article by Mr. Hanger in the *R.H.S. Journal* dated February, 1951.

I find, however, that layering is most successful if parent stock plants no more than three to four years old are planted, in September or October, about four inches deeper than usual and a mixture of peat and sand worked in among the buried shoots. These will then root very freely and within a year the plants can be lifted, and the newly rooted shoots severed from the parents and several of these bunched together to form sizeable and shapely new young plants.

Although I have stated that, once established, heathers will almost take care of themselves, I feel this must be qualified by pointing out that some regular attention is required to keep the plants in good fettle. First of all there is the question of cutting off the old flower heads so that vigorous new flowering shoots are produced. This is

generally done in April to the winter-flowering varieties, and in March to those which are summer-flowering. A light touch is needed, simply use the shears and cut just below the dead flower heads. The old flowers of the summer- and autumn-flowering varieties are very attractive in their various shades of russet and brown in the winter, particularly where they are seen in contrast to the winter-flowering varieties, and those having coloured foliage.

Finally, there comes the question of giving descriptive lists of varieties and I have deliberately decided not to do this. I have grown a great number of varieties for many years and I have studied lists in catalogues and other publications for hours and also referred to many notes I have made. I have ascertained that the total number of varieties of Erica and Calluna appearing collectively in current catalogues of fifteen different nurserymen is two hundred and forty.

It is from this vast reservoir of material that those who decide to plant a heather garden can draw up their planting lists according to their own personal tastes and requirements. I would suggest again that visits should be paid to see existing heather gardens and also to nurseries where heather growing is practised.

I consider, however, that an indication of the time of flowering of the various species and varieties may prove helpful and the following list arranged in order of the normal time of flowering is, I think, a fairly reliable guide :—

Winter and Spring flowering: Erica carnea and cultivars,*Erica* x *darleyensis* and cultivars, *Erica lusitanica, Erica* x *veitchii, Erica mediterranea* and cultivars, *Erica arborea* and *arborea alpina, Erica australis* and cultivar ' Mr. Robert.'

Summer and Autumn flowering: Erica cinerea and cultivars, *Erica tetralix* and cultivars, *Erica ciliaris* and cultivars, *Erica terminalis* (*stricta*), *Erica vagans* and cultivars, *Calluna vulgaris* and cultivars, *Daboecia cantabrica* (Connemara Heath) and cultivars.

The heather garden need not be restricted to Callunas, Ericas and Daboecias, as there are numerous other plants which can be used. Many of these belong to Ericaceae, but others such as suitable Junipers, dwarf conifers, dwarf gorse, the smaller growing brooms, e.g. *Cytisus x beanii,* can be included. I would, however, be very careful to ensure that the heather garden on completion is one made up of heathers with some other plants judiciously selected and not a planting of dwarf shrubs to which heathers have been added. It is, I repeat, a question of scale and balance, but the employment throughout of these important factors should not be made so obvious that the final result appears to be too precise and tidy.

Part of the heather garden at Horsted Keynes. *Photo: J. E. Downward*

(*See p.* 167)

The heather garden at Wisley.

Photo: J. E. Downward

A new Cassiope hybrid.
(*See p.* 158)

Photo: Roy Elliott

Daphne petraea, in tufa.

Photo: H. Esslemont

SOME PATAGONIAN PLANTS

By RUTH TWEEDIE

(Chairman: Dr. Henry Tod)

Patagonia,—there is something fascinating about the name, and the place itself has such a magnetism that its strong pull is hard for me and for many others to resist. I am already waiting impatiently for the chance to go back again, and it is only six weeks since I left. You may have heard that it is in the "roaring forties," that the summer wind is hatefully strong and continuous; you may have heard that the country is cold and bare, dry and barren, that cattle rustling and sheep stealing are not unusual, and that gun battles and murder are not unknown, and that parts of it are like an arid desert. You would be quite right, for all this is true, but it is not the whole story—and in spite of it, Patagonia is a wonderful place.

We were in Patagonia because my husband's family has a sheep farm there. The Estancia is in Argentina, in the foothills of the Andes, almost on the Chilean border in an area of mountains, hills, forests and rivers. There is excellent brown trout fishing in the rivers, and the whole area is much less arid than the eastern Atlantic coast. The light is brilliant, and there is a great deal of ultra violet ray. Throughout the summer days of wind and gale the sun still shines, and the air and the ground are very, very dry. Although the coarse grass is usually khaki coloured there are many flowers, and most of them are new to us, as you will see from their names which you may not have heard before.

Today I am going to tell you about some of the plants we found. Most of my work has been done in the area round the Estancia, but I have also visited the glaciers and wet Nothofagus forests of the Lago Argentino one hundred miles north, and also the arid bare pampa of the south-eastern corner of the mainland at the entrance to the Straits of Magellan. Just behind the sand-dunes on the northern shore of the Straits I found almost the same plant society as that at 3,000 ft. on the Range at the Estancia, 300 miles away. The only notable exceptions were the handsome white-felted *Senecio candicans* growing in the grey sea sand, and the pink flowered *Samolus spathulatus* growing in the meadows behind, and no doubt salted by the spray from the gale-swept Straits.

The plants of Patagonia are interesting both for their similarity to, and their difference from, the plants we know in Scotland and

in Europe. Where heather and *Empetrum nigrum* grow in Scotland you find mile after mile of *E. rubrum* growing in the hills of Patagonia. Here in Britain we have *Primula scotica* and *P. farinosa,* and there, growing in the moist slightly acid meadows and the fringes of the forests is the farinose *P. decipiens.* Why have these different but similar species of the same genus decided to grow in the same latitudes north and south of the equator, divided by 8,000 miles? Then again genera are found in Patagonia which are almost unrecognisable to those of us used to the European members of the same family. They have evolved to suit the climatic peculiarities of the far south, the strong insolation and dessicating winds, the ultra-violet radiation and the stony or sandy soil. Amongst these plants are the Nassauvias, composites with strangely diminished leaves which often form a column; (*N. revoluta* is illustrated on p. 181). *Anarthrophyllum spp.* a leguminous genus found only in southern South America; Adesmias, another pea, specially adapted to the rigours of Patagonia with pinnate leaves much reduced and its scalloped pods hairy and oily. *Adesmia salicornoides* has its leaflets reduced to resemble the fat leaves of *Sedum acre.* Does the physiographic factor of the Rockies-Andes barrier which runs north and south affect this distribution? The Europe-Asia land mass has an east-west barrier in the Pyrenees-Alps-Caucasus-Himalayas, mountains which must prevent migration between the two hemispheres.

We may speculate about the evolution of the flora of Patagonia, but the present and the future of the plants is in our hands. A great part of the world from which plants have been introduced in the past is now unfortunately closed to us for political reasons. In order to keep us alert and experimental we need to have new genera and new species to try out in our rock gardens and our alpine houses. Argentina with her rich and varied flora is fortunately open to us, and there is a great deal of valuable scientific work being done there. I have tried to find some plants new to horticulture, and together with others far more skilled than I we are making our experiments and have had our successes and our failures. It is a great privilege to try to contribute in even a small way to the work of the giants of the past, such as George Forrest and Reginald Farrer.

I have chosen twenty plants which are representative of those which I have seen growing in Patagonia, and in some cases have been able to give some idea of the way in which people are treating them successfully in this country. It will be interesting to hear about other people's experiences with them in the future.

Viola microphylla, 1 in.-2 in., has wide orange flowers rising from

a rosette of dark green hairy lanceolate leaves. Found in arid conditions of scree or short dry turf fully exposed to sun and wind.

Oxalis laciniata 2in-4in., the blue sweet-scented Oxalis which Mr. Tweedie introduced in 1955 received an Award of Merit at Chelsea in 1960. It is a desirable plant and sets seed freely. The colour forms vary from almost white through plum and blue to lilac and deep purple. This plant flowers even more freely in garden or alpine house conditions than in nature, and it likes a very soft open mixture with coarse sand and humus, although in Patagonia I have usually seen it in loam and sand on the eastern side of grass-covered moraine hills. The pink rhizomes grow horizontally 1in-2in. below the surface of the soil and may be divided when the plant becomes dormant in October.

Anarthrophyllum desideratum, 4 in.-12 in., the "scarlet gorse", a dwarf leguminous shrub with spinous grey leaves which form a cushion, covered in spring with upstanding scarlet or tawny orange flowers. It is a spectacular plant and grows fully exposed on the bare dry ledges of high volcanic rocks or in the scree and loam at their base.

Nassauvia revoluta, 6 in.-9 in., called locally "ostrich neck". The tiny ridged leaves are reflexed to clothe the stems which bear the clubbed inflorescence of whitish florets smelling of vanilla. The plant is interesting and sweet-scented rather than spectacular, although its leaf form is beautiful. (Illus. p. 181).

Senecio candicans up to 18 in. with large white felted leaves but an uninteresting yellow flower. It is suitable only for the large rock garden or for the beauty of its foliage in the herbaceous border. In nature it grows in sea sand, but thrives in any open soil however poor.

Calceolaria darwinii, 2 in.-4 in. The appearance of this plant is already well known, but the forms I have been finding are wide in the lip and the lower stripe varies in colour from mahogany to lightly spotted or self coloured. At 2,000 feet the leaves are usually farinose, and at 3,000 or 4,000 feet they are hairy. It grows both in full sun and in partial shade in the turf of moraine hills or in leaf mould. In cultivation it germinates freely, but resents root disturbance. It must be very difficult to keep free from greenfly in an alpine house.

Symphyostemon biflorus, 8 in.-12in., used to be called *Sisyrinchium odoratissimum.* The cream or maroon striped lily-like flowers are scented. It grows easily from seed, and flowers freely in full sunshine, although in partial shade it may become too lax and floppy.

Symphyostemon lyckholmii, 6 in.-8 in., resembles a miniature *S. biflorus* with usually terra-cotta coloured, scented flowers, but sometimes buttercup yellow. It is hardy and desirable and would make a good trough plant.

Sisyrinchium depauperatum, 8 in., with rush-like leaves and white flowers strongly marked with a maroon eye. The four or five flowers open in succession for only a day or two. It is found in rough grassland and meadows near the river.

Leuceria purpurea, 4 in.-7 in., like a miniature garden Pyrethrum in either crimson or pink forms. To maintain character it should be grown exposed and in not too rich a soil.

Leuceria lanata and *L. hahnii,* 3 in.-6 in., similar plants with beautiful pink (or sometimes white) flowers in a white felted involucre of bracts. The rosette of leaves and the capitulum stem are also almost white. It is scented and desirable. It grows at 2,000 to 4,000 feet in grass, moorland or scree, fully exposed to sun and wind.

Cruckshanksia glacialis, 1 in., a tiny yellow Rubiaceae, strongly narcissus-scented. Each small evergreen rosette gives rise to a group of sessile flowers which have inch-long corolla tubes. It is found on the screes at about 4,000 feet.

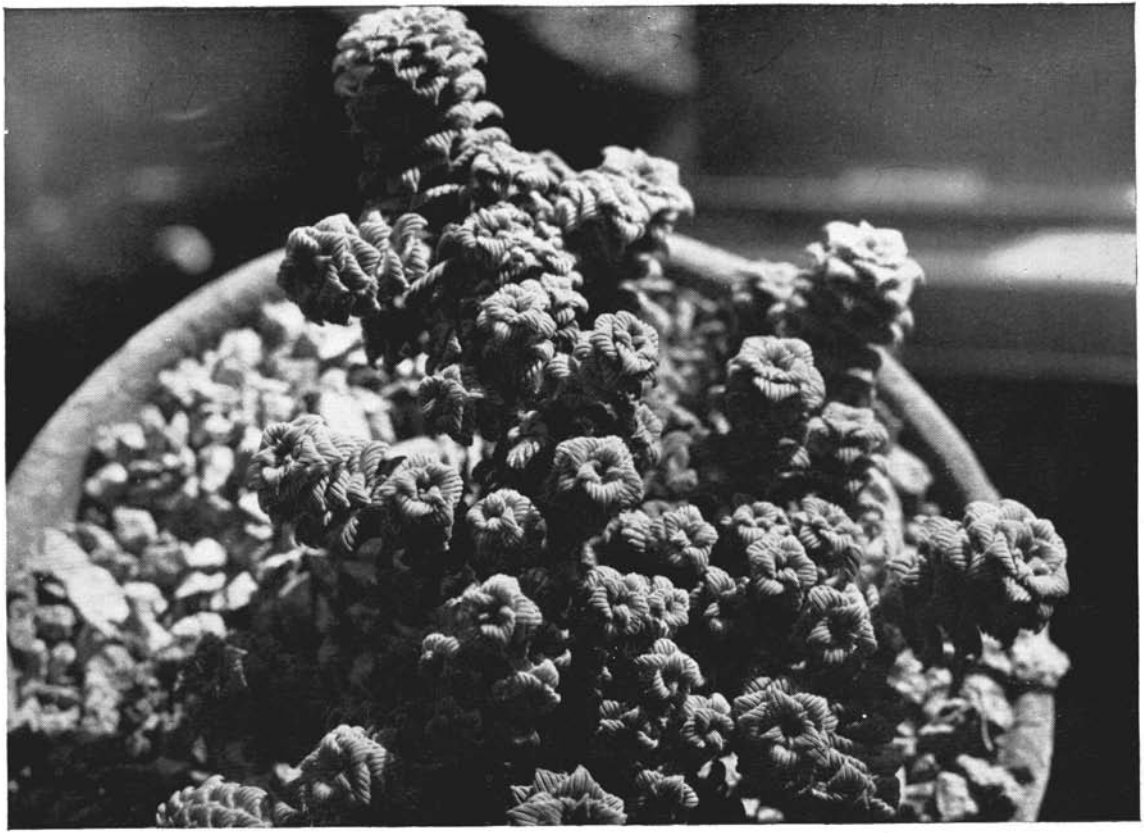
Perezia recurvata 3 in.-6 in. a composite with variable blue flowers. The evergreen leaves are brilliant green with bristly serrated margins. Growing in full sunshine it may be found at any altitude up to 2,000 feet. in sandy loam.

Ourisia ruellioides, 2 in.-6 in., spectacular red tubular flowers the colour of *Tropaeolum speciosum* carried amongst or above the bright green leaves. I found it in running water or under dripping water on a cliff face, but it thrives under normal conditions in cultivation. It has been most successfully germinated on moist chopped sphagnum moss or on the surface of seed compost kept always moist.

Hypochoeris lanata, (P.C. 1957), 3 in.-6 in., a white composite with showy black anthers. It sometimes occurs flushed with pink or purple. It grows exposed in any open soil. (Illus. p. 182).

Chlorea hystrix, 8 in.-12 in., a hardy orchis carrying grey and green chequered flowers with yellow furry markings. It is found in long rough grass and amongst shrubs in partial sun. It is scented and the sheep find it succulent.

Codonorchis lessonii, 8 in., the "snowdrop orchis" with white pendulous flowers and a yellow and purple throat. It grows in leaf mould in the deciduous Nothofagus forest (*Nothofagus pumilio*).



Nassauvia revoluta.
(*See p.* 178 and 159)

Photo: Roy Elliott

Hypochoeris lanata.
(*See p.* 180)

Photo: Roy Elliott

Senecio argyreus, 12 in., a desirable dwarf shrub with silky cream coloured leaves and large yellow flowers. It is scented and found at about 3,000 feet in full sun, but sheltered from the prevailing wind.

Perezia megalantha, 3 in., a large 3 in. diameter capitulum of cream or lilac-grey florets in a tawny involucre of bracts. Found only above 3,500 feet in harsh conditions of sun and wind in scree; the green rosette of crenate leaves is soft and brittle.

As these plants flourish in this part of Patagonia (Lat. 53° S.) where the climate is harsh and the temperature varies from -5 or -10 degrees in winter to 65 or 70 degrees F. in summer they must be perfectly hardy here. The danger may come from our softer variable winter climate when growth begins too soon. But as many of them are already growing in our gardens and appearing on the show benches, I look forward to the time when they are readily available to everyone who loves good plants.

REPORTS IN BRIEF

DWARF CONIFERS by H. G. Hillier, F.L.S., V.M.H.

Dwarf conifer enthusiasts will be delighted to know that it is hoped to publish the full text of Mr. Hillier's paper on this subject as a separate publication in the near future.

Even in his abbreviation of his paper on dwarf conifers, which he read at Edinburgh (under the chairmanship of Mrs. J. G. Neilson) Mr. Hillier was extremely comprehensive, and covered a wide field of the more recently established introductions. He gave us full details of the plants he mentioned, including, in most cases, the original discoverer or raiser, and the growers of the best known specimens.

Since the publication, by Hornibrook in 1938, of the last comprehensive work on this subject, much additional knowledge and many new introductions have come to light, and it was on this material that Mr. Hillier concentrated his text.

He laid stress on the collection of Mr. A. H. Nisbet of Gosport, and on the part of Mr. Nisbet's collection donated to the R.H.S. gardens at Wisley, as places where good specimens of many of the plants he subsequently spoke of could be seen. He also mentioned the collection of the late Mr. Noble of California, and of Mrs. Noble's gift of 500 specimens to the Golden Gate Park of San Francisco.

At least twenty genera of hardy conifers are known to have produced dwarf variants, and after giving some general advice on planting and cultivation, and laying emphasis on the importance of growers being always on the alert for new dwarf variations from the normal, he criticised the over-enthusiasm of those who deliberately tried to induce dwarfing by artificial means, or to perpetuate it by impoverishment. He also had something to say concerning the tendency of certain writers, who, with inadequate checking and study, rushed into print with descriptions and new names for slight variations of known forms—some of them very possibly the product of virus infection. I liked his statement that a miniature pinetum should be a thing of beauty, and not a weird collection of museum pieces. Apart from most of the pines, cedars, larches, Abies and Pseudotsugas, which require to be grafted, all cultivars should if possible be increased by cuttings or layerings.

Mr. Hillier stated that seed of *Abies delavayi* from China had produced several dwarf plants, and that in Mr. Archer's garden near Farnham was an *Abies procera* 'prostrata' which appeared to be a seedling. He mentioned that seedlings of *Chamaæcyparis lawsoniana fletcheri* had produced some compact little buns, but that time alone would prove if they were permanently reduced. *Chamaecyparis lawsoniana* 'globosa' was an attractive globular plant with adult leaves and thick dense branchlets, and only six inches high at 10 years old. The fast and strong growing *Cupressus macrocarpa* had in recent years given rise to dwarf seedling forms, some in the possession of Mr. Corley and Mr. Archer.

Among rarities he mentioned *Diselma* (*Fitzroya*) *archeri* from Tasmania, and *Dacrydium laxifolium* from New Zealand. An interesting feature of Mr. Hillier's talk was that he was always able to state where any of the rarer plants he mentioned were to be seen, and more often than not the history of their introduction. The talk was followed by the hurried run-through of an extensive number of illustrative slides. No time was available for question or discussion, but Mr. Hillier deserved our warmest thanks for the vast amount of work and study most obviously put into the preparation of this paper, and it is with eager anticipation that we look forward to its publication in full.

PLANTS FROM THE SHOW BENCHES

by WILL INGWERSEN

Mr. W. Ingwersen's talks on 'Plants from the Show Benches' are so well known and popular, that his talk at the Conference Show in Edinburgh was crowded with people eager to hear him,

and many were unfortunate in being wedged into positions where the plants were invisible and the speaker inaudible. He selected at random from the benches a dozen or more plants which for one reason or another he found interesting.

One, he admitted, was for purely sentimental reasons. This was *Primula ingwerseniana*—a form of *P. vulgaris* discovered by his father, Walter Ingwersen, in Greece, and a plant he had thought lost to cultivation. It was in effect a white primrose with a yellow eye, and Mr. Ingwersen expressed delight at seeing it again.

Another Primula he chose for consideration was Mr. R. B. Cooke's unnamed dwarf form (?) of *Primula gracilipes*. This plant incidentally, won the Bhutan Drinking Cup for the best species Primula in the Show at Edinburgh in 1960, as it did again this year. This plant is very distinct from what is generally known as *P. gracilipes,* being much neater and more compact in growth, later flowering, and darker in colour of both flower and foliage. It has been suggested that this may be a distinct species—perhaps even *P. petiolaris* itself. Mr. Ingwersen's remarks on his other selections from the show benches were listened to with very keen interest and at the conclusion of his talk he was warmly thanked.

DWARF RHODODENRONS, by H. H. DAVIDIAN

Mr. Davidian very generously stepped into the breach to fill the vacancy in the Conference Programme created by the untimely and greatly-lamented death of Mr. David Wilkie, who was to have spoken on his favourite—'Gentians.' Many or most of us in Scotland have had opportunities of hearing Mr. Davidian on the subject of Rhododendrons, but to many from the South and Overseas, his talk probably came as a revelation. He dealt very extensively with nearly all the dwarf or semi-dwarf species which could be used in rock gardens, large or small, giving descriptions of growth habits, flowering, and their likes and dislikes. Mr. Davidian is a most enthusiastic propagandist for rhododendron growing, and insists that there are rhododendrons suitable for every garden in every part of the country. Members will be glad to know that Mr. Davidian has promised that he will ultimately submit his paper on Rhododendrons in full, both for the *Journal* and for the *Bulletin.*

BULBS FOR THE ROCK GARDEN AND ALPINE HOUSE

(Chairman: Mr. Stewart Mitchell)

PART I—By TH. HOOG

It is a great honour indeed for me to have been invited to tell you something about bulbs. Moreover, it is a great pleasure for me to be in the country of my ancestors again, as about the year 1700 Thomas Hog, born at Larbert near this town was minister to the Scottish Church at Rotterdam. Although called to the Chair of Theology of the University of Aberdeen later, he declined this offer, and I believe I can understand this, as at that time life in the Netherlands must have been somewhat preferable to that in Scotland. And if he was interested in flowers—which I do not know—there must have been an endless variation of garden flowers like tulips, hyacinths, carnations, anemones, etc. to be seen—far more flowers than were grown at that time in Scotland.

I am a bulb grower from Holland and my main occupation is the growing (and selling) of large quantities of tulips, hyacinths, daffodils, gladioli and dahlias, and bulbs that are grown in greenhouses like Amaryllis and Gesneriaceae from very many countries in the world. Besides those at "Zwanenburg Nurseries" at Haarlem, we grow many of what used to be called rare and uncommon bulbs, and about these I will tell you something.

My father, the late Mr. John Hoog, had travellers and collectors in Asia Minor and Asiatic Russia and from these countries we have received many bulbs. About his introductions of Tulip species I have written an article in the *Daffodil and Tulip Year Book* of 1959.

Not all the plants introduced in the years from 1900 to 1914 have survived. In the wild, plants propagate by seeds, and in the humid, wet climate of Holland, Tulips, for instance, practically never set seeds (the exceptions being *Tulipa polychroma* and *T. sprengeri* in the open). Nowadays, we have big greenhouses in which the bulbs are planted out in the open borders; although unheated, these houses give protection from hail and snow and keep out the severest frosts. The atmosphere is drier than outside and many plants set seeds well. Had we had these structures 50 or 60 years ago, perhaps more of the introductions might have survived.

Although in some cases we still depend on seeds for propagation, the best way is to propagate vegetatively. Contrary to the condi-

tions in the wild, where plants propagate exclusively from seeds, we must try to find those that propagate themselves from offsets.

Crocus ancyrensis, the yellow Crocus from Ankara, the capital of Turkey, is an example. During the war, there turned up in our country a fair stock of *Crocus hybridus* "Golden Bunch"— a nonsensical name, which unfortunately is still in use occasionally. I investigated, and found that the correct name was *Crocus ancyrensis.* All the plants on the market are identical. Many times *C. ancyrensis* has been imported into Holland, but it died out again until the moment a clone appeared that propagated from cormlets. So the plant is now firmly established in Holland and need not be re-imported.

There are many more such plants and I would instance *Allium ostrowskianum* "Zwanenburg" which is deep carmine red. It is a true and even stock, and the colour is much better than the colour of the stock of the trade. *Scilla tubergeniana* was introduced by us about 1930 from Northern Persia, but *S. tubergeniana* "Zwanenburg" is an even stock with flowers of a soft uniform blue colour. *Crocus balansae* "Zwanenburg Variety" has flowers of a deep orange colour like a Marigold. *Tulipa chrysantha* is well known to all of you; a charming little Tulip, interior yellow, exterior red. Unfortunately the bulb is very small, but now we have *Tulipa chrysantha* selected, a slightly bigger form which makes a bigger bulb—an important item in the trade. *Tulipa eichleri excelsa* is a bigger form of *T. eichleri. Tulipa praestans* "Fusilier" is a selection from *T. praestans* "Tubergen's Variety." I have some excellent colour forms of *Orchis foliosa* (*maderensis,* as it ought to be called now) and I have hopes that these will propagate in the same way as the mother stock. So you also see that it is not only bulbs that I am interested in! Another item, however, *Leucocoryne ixioides* (L. *ixioides odorata*) the beautiful plant re-introduced by Mr. Clarence Elliott from Chile has not been very amenable so far. I fear it cannot be grown outdoors in most gardens in Scotland, and we grow it under glass and propagate it every year from seeds, but although I have been on the lookout for many years I never yet have detected a plant with offsets. Although we still have our connections in some countries for collected wild bulbs, Portugal for dwarf Narcissi, Italy for some Cyclamen and *Crocus imperati,* "plant protection" makes it more difficult to obtain bulbs—last year I could not obtain any *Iris tuberosa,* as collecting was forbidden. It is a wise measure, and one cannot give any arguments against it, but to us it gives trouble.

So my main theme is to show how important it is to select clones that propagate vegetatively—not only so that one has an even stock, but also one no longer depends on collected bulbs. The

danger, of course, is that a stock that has been propagated in this way for a long time may get infected with virus disease and deteriorate, but nowadays we are much more virus-minded than formerly and any suspicious looking individual is removed and destroyed without any mercy.

You have so many rare plants in Scotland which we cannot grow in Holland like Nomocharis and Meconopsis, that I hope you will not object if I mention a few of my rarities.

Under glass Tecophilaea does very well with us. A careful operation is needed to pollinate the flowers artificially, but then the seeds are readily produced. Of course, the famous plant is *T. cyanocrocus,* the Chilean Crocus, with flowers almost as deep blue as those of *Gentiana verna,* but I prefer the variety *leichtlinii.* This has bigger soft blue flowers with a large white centre. It has been named by Regel, of the Botanic Gardens in St. Petersburg, after the famous Max Leichtlin of Baden-Baden in Germany, who introduced many bulbous plants round 1900. One of the treasures in my library is a small, not very impressive-looking book, which is made of a complete set of the catalogues of Max Leichtlin. It is a mine of information about dates of introduction and in my rare moments of leisure I have made an index to it. It is always at the disposal of any one who wants information. I read somewhere that Farrer had introduced *Incarvillea delavayi,* but it was already in the catalogue of Leichtlin of 1893.

But returning to our Tecophilaea another form is *T. cyanocrocus violacea,* with violet blue flowers, but this is not so attractive in my opinion. Tecophilaea is lifted every year in July, the corms are stored in a dry heated warehouse and replanted in October.

All going well, I have hopes that I will have for disposal this year more than 10,000 corms of *Iris histrioides major.* It grows happily in our bulb garden at Hillegom, where the soil is pure sand, a coarse grain with remains of shells, and water underneath. To a great depth this soil is of the same structure and by turning the soil and bringing the old soil down into the water and bringing fresh soil sterilized by the water to the top we succeed in growing year after year various crops of bulbs on our bulb fields. You must not ask me what chemicals and tricks are used to keep it healthy, but a good stock first of all is a safeguard against losses, and moreover I can offer it at a more reasonable price than some years ago, which makes the distribution easier. *I. danfordiae* also does well at Hillegom, but nowadays slightly bigger bulbs are produced in West Frisia, so I probably will give up its culture myself.

When I was young the corms of *Iris reticulata* used to be a scarce and expensive item and not a profitable one either, as there always

were losses owing to the black spots on the bulbs. One grower in Noord Holland, however, has more than three or four acres of it. When one sees the field in May it looks like a field with wheat, the long leaves moving in the wind. Being available in such a quantity the quality of the bulbs is good and the price is reasonable. It is curious that this man cannot grow *Iris reticulata* "Cantab," while "Cantab" does well with me, while in my garden at Hillegom I cannot grow the ordinary *Iris reticulata.*

Besides some nice hybrids with *Iris bakeriana,* we have made crosses with *I. histrioides major.* These are *Iris reticulata* "Joyce" and "Harmony" which have the great advantage that the leaves are short when grown in pots or outdoors, and do not overtop the flowers as is the case with *I. reticulata* and *I. reticulata* "Cantab."

Iris winogradowii, the pale yellow *Iris reticulata,* does fairly well, but I am not yet satisfied with it. Of course Sir Frederick Stern's stock is well known and there is one place on the continent where it is also grown, but I fear I cannot tell you the locality. I fear it will not be such a popular plant for years to come as *I. danfordiae* is now, but nobody can tell whether some clone may not be produced that propagates well.

I have connections with many countries; from Rumania I again received the beautiful autumn-flowering *Crocus iridiflorus,* and still have hopes to re-introduce the rare forms of *Corydalis solida transsylvanica.* I remember I once had them in white, salmon pink and claret red. Also *Leucojum vernum carpaticum* with two flowers on a stalk is a *desideratum.* I try to read as much botanical literature as possible, and so I got information from the *Botanical Magazine* on *Chionodoxa lochiae* from Cyprus, and *Crocus goulimyi* from Greece, and these are growing now in Haarlem.

Fritillaria persica I obtained again from Anatolia. As long ago as the beginning of the seventeenth century, it was grown in Holland under the name of *Lilium persicum,* and a beautiful illustration can be found in the *Hortus Floridus* of Chrispijn de Passe (Passius). This book was published in Holland in 1614. Not only are the copper engravings the best that have ever been made of bulbous plants, but many plants are illustrated that have been lost to cultivation, like Crocuses with double flowers, and *Leucojum vernum* with double flowers. As *Fritillaria persica* was no longer grown in Holland, I was very glad to be able to re-introduce it. *Iris persica,* Plate number one of the *Botanical Magazine,* also must have been a clone. Before World War I, it used to be available in Holland, but at that time it probably was neglected and now it has quite gone. Sometimes I have received forms of *Iris persica* from Anatolia, but these have always died out. Perhaps some time a good clone may turn up. Mr. Hoog concluded with some fine colour slides.

PART II—By E. B. ANDERSON, V.M.H.

I propose to start with a few suggestions about cultivation, and then to pass on to matters which arise from Mr. Hoog's paper, which I regard as of great importance to lovers of bulbous plants.

The conditions under which the majority of wild bulbs live is so different from that of most rock plants, that I prefer to plant them in beds mainly devoted to them. For sun lovers I recommend raising the beds above ground level, the height depending on the rainfall of the area, say from six inches in the drier parts to two or more feet in the wet, but also to be taken into consideration should be the type of soil of the garden, whether a naturally well-drained sand or loam, or a water-logged clay, or heavy loam. This, without excavation, provides the necessary sharp drainage essential to proper root action, and also facilitates the drying out and therefore the warming up of the soil in summer, which is so necessary for satisfactory maturation of most bulbs. A wet, badly drained soil never warms up. Shade lovers such as Cyclamen, Erythronium, Galanthus, etc., do not need such drastic conditions, but even they require a resting period for satisfactory growth, some more than others. For these subjects the bed should be raised a few inches above ground level unless the natural soil is very well drained or on a slope. The alternative for both classes is to plant among shrubs and small trees, in which event their roots, active in the summer, perform the same function of removing excess water at that season. Feeding under these conditions is essential, but I believe that all bulbs should be fed with a slow-acting manure such as bone meal or hoof and horn with the addition of potash in wet areas. Shade lovers seem to respond without harm to small doses of dried blood or fish meal.

I am not so pedantic as to object to the addition of a small shrub or two, or xerophytic plants to raised beds in sun, or modest growing shade lovers to those in the shade, nor do I intend to discuss the easily grown bulbs which flourish in the Alpine Meadow (opposite).

I am, of course, speaking to those who hope to see the same bulbs appear year after year preferably with some increase, not to those who are prepared to replace losses repeatedly. Some losses there will be, but these should be the exception rather than the rule. Garden hybrids may be more tolerant of adverse conditions, but not necessarily so. I have in my time lost not only the species, but also hybrids of dwarf Narcissi from excessive rain. It is often said that the dwarf Narcissus spp. are short lived and require frequent renewal from seed. I do not think this is true provided the conditions as outlined above are adhered to.

Some bulbs such as most of the Calochorti, *Brodiaea ida-maia,*

The Alpine Meadow, Windsor Great Park. *Photo: J. E. Downward*

Weldenia candida.
(See opposite)

Photo: Roy Elliott

Colchicum variegatum, Crocus sieberi heterochromus, and some of the tulips, require still drier and warmer conditions in the summer. For these I advocate a frame light covering the bed, or a sheet of glass laid flat over the area occupied by the bulbs in question. I am told that in this area Tulip species die out in a few years. May this not be due to the soil temperature never rising high enough for maturation? The National Collection of tulips at the Cambridge Botanic Garden is stored at 63° F. I wonder to what degree the soil temperature rises in this area, and what the effect of bare raised beds would be, i.e. no other vegetation. Bulbs can be grown in pots but on the whole they do not like the experience. It is better to grow them in beds in frames or greenhouses, or even in a bed on a greenhouse bench. If pots are inevitable it is better to repot each year and during growth to feed with a liquid fertiliser about once a fortnight; John Innes No. 1 is suitable for most subjects. My friend Mr. Hoog has dealt in a most interesting way with bulbs from the commercial angle, and I propose to devote the remainder of my lecture to bulbs from the amateur's side. I strongly support his search for satisfactory clones, for we also desire reasonable increase: e.g., I hope his clone of *Iris winogradowii* is such so that in time this lovely bulb will be available to modest pockets; my own is very slow to make offsets. On the other hand we need clones of *I. danfordiae,* and some of the fritillaries, which do not split up so much to produce non-flowering offsets.

General vigour and hardiness is also important; with which is associated ability to flower and withstand the vagaries of our climate. I need only mention *Colchicum triphyllum* or *variegatum, Iris persica* or *I. rosenbachiana,* or *Sternbergia fischeriana,* which occasionally come, and invariably go—or refuse to flower.

Good colour and form is also desired, e.g., the forms of *Scilla bifolia rosea* in the trade are very poor in colour, and the flowers do not compare with those of *S. bifolia praecox.* Also, in my opinion the white form of *S. sibirica* is a poor thing. We still need a clone of *Erythronium grandiflorum* with its large yellow flowers, larger than *E. tuolumnense,* and its red anthers, which with *E. montanum,* the glacier lily, can be cultivated in this country. Not less desirable would be a hardier *Cyclamen libanoticum* or *Weldenia candida,* (illus. opposite), or even of some of the dwarf Hippeastrums, e.g. *H. advenum.*

We must not, however, leave this search entirely to our friends in Holland; no one knows from what quarter success may come. I am always trying to stimulate amateurs to raise fresh bulbs from seed: not only the rare ones which may be unavailable from any other source. One never knows what may turn up, in the way of variation in form, colour or vigour, or even spontaneous hybrids.

Mr. Sealy has recently called attention to the way in which plants vary to an extent not fully appreciated. If one does obtain a rare bulb, one should always attempt to get seed by selfing and so build up a stock, even if it means losing the original bulb.

I have mentioned hybrids, and not being a purist I do not disdain them if they are beautiful and have a good constitution. Unfortunately some genera appear loth to cross, even if the chromosome numbers agree: e.g. *Cyclamen libanoticum* and *C. ibericum* with *orbiculatum.*

There are, as far as I am aware, no crosses recorded for fritillaries. Think how useful colour forms of something like *F. pallidiflora* would be if this difficulty could be overcome. Although not hardy everywhere, the charming dwarf *Alstroemeria hookeri* should be useful as the progenitor of a dwarf race; perhaps *A. pygmaea* may help to this end.

Of Brodiaeas, we have one good hybrid in *B. x tubergeniana, B. peduncularis* x *laxa;* possibly crosses between the yellows would give better plants. Of Calochorti we want clones of hardier plants, or crosses of those likely to be suitable for our climate: e.g., those from Oregon and Washington as opposed to those from California. Does anyone know whether crosses between the groups are possible where the chromosomes are the same, e.g. *C. pulchellus* a globe, and *C. apiculatus* a cat's ear?

We know that Chionodoxa and Scilla will cross, and the results are very vigorous and good garden plants; so far we have only blues, and would like pinks and whites. There is also scope for breeding more plants like the exquisite *Chionodoxa* "Naburn Blue."

There are plenty of hybrids of the larger Colchicums, but we need either hybrids or good clones of the smaller ones, so much more charming for the rock garden; *C. corsicum, cupani latifolium, troodi, triphyllum* and *variegatum* come to mind.

We are well supplied with Crocus, in fact in some groups such as *C. chrysanthus* too many, but development in the pinks would be worth while; as you know approaches have appeared in *C. tomasinianus* and *C. etruscus.*

In Erythronium there are two lovely and vigorous natural hybrids "White Beauty," possibly *E. oregonum* x *citrinum* or *californicum,* and "Pink Beauty," one or other of these crossed with *E. revolutum.* Recently two outstanding hybrids have appeared, raised, I believe, in Holland between "White Beauty" and *E. tuolumnense,* "Pagoda," canary yellow, larger than *E. tuolumnense* and very vigorous (a leaf measured recently was 7 x 3 in.), and "Kondo" of similar colour, with a deep reddish-brown eye.

It would appear that we have plenty of Galanthus, but there are

still possibilities as shown by the spontaneous " John Gray " which galanthophils regard as the best early flowering form there is. This appeared as a chance seedling in a garden at Saxmundham, Suffolk.

In Iris we have been well served by our Dutch friends, the crosses between *I. histrioides* and *I. reticulata,* " Harmony " and " Joyce," are outstanding in colour and vigour. For those who cannot grow the species, the *bakeriana* cross " Clarette " is an excellent substitute. In the " Junos " we need the *I. persica* crosses repeating say with *I. graeberiana* and the yellow *I. persica issica* with *I orchioides* and *I. bucharica.*

There is another road for colour and other changes—that is, to take advantage of the variations, often at first very slight, which seedlings exhibit, selfing those which seem to possess desirable characteristics. To take an instance : one of Dr. Peter Davis's collections of *Cyclamen pseud-ibericum* shows a gradation of colour from the usual carmine to pale pink, and therefore a white is not out of the question. There is one corm, perhaps more, of a white *C. europaeum,* but it never sets seed; raising many seedlings might once more produce such a desirable plant, perhaps fertile like *C. orbiculatum album.* Tecophilaea varies, as you know, between the gentian-blue type, the white eyed *T. c. leichtlinii* and the redder *violacea.* Seedling selection might produce a white with a picotee edge of blue. We have a fairly good pink *Trillium grandiflorum* but selection, although admittedly here a very slow process, might produce a better.

Look what the late Mrs. Garnett-Botfield accomplished for Rhodohypoxis, mainly by seedling selection in twenty years. *Ranunculus calandrinioides* would be much improved by the possession of more substance in the petals, as well as in a pink form. *Fritillaria pallidiflora* is an excellent plant but it does vary and a race with pure canary yellow flowers would be very nice. Beautiful as are Erythroniums, there is scope for development in the eye, which is very variable, and the back colour of the tepals, which is also very variable, e.g. *E. oregonum.*

You may say, why do all this, when we have plenty of satisfactory bulbs as it is. My reply is, there is no greater satisfaction in life than in exercising one's faculties in the creation of beauty. The world has advanced, where it has done so, as a result of restless, enquiring unsatisfied minds; so has gardening. The completely satisfied man might as well be dead; he is, to all intents and purposes. I have tried to indicate to the adventurous that there is no need to weep because there are no more worlds to conquer, as did Alexander at the gates of India, but rather to say with Cecil Rhodes, " So much to do, so little time."

SHOWS, SHOWING AND JUDGING

A SYMPOSIUM

(Chairman : Mr. H. Epstein)

The four speakers in this symposium decided at more or less the last minute to abandon the idea of four separate talks, in favour of dealing with the subject in a round-table discussion. According to the later remarks of many of the audience, this proved a very acceptable decision. Mr. Harold Epstein introduced the speakers by stating that it was not to be a "free for all" but a private fight limited to those round the table—at least to begin with—and after a few remarks on the problems concerned with the subject in America, called on Dr. Henry Tod.

Dr. Tod spoke from the point of view of the exhibitor, starting with the presentation of exhibits for competition. He laid stress on the importance of tidiness of the plant and its container, appropriate surface dressing (preferably of a neutral nature), proportion or balance of plant to container, pot or pan, and—in multiple plant classes—their arrangement on the show bench.

This led on naturally to the duties of the Show Secretary and his committee, and here Dr. Tod was emphatic that only the Show Secretary or persons authorised by him should be allowed to move or rearrange exhibits; no exhibitor should be allowed to move other competitors' entries at any time. The layout of classes on the show benches should be clearly marked, the space allocated to each class being obvious at a glance, and everything possible done to make things unambiguous for competitors. During judging the Show Secretary, or someone deputed by him, should be quite free of other duties to answer any questions regarding doubtful entries put to him by the judges, who should never take it upon themselves to try to rectify staging errors.

At the same time it was most important that both he and his stewards keep well clear of the judges, preferably out of earshot, and only be available when called for. Dr. Tod's further remarks were all of a very helpful nature, and met with very strong endorsement from other members of the team, except that Mr. E. B. Anderson questioned the emphasis on dressing and cleanliness of the pot—saying that he was only concerned with the plant itself. Mr. W. Ingwersen assured Mr. Anderson that all would agree that the plant was the primary consideration and that other matters came second. But surely a good plant merited some respect in careful presentation.

Mr. Mowat took up the judging angle, and here again all those round the table being active judges there was considerably more

agreement than disagreement. He stressed the need for judges approaching their work thoroughly prepared by a careful study of the rules applying to the show concerned. With the greatest of care in drafting, an ambiguity sometimes crept into schedules, and where a judge felt any doubt, he should enquire of the Show Secretary just what was intended. An essential in all judging was that one should sink all one's own likes and dislikes, and approach the job quite impartially. Another thing to guard against was first impressions, which on closer inspection, often proved to be misleading. In the actual judging, the limitations of each class should first be checked, because even with the most careful staging odd plants sometimes found their way into wrong classes, so leading to good plants being marked " not according to schedule " instead of gaining a prize ticket. As Dr. Tod said earlier, cases like this should be referred to the Show Secretary or his deputy for correction —a judge should never interfere with any exhibit. A reference by Mr. Mowat to the importance of " true character " in a plant led to some disagreement and discussion amongst his colleagues, who queried what exactly was " true character " and stressed that character could vary according to locality and conditions, but all seemed agreed that there were times when plants were obviously " out of character."

Mr. W. Ingwersen from his vast store of knowledge of plants, and the showing and judging of them, gave some very helpful advice and ideas, and went over a number of points already made, further elaborating on a number of them and laying emphasis on the points which he thought were of most importance. Mr. Anderson took up the matter of pointage laid down for the guidance of judges, and said that he did not quite agree with this. He felt that judges should be able to make their decisions without having to point everything.

In fact, the agreement round the table was such that the audience, who had behaved wonderfully, was obviously getting restive and itching to " have a go." After listening for an hour, they at length broke in, and a spate of questions, disagreement, and good natured criticisms followed. We were told that we had had it all our own way for long enough, and now it was the turn of the ordinary competitor to have his say. The fun was fast and furious, with questions and suggestions coming from all directions, very often with several people on their feet at once trying to catch Mr. Epstein's eye. He very successfully kept everything well in hand, and, when at a late hour he finally applied a closure and told the audience it was time they all went home to bed, he was accorded a round of well-merited applause.

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SCOTTISH ROCK GARDEN CLUB

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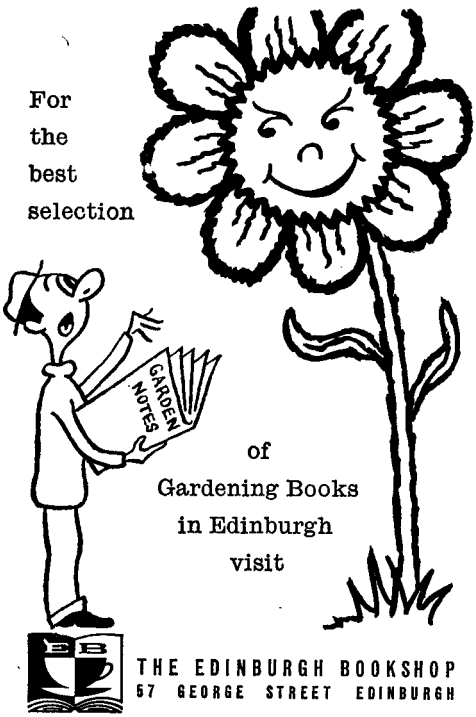

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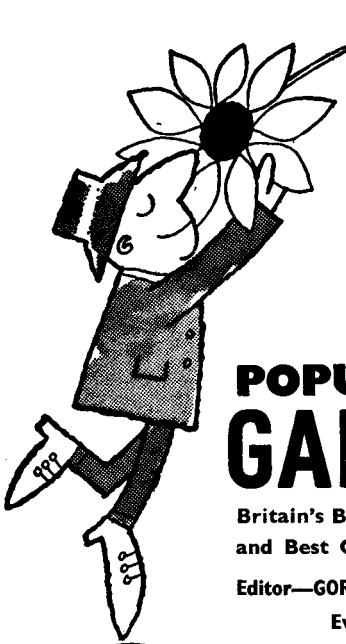

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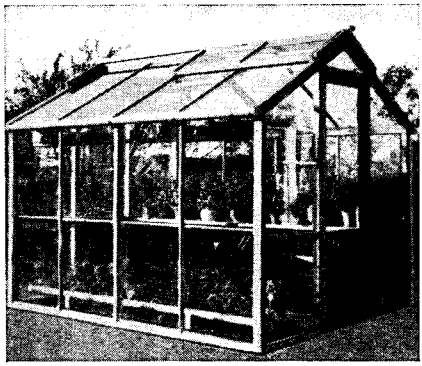

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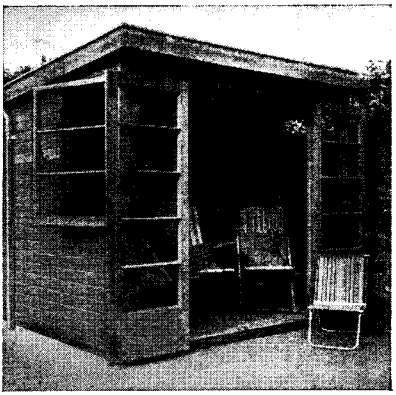

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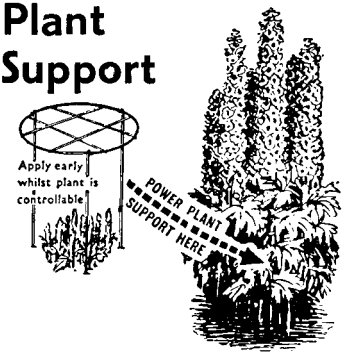

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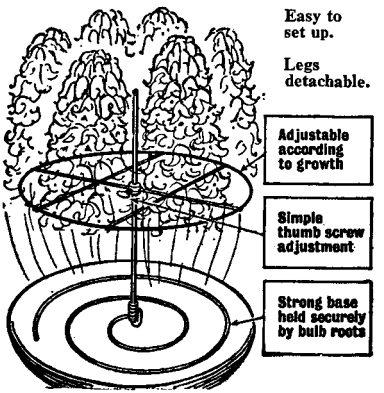

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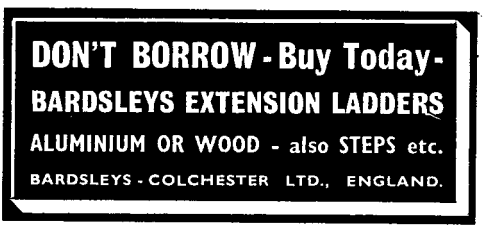

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