THE ROCK GARDEN 131

July 2013

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Members' subscriptions are payable annually by October and provide membership of the SRGC until the 30th September the following year.

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The Rock Garden

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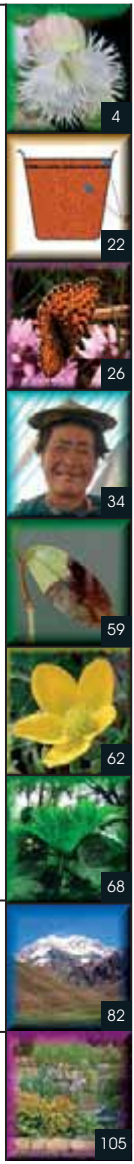

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The Editor welcomes articles, photographs and illustrations on any aspects of alpine and rock garden plants and their cultivation. Authors are encouraged to submit material electronically but articles may also be submitted in manuscript. Digital images are particularly welcome but 35 mm slides, high quality prints or drawings may also be submitted.

The normal deadlines for contributions are 1 November for the January issue and 1 April for the July issue. These dates also apply for material for the Yearbook & Show Schedules.
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Random Germinations and the 67th SRGC Seed Exchange

Ian & Carole Bainbridge and Stuart Pawley

How Long?

The number of small labelled pots scattered round the Bainbridge garden ever grows, even if their seeds don't. We are often asked '*How long do you keep your pots?*' Received wisdom is that some seed is viable only for a short time. Willow seed is reputed to remain viable a few weeks, Asteraceae are said to be short-lived, as are many Ranunculaceae. Seed of lilies, trilliums, cardiocrinums and arisaemas continues to germinate for a number of years and, because we don't prick these out, we often see their sequential germination. Primulas often germinate over two years or more, as our failure to prick out all seedlings also shows.

We generally keep seed about five years before recycling the compost, so we expect to see odd items germinating in the top dressing on our alpine beds. However, a surprising *Ranunculus lyallii* seedling emerged this spring from a neglected 2008 pot, so some Ranunculaceae have it in them to survive for several years.

At the 2011 International Conference, Michael Kammerlander told how he tracked Juno Iris seed for twelve years before it germinated. We wondered just how long might be needed, when we remembered a recent article (*Nature*, 23 February 2012). It told of Russian scientists who germinated seed of the arctic *Silene stenophylla* buried 30,000 years ago by Siberian ground squirrels hoarding food for the winter, and then preserved in permafrost. Admittedly they used micro-propagation techniques but the resulting plants flowered normally with fertile seeds that produced a second fertile generation. They compared the 'ancient' and 'modern' *S. stenophylla* that still grows by the Kolyma River. The ancient form produced more buds but was slower to put out roots, suggesting that the original has a distinct phenotype, adapted to the extreme environment of the Ice Ages.

So, maybe the answer is to keep your seed pots as long as you have space and the *Marchantia* (leafy liverwort) hasn't covered them completely, and label them very permanently so the rock gardeners who find the pots in 30,000 years know what you sowed!

John Aipassa's garden with *Acer griseum*

Fertile Blue Group Meconopsis

Meconopsis 'Keillour' has been at Keillour Castle near Perth for decades, grown by the Knox Finlays who received material from George Sherriff. The plant was recognised by the Meconopsis Group as quite distinct, categorised as in the Infertile Blue Group. Very few pods have viable seed, thought to owe to doubling of the otherwise unmatched chromosomes (allopolyploidy). Stuart has tried to grow from these seeds, nearly succeeding with a strong plant battered by wind at flowering time, the plant being lost because the flowering stems of perennial blue poppies are individually monocarpic. Years later, a plant appeared out of the (not quite) blue and can only have derived from *M.* 'Keillour'; we suggest it should be named *M.* 'Keillour Violet'. It is in the Fertile Blue Group, gives copious viable seed, and was offered in the Exchange 2011/12 as SRGC 65 2648. Growing not quite as tall as *M.* 'Lingholm', it flowers a week earlier and for longer in the autumn. The soft violet flower is up to 15 cm across and is considerably bigger than its parent, whose flower differs from other IBG flowers in its purple sheen. The new plant is strong, sturdy and bulks up well; seeds will be on offer in the Exchange this coming season. Plants already growing from seed have not yet flowered, so we wait with hope that the seedlings come true enough to please.

Acer griseum Germination

For the last few years Stuart has investigated all donations of *Acer griseum* coming into the Exchange and most commonly found the 'nuts' empty and non-viable. When there were some with viable embryos, they were put in the seed list. The best crop came last year from John Aipassa's Netherlands garden. Stuart found out that John had eleven trees, and extra seeds were sent. Stuart extracted fifty embryos, removed their protective covering and tried to germinate them following Norm Deno's instructions. He sowed the others in a seed tray; none has yet germinated and patience seems the order of the day. John tells us he has seedlings growing like weeds. He'll send us a good crop this year and, as the embryo rate is at least 50% for all the trees, this should be a good opportunity for all those interested.

The 67th SRGC Seed Exchange 2013-14

The Seed Exchange will operate in its usual way. Full details are in the Secretary's Pages but here are a few key points and requests:

Henceforth, we will charge for all seed requests, UK and overseas. The soaring cost of international postage means this is the only way to keep the Seed Exchange viable and to keep the overseas membership rates at a sensible level. Overseas members no longer receive seed as part of their subscription. Everyone will be asked to pay £5 or equivalent for their main seed request.

Please send your seed donations **before 31st of October** to the Seed Reception Manager: Prof. Stuart Pawley (gsp.srgc@btinternet.com), Acres of Keillour, Methven, Perth, PH1 3RA, Scotland.

The seed list is prepared on 1st November, so if your donation might be late, please post a separate list early or send an e-mail with the list in the text (no attachments please, to reduce the risk of viruses). Seed should be cleaned, dry and in paper envelopes, with the seed's name and yours clearly on the packet.

Seed lists will be available around 10th November. UK non-donors should send a stamped addressed C5 envelope to Stuart Pawley before 14th December if they wish to receive a seed list. All donors and overseas members will receive the list as of right. The seed list will also go on line at the same time; you may browse and order online as well as by post, by January 15th. **The password for 2013/14 is: 80yrsyng.** You should also enter your membership number (on the envelope that *The Rock Garden* arrived in).

Seed packeting is organised by Ian Pryde between early November and December. He would welcome a few more volunteer packeters, so if you're willing to packet seed, Ian will post you a modest box of seed, with all necessary instructions, to anywhere in the UK. Please contact Ian on 01875 615185 or at ipryde@btinternet.com

Seed distribution will begin in early January and all main requests will be completed before surplus requests are sorted in the second half of the month. Everyone will receive their main and surplus requests separately, usually about two weeks apart.

Seed requests should be sent to the Seed Request Manager: Dr Alan Hayes, (alan.hayes31@blueyonder.co.uk) 31 Liberton Brae, Edinburgh, EH16 6AG, Scotland. Send your requests before 15th January.

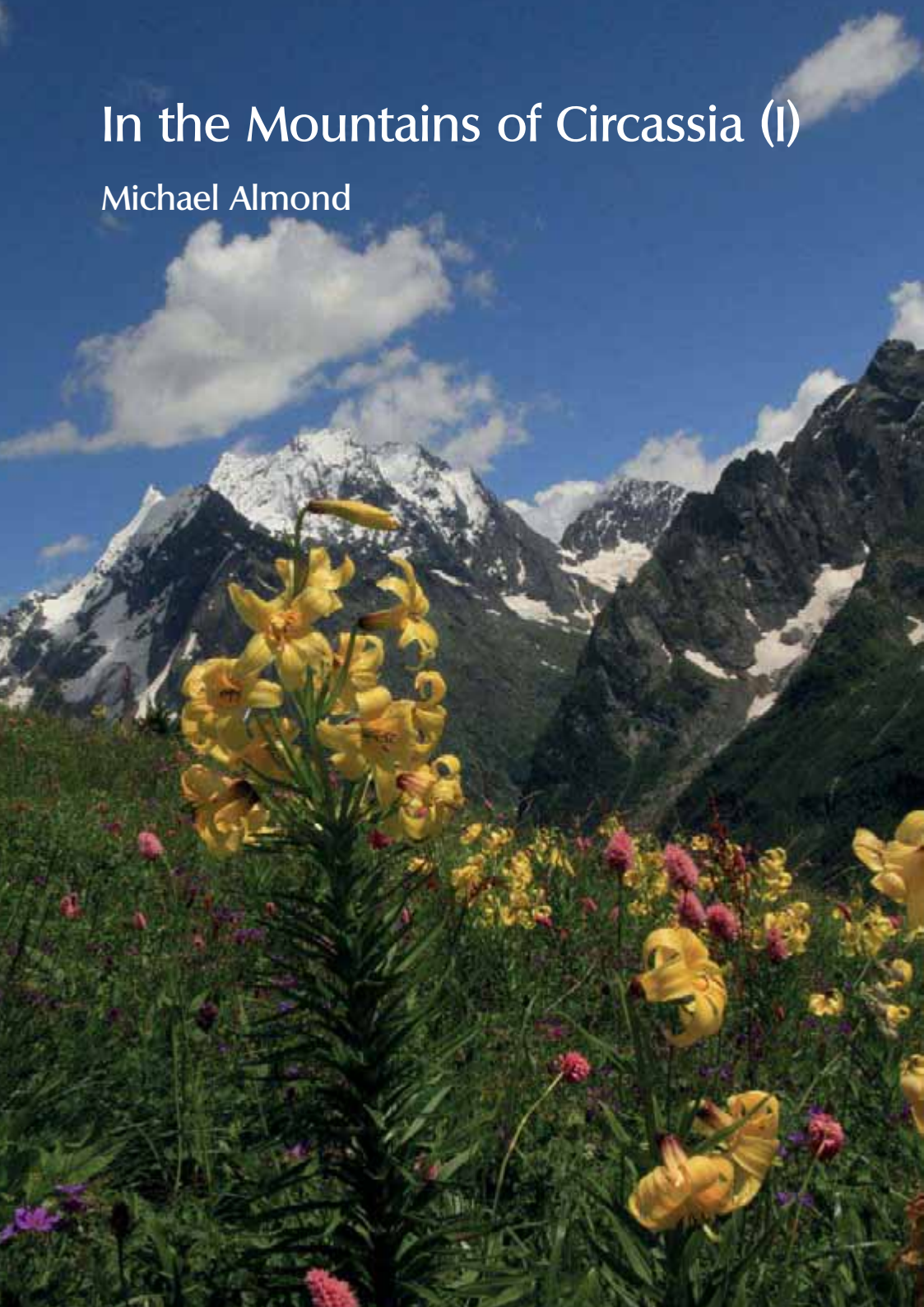
Finally, to our American members, please remember to send us your APHIS 'small lots of seed' permits, and labels, and **check that your permits are still valid**. Send your permits with your seed donations rather than waiting for the order form to arrive. For US, Australian and New Zealand members, we still need you to **send a numbered list of requested seeds** unless you order online, when the computer will do that job for you and us. We ask other overseas members to check with their authorities whether any import requirements exist; we do wish to comply with any laws relating to seed imports.

Full details of ordering information will be issued in the seed list so please donate some lovely seed, order some gems, and share the benefits of the SRGC Seed Exchange!

Margin: *Meconopsis* 'Keillour violet'

In the Mountains of Circassia (I)

Michael Almond



In 1991 Lynn and I were inspired to visit the north Caucasus, partly by the articles written by Gilbert Barrett in the Quarterly Bulletin of the Alpine Garden Society (AGS). Our trip included the Baksan valley below the eastern flanks of Elbrus (described by Gilbert in *The Impossible Mountains*) and we returned to the same area the next year (see my articles *The Caucasus: part I*: *Across the Caucasus* and *part II*: *Along the Caucasus*). After visiting Georgia on several occasions in the meantime (nine in all on my part, see my articles *Travels in the Caucasus*, *In the High Valleys of Georgia*; *Below the Caucasus* and *A Walk on the Wild Side*) we jumped at the opportunity in 2012 to travel to another area visited by the Barretts. In July that year we joined a trip organised by *Greentours* for the AGS to what was described as 'the Russian Caucasus'. We visited the Dombai area in the north, west of Elbrus (described by Barrett in *Again the Caucasus* and *Dombai Revisited*) together with the Lagonaki plateau, in the far western Caucasus (never visited by the Barretts) and Krasnaya Polyana (a brief autumn visit to which was described by Barrett in *Helicopter to the Mountains*), which is just inland from Sochi, near the border with Abkhazia. All of these places, although nowadays within the Russian Federation, fall within the area which can be described as Circassia and which was largely inhabited by Circassians before the Russians began their campaigns of 'ethnic cleansing' in the nineteenth century.

Opposite: *Lilium monadelphum* and Mount Dombai-Ulgen
Right: *Pedicularis atropurpurea*

Daphne glomerata (pink form); *Gentiana pyrenaica*; *Paris incompleta*

Krasnaya Polyana

Our first destination was Krasnaya Polyana which, unfortunately, has little to recommend it at present. It is due to host the Winter Olympics in 2014 and was effectively a building site. A rail link is being built from Sochi along the Mzymta valley in which it sits and the bottom of the valley has been comprehensively trashed by the construction works. The two cable cars that we should have been able to use no longer gave access to the mountain ridges above the valley. We spent one of our two days there exploring woodland areas near sea level, close to Sochi – hardly alpine areas and long past the flowering season. On the other day we travelled by four-wheel vehicle up a 'road' to the Smelovskie lakes at about 1900 metres above sea level on the flanks of Mount Achishkho, above and north-west of Krasnaya Polyana. Although we did not get into the alpine zone, there was still a number of interesting flowers to be seen in the clearings and on the woodland margins.

At the edge of the woodland surrounding the Small Lake, *Rhododendron ponticum* had long finished flowering but *Pedicularis atropurpurea* was majestic in full flower, with four foot high spikes of dark purple flowers and silvery-grey 'wool'. There were also some specimens of *Euphorbia oblongifolia*, with clusters of small, nodding and brick-red flowers. In grassy areas beside the lake, which were being grazed by very Swiss-looking cattle, lurked *Daphne glomerata* and also some small examples of what was probably *Dactylorhiza caucasica* together with a few *Gentiana pyrenaica* (called *G. djimilensis* by the Russians).

The grassy area round the Big Lake was more floriferous and was not being grazed, although the presence of a considerable quantity of *Veratrum album* suggested that it

A doline with *Alchemilla tredecimloba* and *Kemulariella caucasica* (inset)

often was. We were pleased to find an *Erythronium caucasicum* in flower, even though it was the only one we saw in the whole trip. The turf also contained orchids: more *Dactylorhiza caucasica* and the white *Traunsteinera sphaerica, Astrantia maxima, Kemulariella caucasica, Pulsatilla albana* (in seed) and clumps of *Polygala caucasica* and *Gentiana asclepiadea* (not yet out) were growing in the longer grass, and a fine group of *Inula orientalis* stood by the fence of the chalet. In places, the banks of the lake were yellow with *Euphorbia villosa*. At the edge of the woodland some of the *Rhododendron luteum* was still in flower.

The dark floor of the woodland itself was carpeted with ferns in places (possibly *Matteuccia struthiopteris*) and in others with *Paris incompleta.* Where more daylight penetrated we found some large clumps of *Trollius patulus* and an attractive yellow buttercup, probably *Ranunculus oreophilus.* At the edge of a larger clearing there was a fine group of *Lilium kesselringianum*, taller and with larger flowers than the *Lilium monadelphum* we were to see later, and preferring woodland margins to open hillsides. In this same clearing there was quite a lot of the bright-orange *Lathyrus aureus.*

Lilium kesselringianum

Campanula sarmatica

Centaurea nigrofimbria, Betonica grandiflora and Polygonum carneum above Dombai

Lagonaki

The Lagonaki plateau lies north-north-west of Krasnaya Polyana on the other side of the watershed, to the north-east of the last mountains of any great altitude and before the Caucasus chain loses its identity by falling away west to the Straits of Kerch, east of the Crimea. It consists mainly of undulating limestone tableland at an altitude of roughly 1800-2000 metres above sea level. We were lucky enough to be able to stay at an hotel right on the edge of the plateau and thus could devote two full days to exploration. The roadsides and woodland margins near the hotel had large stands of the giant hogweed, *Heracleum mantegazzianum*, together with *Leonurus quinquelobatus*, *Campanula sarmatica*, bright orange-yellow *Inula magnifica*, creamy-yellow *Salvia glutinosa* and butterscotch-yellow *Orobanche flava*. The margins of the clearing in which the hotel stood were awash with brilliant yellow *Lilium monadelphum*, steel-blue *Delphinium speciosum* and purple-blue *Polemonium caucasicum*. On the woodland margins at the north-eastern edge of the plateau there was an abundance of bright yellow *Lilium monadelphum*, dark purple-blue *Campanula latifolia* and (with flowers similar in colour but entirely different in shape) *Asyneuma campanuloides*, together with *Aconitum orientale*, *Erysimum ibericum* and *Delphinium speciosum*. In the lush meadows beside the woods there was pink *Betonica grandiflora*, yellow *Alchemilla tredecimloba*, orange *Inula orientalis*, pink *Linum hypericifolium*, pinky-white *Heracleum asperum*, creamy-white *H. colchicum*, mauve *Campanula sarmatica*, dark purple *Gentianella umbellata*, white *Silene wallichiana*, white *Valeriana saxicola* and geraniums of various hues of purple and mauve. In fact, everywhere we

Border: *Inula, Dianthus, Campanula latifolia* and others
Border Opposite: *Gymnadenia conopsea*
Opposite: *Linum hypericifolium*; *Asyneuma campanuloides*







Top left clockwise: *Arnebia pulchra*; *Aquilegia olympica*; *Primula algida*; *Primula elatior* ssp. *ruprechtii*

went in the mountains on this trip the meadows were a riot of colour. On rocks there were some attractive clumps of *Sedum hispanicum* and, *here and there in the turf, orchids of various descriptions: Dactylorhiza caucasica*, *Gymnadenia conopsea* (occasionally white), *Traunsteinera sphaerica* and *Coeloglossum viride*.

The limestone plateau is dotted with *dolines* (Russian *dolina*, a valley), or sink-holes of various shapes and sizes, affording a variety of habitats for a wide range of plants not found in the meadows. The fact that snow accumulates in these sink-holes and takes a long time to melt also means that many plants which one might expect to be over by July were still in flower when we were there. The steep turf above the cliffs of the first dolines we encountered were covered in flowers such as *Anemone fasciculata*, *Arnebia pulchra*, *Trollius patulus* and *Polemonium caucasicum*, while *Aquilegia olympica* and *Iris sibirica* could be found among the boulders. On the rocks were clumps of *Saxifraga sibirica* and *Trifolium polyphyllum*. In the shorter turf beside the cliffs were to be found primulas: the small pink *P. algida*, the large yellow or cream P. *elatior* ssp. *ruprechtii*, the large red, pink or (sometimes) white *P. elatior* ssp. *meyeri* and hybrids between the two subspecies of *P. elatior* in various intermediate shades. Also in this turf we found pink, red and purple *Corydalis conorhiza*, the striking *Fritillaria collina* with its large, yellow bells, a small amount of *Daphne glomerata*, *Anthemis caucasica*, bright pink *Kemulariella caucasica*, *Muscari szovitsianum*, *Erigeron*

Border: *Anemone fasciculata*




Top left clockwise: *Primula elatior* ssp. *meyeri* x ssp. *ruprechtii*; *Primula elatior* ssp. *ruprechtii* (paler form); *Gentiana oschtenica*; *Anthemis caucasica*

caucasicus, a yellow *Potentilla* species, *Thalictrum foetidum*, the yellow *Pedicularis condensata*, the brick-red *Orobanche elatior*, an attractive white dandelion (presumably *Taraxacum* sp.) for which we have not been able to find a name and – something really to set the pulse racing

A rare sighting of *Campanula dzaaku*

Fritillaria collina

Rhynchocorys stricta

Pedicularis condensata

– one or two small clumps of *Gentiana oschtenica*, the yellow flowers unfortunately tightly closed up under the low cloud and rain.

The next day we strode on at the double past these riches in order to get further afield. Here there were fewer dolines but the open plateau was bisected by shallow valleys with low cliffs, rising up to a higher ridge in the distance. The weather was better and we were amply rewarded for our efforts. The meadows, grazed in places by the herds of horses which are kept here, were a mass of *Betonica grandiflora*, *Centaurea nigrofimbria*, *Polygonum carneum*, *Valeriana saxicola* and *Geranium* species. In places there were drifts of *Alchemilla tredecimloba*, *Kemulariella caucasica* and

Centaurea nigrofimbria

Pedicularis wilhelmsiana

Viola oreades

Dactylorhiza caucasica. Above the low cliffs were *Anemone fasciculata* and *Arnebia pulchra*; below them a mass of *Daphne glomerata*, some with flowers of a much deeper pink than usual, *Rhynchocorys stricta* (the bright yellow flower of which is shaped like an elephant's head, with big ears and a trunk), the yellow *Pedicularis condensata*, the smaller, but very striking *P. wilhelmsiana*, with its silvery 'wool' and its long orangey-brown lips, and more – much more – *Gentiana oschtenica*, this time some with open flowers. In a valley leading up to the ridge we found lots more primulas: *P. algida*, *P. elatior* ssp. *ruprechtii*, *P. elatior* ssp. *meyeri* in various colour forms and, again, hybrids between the two subspecies. There were some fine patches of the brilliant yellow *Anthemis caucasica* and one or two more examples of the white dandelion we had seen the day before. Also in this valley there were lots of the large mountain pansy, *Viola oreades*, predominantly yellow but with a sprinkling of purple flowers. As we climbed higher and the turf got more alpine, we came across sheets of *Campanula biebersteiniana* and large amounts of *Gentiana pyrenaica*. There was the odd *Pedicularis nordmanniana* and *Erigeron uniflorus*. We were also very pleased to find the rare endemic *Campanula dzaaku* draped over a rock; there was more of it on rocks at the top of the ridge

Pedicularis nordmanniana

Asperula abchasica

Campanula trautvetteri

Gentiana cruciata

but the flowers there were not in such good condition. The rocks at the top of the ridge, at about 2300 metres above sea level, were interspersed with the pink *Asperula abchasica* and the white *Gypsophila tenuifolia* while there were plants of the attractive pale-yellow umbel *Chamaesciadium acaule* dotted around. It was from this ridge that we should have had a fine view of Mount Oshten, after which *Gentiana oschtenica* is named, but the weather was not co-operating. All we got as we reached the top of the ridge was a fleeting Salome-like glimpse of the mountain's flank before it was veiled again, not to reappear before it was time for us to retreat.

Next morning, as we drove down from Lagonaki north into the Belaya valley, we stopped to investigate the roadside at a height of about 1000 metres. There were fine stands of the lemon-yellow *Alcea rugosa* and pink *Althaea officinalis* among the bushes at the roadside. Opposite them was a grassy bank with a wealth of interest: white *Campanula alliariifolia,* purple *C. rapunculoides* and the *C. glomerata* look-alike *C. trautvetteri,* together with *Melilotus albus, Geranium* species, G*entiana cruciata, Dianthus oschtenicus* and a number of *Anacamptis pyramidalis* of an exceptionally vivid red.

Anacamptis pyramidalis

Campanula latifolia

Dianthus oschtenicus

Heracleum leskovii with Mount Semenov-Bashi and the Alibek valley

Mount Pastukhov

Dombai is situated in the Teberda valley, a tributary of the Kuban. The next valley west from the Kuban valley is the Arkhyz valley and above this, a little south of the main road from Maikop to Kislovodsk, lies Mount Pastukhov. On top of this mountain, at a height of 2070 metres, is the *Special Astrophysical Observatory* of the Russian Academy of Sciences –

Seseli petraeum

Symphyandra pendula;
Delphinium flexuosum;
Orchis ustulata

and, of course, it has a road up to it. The grassy areas around the observatory were bright with orchids, mainly *Gymnadenia conopsea* and *Coeloglossum viride* but also some fine stands of a particularly robust marsh orchid, which may well have been *Dactylorhiza euxina*; against these the *D. caucasica* we had seen at Lagonaki were quite puny. There were also clumps of tall *Inula orientalis*, lower-growing yellow *Medicago falcata*, statuesque *Heracleum leskovii* and *Campanula latifolia*. The road back down into the Arkhyz valley was lined with *Cirsium obvallatum* and a roadside cliff was festooned with the attractive pinky-white umbel *Seseli petraeum*; at the base of the cliff was a four-foot tall spike of bright yellow *Linaria caucasigena*.

Gumbashi Pass

A little east of the Kuban valley, on the road between Karachayevsk and Kislovodsk, lies the Gumbashi Pass, at 2023 metres above sea level a noted vantage point for viewing Elbrus (at 5642 metres the highest peak in the Caucasus and, indeed, in Europe) only about 50 km to the south. Unfortunately, the day we were there, with rain and low cloud, visibility never rose above about 5 km. There were,

Aster alpinus

Scutellaria orientalis

however, plenty of flowers to see. On the road up to the pass we passed a cliff with several clumps of the large white bellflower *Symphyandra pendula*. In the long grass beside the road at the top were *Betonica grandiflora*, *Inula orientalis*, red *Hedysarum caucasicum*, *Gladiolus tenuis*, *Delphinium flexuosum* and orchids: probably both *Dactylorhiza caucasica* and *D. euxina* and possibly hybrids between them, together with *Gymnadenia conopsea*, *Coeloglossum viride* and the burnt orchid,

Onosma caucasicum

Orchis ustulata, some of which had much more red in their colouration than we have seen elsewhere. Higher up were various campanulas, *C. trautvetteri*, *C. rapunculoides* and *C. hohenackeri*, with also the statuesque *Orobanche grossheimii*, diminutive *O. alba* and one solitary specimen of the pillar-box red parasite *Phelypaea coccinea*.

On and around the boulders below the cliffs that tower above the pass we found more orchids: a lot of *Gymnadenia conopsea* and one or two *Platanthera bifolia*. There were also more campanulas: *C. bellidifolia* and *C. ciliata*. Also in the turf we found the white *Draba siliquosa*, *Asperula alpina*, *Aster alpinus*, *Thalictrum foetidum*, the bright pink *Pyrethrum coccineum*, *Asyneuma campanuloides*, *Rhynchocorys orientalis*, *Aetheopappus caucasicus*, *Scutellaria orientalis* and *Onosma caucasicum* (sometimes given as *Onosma caucasica*). In the turf and on the rocks was a lot of *Dryas caucasica*, presenting far more leaf than flower as is also often the case with its close alpine relative. On the boulders were *Saxifraga scleropoda*, *Silene italica*, *Gypsophila tenuifolia* and the diminutive *Valeriana saxicola*. Just below the cliffs was a magnificent stand of *Lilium monadelphum* looking out across the valley.

The Dombai Area

Back in the Kuban valley (or, more precisely, the Teberda valley which leads to Dombai), we took a short but steep walk up from the

Border: Meadows below Mount Dombai are resplendent with *Scutellaria orientalis*, *Pyrethrum coccineum* (pink, lower left) and *Lilium monadelphum*

Rhynchocorys elephas

Campanula lactiflora

road through the woods to the Shumka waterfall at about 1500m above sea level. On the edge of the woods by the road were there was *Campanula latifolia*, *Cephalanthera rubra* and a large patch of *Paris incompleta*. Further into the wood, so little daylight penetrated the canopy that, apart from fungi, the only plants we saw below the trees were saprophytic bird's-nest orchids (*Neottia nidus-avis*). Around the cliffs at the base of the waterfall there was a bit more light and here grew *Asyneuma campanuloides* and one (or possibly two) unidentified species of campanula. What we had come to see, however, was *Primula renifolia* which we knew had been seen here, although we also knew that it was long past its flowering period. We did find it – but only the leaves which are, indeed, kidney shaped.

A little further up the Teberda valley a tributary valley leads off south-east to the Klukhor Pass (2781 metres). This pass is one of only three passes that had roads built over them to enable the Imperial Russian Army to cross the Caucasus mountains; the other two were the Mamison Pass (2820 metres) and the Krestovy Pass (2379 metres). Of the three, only the Krestovy Pass is still passable by road vehicles; it may well still be possible, however, to get a tracked, all-terrain vehicle over the Klukhor Pass, which would explain why it is a closed military area. So we could not visit the pass. Nor were we free to wander at will in the valley below it. It is

Silene multifida

a nature reserve with strict rules. Put a foot off the asphalted road and you are liable to be fined 1000 roubles (£20). As tourists who (in Russian eyes) had more money than sense, we felt that we would be easy game if we broke the rules. Although this made the walk along the road rather frustrating, it was pleasant enough as far as it went. The valley floor around the lake of Tumanli Kel, where we started our walk, lies at about 1900 metres above sea level. The valley sides rise precipitously to a great height but the floor of the valley is relatively flat and has extensive meadows awash with *Betonica grandiflora* and plentiful populations of *Campanula latifolia, Aconitum orientale* and *Heracleum leskovii*. In the distance we could see *Lilium monadelphum* and at the roadside were *Aetheopappus caucasicus, Rhynchocorys elephas, Dactylorhiza euxina, Dianthus ruprechtii, Aconitum nasutum, Swertia iberica, Chamaenerion (Epilobium) dodonaei* and a little pansy that appeared to be *Viola* x *contempta*.

Later, as we walked down the valley through the woods, we passed numerous examples of *Acer trautvetteri* with its brilliant red keys. We also came across the beautiful *Silene multifida, Campanula latifolia* (including one with pure white flowers), *C. lactiflora, Pedicularis atropurpurea* and *Heracleum roseum*, with its delicate pink and white umbels.

And so to rest; in part two of this article I shall continue our botanical exploration up to the heights above Dombai.

Germination of the Western *Lilium* Species

Gene Mirro
(Oregon Wild Lily Sanctuary)

The western lilies are commonly referred to as delayed hypogeal germinators. A delayed hypogeal seed requires about three months of warmth and moisture, during which it develops a tiny underground bulb. About four months of cold are then required, after which root and leaf growth appear. This is *not* how western lilies germinate.

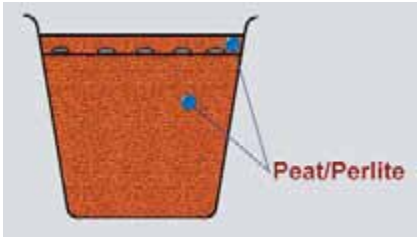
It is true that western lilies have distinct below-ground and above-ground germination phases, but the below-ground bulb development occurs during the cool and moist days of autumn and early winter. No warm period is required. In fact, I have found that several months of warmth and moisture will seriously delay germination, often for a year or more. The above-ground leaf development begins after a period of winter chilling that varies from a few weeks to a few months, depending on species and seed age. *Lilium humboldtii* and *L. ocellatum* require only a few weeks. It is very difficult to generalize further, since many of the species are very widely distributed and their needs will be a function of their local adaptation.

Here is my step-by step method for germinating these lilies. This will work for all western species although you may find that some seeds of *L. philadelphicum* and *L. maritimum* will germinate almost immediately. I recommend planting these seeds in early autumn as the temperatures are cooling to the 15˚C range.

My Method

Make a potting mix of 50% sphagnum peat and 50% perlite. To each gallon of mix, add a teaspoon of dolomitic lime and a teaspoon of bone meal. Place in a plastic bag with a little water. Close the bag and knead vigorously until the medium is uniformly slightly moist.

Select containers at least 8 cm deep. Fill with mix to the top. Firm the mix. Refill to within 12 mm of the top. Distribute seed on the mix, no more than 9 seeds per square inch. Cover seed with mix. Firm the mix. Water lightly to settle the mix around the seeds. Do not soak. Label the containers. Place the containers in small plastic bags, preferably the type that uses tie wraps. Seal the bags closed with tie wraps or whatever suits.



Seeds lie in a simple potting scheme

Place the bags outdoors in a shaded place, protected from birds, mice and such pests. Light

is not necessary. As winter approaches and the temperature drops, do not expose the seed to temperatures lower than about -2˚C. If it gets too cold outdoors, move the bags into the refrigerator. Do not place the bags in a heated room. The optimum temperature in winter is 5 to 7˚C.

Check the containers every week or so for above-ground growth. Also make sure the mix is not getting dry. When growth commences, feed with a dilute liquid fertilizer and place in a cool (10 to 16˚C) and bright location, such as under fluorescent lights in the basement or in a cool greenhouse. Do not expose lily seedlings to full sun.

Some growers mix the seed with some moist medium in a plastic bag that is then placed in a refrigerator until germination takes place. It works, but it means that you have to transplant the germinated seeds into a container. Why not just plant the seeds in a container in the first place, as we have done here?

If the seed does not germinate by spring, do not discard. Keep the container in the sealed plastic bag in a shady protected place over summer, and repeat the cooling process the next autumn and winter. Keep the medium moist. I have had both *L. washingtonianum* and *L. rubescens* come up three years after planting.

My Latest Growing Mix

I use equal parts good topsoil, bark dust, peat moss, perlite, pumice and 25% vermiculite. To

Sealed sets of pots: above 2˚C

Protection from winter cold: 5 to 7˚C

Start of growth: 10 to 16˚C

each gallon of mix, I add one teaspoon of lime, one of bone meal and a quarter teaspoon of Micromax trace element mix (it includes trace Copper, Zinc, Iron, Manganese, Boron and Molybdenum). I don't sterilize the mix.

Soluble Fertilizer for Seedlings

I use Peters 20-20-20 with chelated Iron and Manganese Sulphate. The Peters mix is a blend of Nitrogen, Phosphorus and Potassium in a 1:1:1 ratio that works well on all plant materials as a general-purpose fertilizer. It contains fully chelated trace micronutrients such as Manganese, Iron, Copper, Boron, Zinc and Molybdenum.

Outdoor Growing Tips

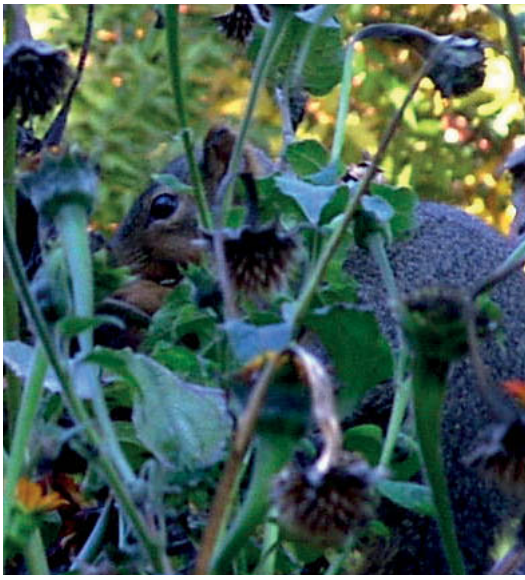
Keep them cool. If the potting mix gets too warm, the bulbs will all rot. Get the seedlings into the soil by mid-May. Plant them where they are shaded during the hottest part of the day. They will grow slower but they will survive. Mulch with bark mulch. You *must* protect from slugs (bait), birds (plastic netting), moles (traps), deer (fence and repellent). Do not let them get too dry. For westerns, if they go dormant, let the soil dry and provide lots of shade and mulch to keep the soil cool. Do not let the soil bake in the sun.

Winter Growing of Western Species under Lights

The timing of operations varies according to the species type. Western and delayed hypogeal species require different treatment.

Sow the western species in March. Keep them at 15 to 18˚C for at least six weeks, then place in the fridge

Growing in the shade of sunflowers



Keep your critters fat and happy, and they may not eat your choice bulbs!

at 5˚C until late September. Then place under lights for the winter.

Delayed hypogeal species should be sown in March. Keep them at 20 to 24˚C for three to four months (until little bulbs form), then place in the fridge at 5˚C for four months. Then place under lights. Keep them cool. Grow from autumn to spring in a cool basement or enclosed porch. Tops of plants should be 10 to 15 cm below bottoms of fluorescent tubes. I water from the top but let the mix dry down to the bulb level before watering again. Let some annuals or weeds grow as indicator plants in the pots with the lilies. If they look vigorous, you've got the right amount of fertilizer and water. The lilies will not show malnutrition and drought stress nearly as well as the annuals. Keep trimming the foliage off the annuals so they don't shade the lilies.

Lilium dauricum, 2 months after germination

Lilium neilgherrense, four months after germination

Lilium ocellatum, two months after germination.

Under lights, October 2006

The Golspie Expedition 2012

Ian Christie

Thank you to everyone who sent messages to say how much they enjoyed the 2011 Golspie article; we often forget just how special our Scottish native flora is, so here are our notes and pictures from 2012. We were in Golspie at the end of June, a very mixed week with pouring rain and dense mist on the first day, and we headed north to Dunbeath, parking at the harbour where an interesting ice house is to be found at the end of the walkway. We crossed the river and walked about a mile along the track, past large rocky shore formations buffeted by the waves. Just around the corner we found some sandy areas. Now this sand is an unusual dark reddish brown, very gritty, and in it grows a special plant, *Mertensia maritima* (the Oyster Plant). We were lucky to find several dozen plants in full flower; they are really striking, with superb fleshy blue leaves and clusters of blue Forget-me-not flowers where the towering cliffs sculpt a dramatic landscape between sea and land. We headed north to Thurso then over towards Strathy Point near Bettyhill, seeing huge mountains of cut peats on the way. I was tempted to see if I could take

Mertensia maritima at Dunbeath

Primula scotica

some home but they are really only fit for burning. We searched around the cliffs at Strathy Point where many *Primula scotica* were in flower along with orchids 5 cm high. The wind and rain that day were indeed severe and although I tried to take a picture of *Scilla verna* on the edge of the cliffs, I failed miserably. With such conditions it is little wonder that the plants only flower as high as 5 cm.

The following day our usual visit to Balblair Woods was much more pleasant. *Moneses uniflora* abounded while huge carpets of *Linnaea borealis* spread around under the tall pine trees, although only a few

Linnaea borealis

Pyrola minor

flowers remained. Along the track we found two flower spikes of *Pyrola minor* and plenty of non-flowering rosettes to assure us that the plants were healthy. Further along the path we descended to the shore through an opening in the trees to a large colony of fully flowering *Centaurium littorale,* the Seaside Centaury, a striking pink gentian relative; these plants are surely submerged by salt water when the tide is high. We meandered back along the path through shafts of sunlight glinting through the magnificent tall pines. In several areas of the raised beach at Little Ferry

Centaurium littorale

were hundreds of Northern Marsh Orchids (*Dactylorhiza purpurella*), their distinctive rich carmine heads attracting Burnet Moths and other small butterflies.

On our third and last day we returned to Doll in search of more orchids. In the field near the post box, *Dactylorhiza fuchsii* and *D. maculata* flowered by the score, and winding north along this small road we came upon a wonderful sight of twenty or more Lesser Butterfly Orchids, *Platanthera bifolia*. What a treasure - they were dotted

Dactylorhiza purpurella

amongst *D. fuchsii, D. purpurella* and others. Once at Brora on this byway we reached heaven in a field like an old-fashioned hay meadow; there were around a hundred Lesser Butterfly Orchids and we spent some time amidst this rich pasture. Heading northward again towards Helmsdale took us to a turn up the very narrow road

Platanthera bifolia

Dactylorhiza maculata

to Glen Loth. It was hardly a road but it proved very scenic over the top and down to the bridge by the waterfall where we stopped in a forest track with very many flowers. A most interesting *Drosera rotundifolia* (Round-leaved Sundew) grew amongst the wet sphagnum moss with scores of *Gymnadenia conopsea* (Fragrant Orchid), whose delicate pink spikes lit up the dull hillside. We met several local folk who were surveying the Lesser

Above: *Drosera rotundifolia*

Below: *Gymnadenia conopsea*

Loiseleuria procumbens forma *alba* (Photo: David Savage)

Butterfly Orchids and were excited to share our finds. Flower hunting can often be sociable - we had hoped to meet up with Anne & Viv Chambers, well known club members, but they were delayed until later. They did however see all the flowers - we are not the only mad people who drive to Golspie to look at them. Anne especially wanted to see *Primula scotica* so we sent them to Strathy Point.

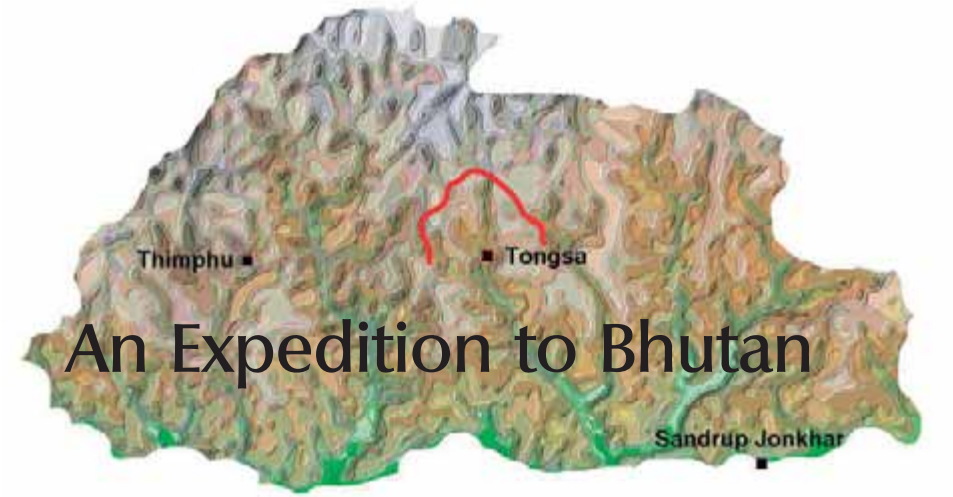
A welcome contact arising from the 2011 article is David Savage, a native of the far north, who very kindly sent me three pictures of *Loiseleuria*

Epipactis atrorubens

Oxytropis halleri

procumbens in its white form (a very rare plant indeed), *Epipactis atrorubens* (Dark Red Helleborine) and *Oxytropis halleri*. Everyone we met never seemed to notice the wettest windiest days but they all just enjoyed the natural wonder of our native flowers. Here's to next year!

Female Common Blue, Pearl Bordered Fritillary and some inviting peat stacks



An Expedition to Bhutan

Elspeth MacKintosh

This particular account of our recent Bhutanese expedition is offered most gratefully to members of the SRGC, whose financial support helped make my own participation possible. The eastern Himalayas have long been considered critically important in terms of global biological diversity and Bhutan, because of its global isolation and the inaccessible nature of much of the country, remains a reserve of an astonishing array of plants. With habitats varying from tropical to alpine, this small country is home to some 5000 plant species including 600 orchids and 46 rhododendrons. Few botanists have visited although the legendary Frank Ludlow & George Sherriff made seven major expeditions into Himalayan Bhutan between 1933 and 1949. They collected large numbers of herbarium specimens and seed collections and later described many new species. More recently, botanists from the Royal Botanic Garden Edinburgh (RBGE) collaborated on the *Flora of Bhutan* (2002) and Bhutan has since developed its own Botanic Garden and National Herbarium with its own researchers. Because of its inaccessible nature, many of the country's areas still require botanical investigation.

Bhutan

Bhutan, called Druk Yul (*Land of the Thunder Dragon*) by its people, is a small land-locked country in the eastern Himalayas. It is bounded by Tibet to the North and India to the South with Sikkim and Arunachal Pradesh lying respectively west and east. It is about 300 km long and 150 km wide, an area similar to Switzerland.

Almost the entire country is mountainous and ranges in height from 100 metres to the 7451 metres peak of Gankhar Puensum on the Tibetan border. It is divided into three major geographical regions: the Himalayan region to the North, the hills and valleys of the inner Himalayas in the central belt, and the foothills and plains to the South opening into India.

The southern plains have a tropical climate whereas the uplands have cool winters and hot summers. The northern mountains have extremely cold winters and cool summers. The summer monsoon that sweeps up from the Bay of Bengal affects the whole country between May and August. The population is small – almost seven hundred thousand, of whom 65% are Buddhist of Tibetan origin. The remaining 35% are of Nepali origin and are Hindus, settled in the southern foothills. The country has one of the smallest economies of the whole world and Gross National Happiness takes precedence over Gross National Product. It is still very much rural with 69% of the population involved in agriculture working 8% of the land. Sheer inaccessibility coupled with low population and the Buddhist reverence for Nature have brought Bhutan unspoilt into the 21st century with 72% of its land still under virgin forest. As such it remains a mecca for botanists, virtually unchanged since Ludlow & Sherriff explored the valleys during the last century.

The Chance of a Lifetime

In spring 2010 I was invited to join a group of plant enthusiasts (Julia Corden, Tim Lever, David & Margaret Thorne and Martin Walsh) to trek to the legendary Me La area in Northern Bhutan. It is a restricted area close to China and Arunachal Pradesh and no botanists are thought to have visited since Sherriff was there in 1949. Unfortunately, we were denied permission at the last minute and had to arrange a new itinerary. Our organizer, Sonam Wangchen, came up with a new route in Central Bhutan exploring two river systems and botanizing the unknown area between them to heights of 5000m. Our aim remained unchanged: we were to study high altitude alpines, in particular Meconopsis and Primula. For me, this was the chance of a lifetime. Having grown and tended Himalayan plants in the RBGE for the last 20 years, the opportunity to study them in their native habitats and to tread the same unspoilt valleys as the legendary plant hunters Ludlow & Sherriff would realize a dream. In practical terms I hoped the experience would strengthen my plant knowledge of high altitude alpines and aid me in their cultivation.

Our journey took place in the last half of June 2010 in a country dominated by rivers (Bhutanese *Chu*) and passes (Bhutanese *La*), both very important features in Bhutan's geography. There are four major river systems, three of which flow from Tibet. Flowing south, they have carved deep valleys, making east-west travel a tedious process of sharp and winding ascents and descents. Our route lay along tributaries of the Mangechu (Mange River) which drains Central Bhutan. Starting at Nikkachu on the west-east main road, we headed northwards up the Nikkachu to Maroothang and the Om Tscho, heading to Padima Tscho and over the Chukarpo river. Then eastwards to cross the Sasachu and down to the basin of Warthang. East again, and down to the Mangechu before our last

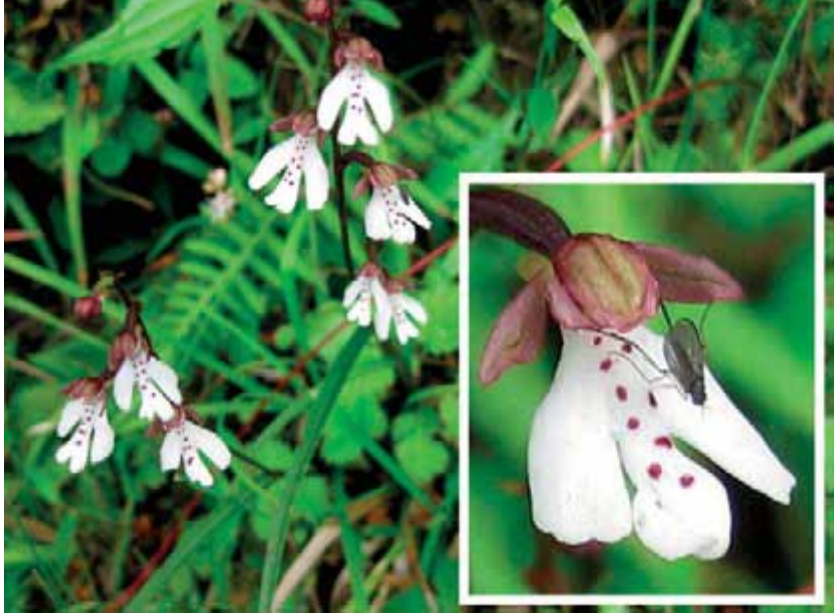
climb over the Jule La. The Gorsum Chu led to our finishing point at Dur. The altitude ranged from 2603m at our start to a maximum of 4983m at the Demso La before finally dropping to 2727m at Dur. The first and final legs of our expedition trod the same ground as Ludlow & Sherriff; they had explored the Nikkachu area, and Ludlow botanized around Dur in 1949.

Yak trails lead through silver fir forest, rhododendron woodland, juniper and rhododendron scrub to high alpine pastures crossing high passes before dropping back down to cross rivers. Ascents and descents are steep and it is not unusual to climb 400m to drop 700m in a day. Our last four days would be spent driving across and out of the country at Sangdrup Jongkhar in the south. This would be a bonus, offering the full range of warmer vegetation zones, Blue Pine and Evergreen Oak, Chir Pine and broadleaf forest, culminating in sub-tropical on the descent towards India.

The High Botanical Trek

Flying in from Delhi over the Himalayas with the high peaks rearing through the clouds and diving down to Bhutan's only airport in the beautiful Paro valley leaves a lasting impression. Few pilots are qualified to fly this route, which suddenly plunges past steeply forested ridges. Wingtips almost brush the houses at what must be the most scenic airport to be found. Welcoming Bhutanese in their striking national costume placed Buddhist scarves round our necks in their traditional welcome and we were whisked off to the capital, Thimpu. The air was clean and clear as we drove through alpine scenes of little white houses scattered over the green valley flanks.

Iris clarkei and prayer flags at Dochu La



'Buttoned Ghost Orchid' *Amitostigma puberulum*

The next day we met our trek staff and drove eastwards to the Phobjika valley through forest-clad twisty roads, crossing mist-shrouded passes with their chortens (memorials to the teachings of the Buddha) and prayer flags. Familiar plants abounded- pines, oaks, hemlocks, primulas, anemones and arisaemas. We stopped at Dochu La to walk through a glade of magnificent moss-clad hemlocks festooned with prayer flags. *Magnolia globosa* was in full flower with *Iris clarkei* and *Arisaema griffithii* close by. We had our first sighting of *Pleione hookeriana* bedded in a mossy tree trunk.

Dropping to valley floor level we came across spindly pines, paddy fields and *Opuntia* hedges. We visited the impressive 16th Century dhzong (palace) at Punakha built at the confluence of two rivers. To this day dhzongs remain the seats of administration and monastic teaching. We then climbed up twisting wooded roads over the Lowa La (3200m) to the cloud-shrouded beautiful and wooded Phobjikha valley. The rare black-necked crane arrives here every autumn from Tibet when the farming families migrate from the valley to warmer climes. Sadly, there were no stragglers to be seen. We drove past stands of prayer flags, twisting up valleys with traditional homesteads scattered along their flanks, cattle and horses in fields, and crops of potatoes behind ranch-style fencing. We drove through woods of rhododendron, fir and birch with pink *moyesii*-type roses and *Buddleja colvilei*. Clumps of *Arisaema* and *Euphorbia griffithii* grew at the roadside. Crossing the Phele La with its chortens and prayer flags, we saw on the other side of the valley the Black Mountain National Park that stretches south to the border with India.

Lilium sherriffiae

On the approach to Nikkachu, we saw our first lily, *Lilium nepalense*, in bud on the roadside banking. Seventeen yaks waited to carry our baggage and food but I was distressed to see blood trails running down their coats from the attacks of tiger leeches. The leeches drop off after they have had their fill but the wound keeps bleeding. Seemingly, yak herders would gather up 'full' leeches and cook them – Bhutan black pudding!

With back packs, and trekking poles at the ready, we set off up the valley. Local children saw us off. We followed yak herders' tracks that lead to the upper pastures and passes. Flowers studded the pasture, small orchids like buttoned ghosts, potentillas, bugle and the small yellow *Hypoxis aurea*. *Roscoea alpina* and pink *Pedicularis* were colourful.

After lunch we met three girls walking homeward down from the Lunana district on the Tibetan border. They had been collecting Cordyceps, the fungus-invaded caterpillar that is

Primula primulina

Primula sapphirina

literally worth its weight in gold. This caterpillar phenomenon is common in Tibet and I had wondered if we would meet collectors in Bhutan. One family member is allowed to collect for the month of June and we met many collectors of all ages, some with tiny babies. They travel light and walk like the wind in their blue wellies.

We continued through woodland, the trees moss-clad with an understorey of rhododendrons. *Pleione hookeriana* poked out of a mossy trunk and a pretty little oxalis caught the eye. Following the river we got into camp late, picking our way over boulders in the dark, the river ominously close.

Next day we left our buttercup camp in its woodland clearing and saw by daylight the boiling river. A yak was to fall in later with its load of rice. We went upwards through untouched woodland heading for Maroothang. Our first *Meconopsis*, the yellow flowered *M. villosa,* grew by the path alongside green-hooded arisaemas. A strange horse lichen grew beside a petiolarid primula (no longer in flower) and *Primula geraniifolia* grew on the pathside banking. *Polygonatum* and a red-flowered *Maianthemum oleraceum* arched towards the path over a carpeting of ferns, *Viola biflora* and yellow potentillas. We discovered *Meconopsis paniculata* as the woodland thinned. Its smaller relative, the blue-flowered *Meconopsis primulina*, grew in the shelter at the foot of a tree.

We were now in leech country and were wary of walking through the small scrubby bamboo. However, a leech dropped onto my neck

from an overhanging branch. As the woodland thinned into rocky pasture by the river, we saw our first *Androsace* cushion, white-flowered *Androsace globifera*, clothing the ground under a berberis. Exploring a side ravine we came upon a treasure chest of plants – cushions of pink and white androsaces clothed the rocky banks together with *Meconopsis bella* and *Anemone rupicola*. A small crucifer, *Pycnoplinthopsis bhutanica*, with its rosette of jagged leaves and white flowers grew at the waterside with the sweetly scented white *Primula munroi* and the larger *Primula sikkimensis* var. *hopeana*. This *P. sikkimensis* was much shorter and finer than any specimen I had seen before and had a creamy white colouration. We were to become quite familiar with these plants as our trek progressed.

Climbing higher, a lovely pink lily was found, looking very much like a pink form of *Lilium sherriffiae* - but neither had been recorded in this area. Next day, Martin, Sonam and Tim returned to the ravine; they found a darker form that indicated the 'new' lily was indeed a pink form of *L. sherriffiae*.

We ascended through the yak pastures by the Nikkachu. At the last 'shop' in the valley we found a lady cleaning Cordyceps. It is valuable, and she was nervous at letting us borrow it to photograph. Prayer flags lined our way through rhododendron woods, the pretty *Clematis montana tongluensis* scrambling throughout. White- and blue-flowered *Meconopsis simplicifolia* grew under shrubs. Out in open pasture were attractive clumps of *Arisaema* and abundant *Primula munroi* in wetter areas. My first clump of the little *Primula primulina* was seen here with its pompom of white hairs in its throat, growing close to the creeping stoloniferous *Saxifraga brunonis*. *Cassiope fastigiata* and a pale yellow *Rhododendron lepidotum* grew on the top of a large rock with cushions of *Androsace* at its base. A tiny rush with white 'flowers', *Juncus* aff. *thomsonii*, looking like a small allium, was widespread with the yellow-bracted *Chrysosplenium*.

Carrying on up to the top of the valley the slopes were clothed with *Rhododendron campanulatum*. *Meconopsis paniculata* scattered over the rocky slopes with *Meconopsis horridula*; a white flowered *Lloydia* drooped in the shelter of a rock. Towards the top, altitude sickness powered in and the yak man had to push me uphill past beautiful plants which I did not have the energy to stop at. Our camp was set out on a grassy pasture between snow-clad rocky slopes. The toilet tent was a beacon.

On the fourth day I enjoyed the Bhutanese cure for altitude sickness - garlic and ginger soup and ginger tea by the bucketful! I had soup for breakfast, lunch and dinner. Thankfully this became a rest day that entailed only a gentle stroll and plenty of fluids. We walked through drifts of *Primula sikkimensis* var. *hopeana* down to the 'Lake with no Tail', so-called by the Bhutanese because it has a number of waterfalls entering

Pedicularis oederi

but no visible exit point. Yellow *Lloydia flavonutans* and white *Leontopodium* dotted the alpine turf with occasional clumps of *Primula calderiana* and *P. macrophylla*. The dwarf *P. sapphirina*, its violet flowers like tiny parasols, was abundant on damper ground and in the lakeside water flush *Corydalis calliantha* and *Sedum oreades* formed pervasive yellow clumps throughout.

On rockier slopes white and yellow saxifrages grew with *Meconopsis horridula*, and yellow and pink forms of *Pedicularis* looked attractive amongst clumps of small prostrate willow. We found clumps of creamy-yellow *Primula elongata* in amongst small rhododendrons with *Cassiope* while *Rheum nobile* stood out high on the steep slopes on the valley behind.

Refreshed next day, we headed over the Om Tscho La (4574m) to Padima Tscho, passing the Om Tscho lake. Following a dry start we walked up and past the 'lake with no tail', its surface like a mirror in the still morning air. It was a pleasure to photograph *Meconopsis horridula* and some rather attractive clumps of *Primula megalocarpa*. The damp slope was a carpet of yellow *Caltha palustris himalaicus*. On a ridge overlooking

the lake we found lovely *Diapensia himalaica* growing on a north-facing slope with pink *Rhododendron anthopogon*. A flat damp area of pasture was carpeted with *Primula calderiana, Caltha* and a small white anemone. The skeletal-flowered *Primula tenuiloba* was widespread on a damp bank and *Primula megalocarpa* thrived. Once over the pass we descended to the lakeside where broad drifts of *Primula sikkimensis* var. *hopeana* ran down to its shore. Many of the creamy-white flowers had a very attractive rose-tinted corolla tube. Fluffy *Eriophyton wallichianum* and *Corydalis meifolia* ran around in the rockier scree areas, while in the steep lakeside pasture *Pedicularis* and the pink *Ponerorchis chusua* orchid made a pretty display with white *Anemone rupicola* amongst *Cotoneaster*. Dainty

Below: *Primula umbratilis*

Right: *Diapensia himalaica*

Primula atrodentata made a shy appearance. Further on, *Meconopsis bella* and a pink crucifer grew on the rocky slopes alongside showy yellow-flowered *Saxifraga thiantha* var. *citrina*. The steep slope on the other side of the valley was densely clothed with larger rhododendrons.

Our camp at the far end of the lake was probably where Ludlow had camped in 1949. By chance, a passing Cordyceps hunter had actually met him. This man, Tenzin Norbu, was a young child when he met his first westerner (Ludlow) and had been intrigued by the man '*putting flowers into a book*'.

Day six brought a fine start. We dropped 400m to cross a river and then climbed 900m towards our camp below the Khema La. It was wet and slippery underfoot as we cut down a landslip through the juniper scrub to mixed woodland; I fell several times. In the woodland we came across our first *Meconopsis sinuata* with nodding lilac-blue flowers in a group of four in the shelter of a rhododendron. A mauve-flowered *Polygonatum kasuense* caught our attention as the diminutive *Parnassia delavayi* grew amongst rhododendron leaf litter. On the climb out of the woodland a fine colony of exquisite *Primula umbratilis* inhabited a rocky slope and a very large cushion of *Androsace lehmannii* reared out of the juniper scrub like a white boulder.

Saxifraga hemisphaerica (female form)

As we gained height all the small primulas made an appearance whenever conditions suited and we spied a newcomer on a damp slope, *Primula rebeccae*.

Day seven – we came out of the tent to the snow-tipped peaks with waterfalls tumbling down steep green slopes and the morning mist snaking up the valley below. Breakfasting in the mess tent, we looked onto a damp scree slope with *Primula sikkimensis* var. *hopeana* and the small ice-blue crucifer, *Pegaeophyton scapiflorum* ssp. *robustum* amongst the stones. After a short climb to our first pass, we found *Lilium nanum* growing under a

Yellow-flowered *Saxifraga thiantha* var. *citrina*

boulder, then found tightly cushioned *Potentilla tapetodes* abundant at the top within a pink-studded carpet of the tiny bistort, *Polygonum macrophyllum*. Nestled amongst rocks were cushions of *Arenaria* alongside *Eriophyton* and a tight-cushioned *Saussurea* that looked more like a *Celmisia* in foliage. The little white-flowered *Draba bhutanica* was scattered around.

A new plant, a densely woolly white cut-leaved cushion turned out to be another *Saussurea, S. tridactyla*. Tiny electric-blue *Corydalis ecristata* dotted about and, over the pass, *Lilium nanum* was plentiful in the alpine turf with the hairy *Anemone polycarpa*, and small rhododendrons clothed the slopes in a tapestry of colours - pink, yellow and white. The banksides were dotted with yellow *Lloydia flavonutans*. Lake Conch (in the shape of the revered conch shell used in religious ceremonies) was glass-like with a wash of *Primula sikkimensis* var. *hopeana* running down from the cliffs. A steep slope was once more home to *P. umbratilis* and saxifrages were common amongst the rocks. From the second pass we made a difficult

Tenzin Norbu

Yak lady

and muddy descent down to the bridge to cross over and climb to the night's camp. An impressive clump of *Saussurea obvallata* grew amongst the rocks at the crossing.

Day eight started in heavy rain that didn't let up. On the river plain were no ibis, but the sweet scents of *Primula munroi* and aromatic pink rhododendrons were very strong. Pink *P. sapphirina* rather than the violet form and herbaceous *Potentilla* carpeted the damp ground. We crossed boulder fields and old screes where well-flowered *Meconopsis horridula* were flattened by the rain. *Eriophyton*, *Corydalis*, and yellow saxifrages all defied photography while groups of *Rheum nobile* stood proudly on the other side of the valley. Where there is no path the plants remain undisturbed and are not collected as a Bhutanese vegetable.

Rain turned to driving sleet and we had to stop to defrost at a yak herder's shelter, being wet through and frozen. The Bhutanese are such a hardy race – the yak lady was out knocking snow off their blue tarpaulin roof in bare feet! We shared lunch with them and she put on her traditional hat to have her photograph taken. She and her husband had never seen westerners in this area and said we would be the first to cross over the pass.

On the ninth day we set off watched by a group of blue sheep cavorting on the snowy crags. We made our way up the valley wondering if we were being watched by snow leopards. Elusive creatures, the elderly yak herder had only seen them four times in his whole life. We followed the stream upwards to cross extensive boulder fields with their tenacious rhodiolas, and consolidated screes with their rich populations of high alpines – *Eriophyton*, *Meconopsis horridula*, saxifrages and primulas. Very impressive specimens of the woolly snowball-headed *Saussurea gossypiphora* sheltered between rocks. An intriguing light-grey cushion with toothed incurved leaves grew between rocks nearby. This was *Saxifraga hemisphaerica* (female form); we never saw this plant again.

We erected a flag to celebrate our crossing the snowy Demso La and as we made our way downwards we came across a large population of the cushioned potentillas, and very nice specimens of *Primula tenuiloba* and *P. caveana* were tucked in between rocks. Very striking pink-flowered *Saxifraga bergenioides* made an appearance while a similar yellow-flowered and red-calyxed *S. lychnitis* made a good showing on a damp grassy slope. Continuing downwards we followed a fresh landslip, leaving behind the small alpine flora to be replaced with the larger *Rhododendron campanulatum* and rat-tailed bistort. Underfoot was treacherous, being a descent over slippy boulders down to our woodland camp.

That night the yaks chomped all night around our tent, the sound like a waterlogged wellie. We made our way down to the river to cross the bridge. On an open slope amongst dwarf rhododendrons and

cotoneaster we found a good specimen of *Cypripedium tibeticum* alongside a collection of small green orchids and the deep pink *Ponerorchis chusua*. A further group of *Cypripedium tibeticum* looked tired as did an example of *C. himalaicum*. However, a small group of *Primula bellidifolia* looked charming amongst the rocks.

Over the bridge onto a path through large-leaved rhododendrons we came across a very attractive thistle, *Cirsium eriophoroides*, white and woolly in bud. In flower it would be stunning with a dark red centre and mauve filaments. Climbing past red-thorned roses we were on our way to look for *Meconopsis sherriffii,* reputed to be in a clearing in the woodland where the *Abies densa* had been destroyed by fire. After crossing loose scree and a steep ravine, we found only one flowering plant, damp with all the rain but a lovely clear pink.

Meconopsis sherriffii

Climbing up and out of the ravine afforded us a close inspection of the flora - a tight tapestry of cotoneaster, *Ephedra*, Rose, *Spiraea* and Juniper with *Androsace strigillosa*. Re-joining the path to the campsite we came across some very nice *Androsace* cushions, all of which were eclipsed by thousands of golden *Meconopsis paniculata* in the mist at Shachu Na.

In the following clear morning light we could see the path of the previous day snaking down the valley opposite. It looked

Meconopsis paniculata

Rheum nobile

Inside a *Rheum nobile* spike

Rain and cloud in the Warthang basin

very steep. Today we were to climb out of this valley and down to Warthang. There were thousands of golden *Meconopsis* but very few rosettes of flowering size for the next season. Walking up the valley we found a reasonable population of *M. sherriffii* growing through prostrate juniper and *Lonicera*. Further up, some very nice *Androsace* cushions dotted the rocky landscape, all overlooked by stands of at least two hundred *Rheum nobile* on the upper rocky slopes. We met up with them later and took the opportunity to look inside the spike. The leafy bracts protect the reproductive parts and temperatures inside may be 5˚C more than the outside temperature. The spikes were almost 2 metres tall.

Drifts of *Primula sikkimensis* var. *hopeana* and *Cremanthodium* brightened the landscape and again the beautiful primulas, *P. umbratilis*, *P. tenella* and *P. sapphirina* accompanied us up and over the pass. In this area there are white forms as well as the blue shades of *P. umbratilis*. Descending into the Warthang amphitheatre we came across creamy yellow *Primula elongata* growing down a rock cleft and through a shrubby juniper. *Rheum nobile* advanced over the hillside while *Cassiope* and dwarf rhododendron clothed rocky outcrops. The alpine turf was studded with flowers of *Lilium nanum* and the tiny bistort with an even tinier blue

Lloydia flavonutans

gentian. Water rivulets and the surrounding wet ground were home to a population of *Cremanthodium*, *Meconopsis horridula*, *Primula sikkimensis* var. *hopeana* and saxifrages.

On the twelfth day we left the Warthang basin behind, climbed up the pass and then dropped down 1000m to the hot springs at Dur Tsachu. On the opposite side of the valley the yak sheilings raised a smoke in the early morning. This was to be our last yak day – ponies were waiting to take over at our next camp. As we climbed to the pass, *Saussurea* rosettes scattered over the rocky turf with *Lloydia flavonutans* and *Meconopsis bella*.

Once over the pass, *Rhododendron campanulatum* swathed the valley sides together with *Swertia* and rat-tail bistort. A tall *Lilium nanum* flowered in the protection of a berberis. We continued, dropping into *Picea densa* forest and then fell into a landscape of large rhododendrons with cherries and rowans. *Clematis* climbed through pink and yellow roses while *Bergenia purpurascens* spread over a mossy rock. As we often noticed, petiolarid primulas preferred to be on the down side of the rocks whereas pink *Primula geraniifolia* inhabited more open banking. The force of last year's monsoon was evident by the number of landslips and shattered trees in the valley bottom. We crossed a dilapidated bridge over

the Mange Chu and climbed to our woodland camp, there making haste to the hot springs where the promise of a long soak in a very hot open-air tub was long overdue!

A long thirteenth day offered the hope of a rest day at the Jule Tscho. It had rained all night and promised to rain all day. A six-hour hard slog took us up through the woodland on a muddy rocky path. A new find, the tall purple *Corydalis flaccida*, proved impossible to photograph. *Astilbe rivularis* was another discovery. Towards the upper reaches of the woodland a large rock outcrop was the ideal habitat for the cliff-dwellers *Primula umbratilis*, *Meconopsis bella* and *Anemone rupicola*. Lunch was held at a yak sheiling sitting amongst a sea of yellow rather than white *Primula sikkimensis* var. *hopeana*. The rose staining on the corolla tubes was also clear in this population. Elegant *Geranium refractum* appeared in small numbers. Towards the Jule La, *Anemone rupicola* and cushions of pink *Androsace ludlowiana* appeared on a rocky bank with *Meconopsis bella* and a charming pink-flowered, red-stemmed saxifrage.

Drifts of *Anemone rupicola* grew through the short turf. Down from the pass the slopes were clothed in large patches of *Rhododendron campanulatum* with areas of short turf and scree. *Swertia hookeri* were abundant. The valley slopes down to the lake were clothed with *Meconopsis paniculata* and *Primula sikkimensis* var. *hopeana* while the sheltered slopes on the other side of the lake were a solid mass of

Androsace ludlowiana

Meconopsis bella

Rhododendron campanulatum. Our camp was set up at the far end of the lake, a pleasant walk after the exertions of earlier in the day.

Our rest day was at the Jule Tscho. It rained very heavily all night with water running down the slopes and flooding the mess tent. By mid-morning the sun came out and there was a flurry of activity to dry and air everything including the cook's cheese! Horse mats covered the ground, a colourful array of Tibetan and Bhutanese textiles. There was a holiday atmosphere – with Cordyceps hunting and a special lunch; our horses and the now ten-day-old foal lay among the primulas at the waterside.

Exploring our surroundings we again found the crucifer *Pegaeophyton scapiflorum* ssp. *robustum*; this plant differs from *Pycnoplinthopsis bhutanica* in having smooth rather than jagged leaf edges. *Cremanthodium thomsonii* was widespread in the stream delta

with *Primula sikkimensis* var. *hopeana* and *P. munroi*. In contrast, abundant *Cremanthodium reniforme* with its dark purple leaves preferred unstable shale but was too early to show us any flowers. Yellow *Corydalis meifolia* was plentiful and an attractive starry *Leontopodium* was common in the alpine turf with *Potentilla* and *Sibbaldia purpurea*. Once more we came across the larger *Primula elongata, P. macrophylla, P. calderiana* and the diminutive mauve *P. glabra* as a solitary clump on a mossy rock. A rocky grassy bank provided some of the best *Meconopsis bella* that we have seen. Spikes of *Rheum nobile* stood erect amongst the small rhododendrons and large numbers of immature specimens were scattered up the watercourse.

We were woken in the depth of night by turmoil. Julia had woken to a rumbling crashing sound and the rushing of water. There had been a landslide and water was pouring around our tent. In the pitch dark we could not see where the landslide was. A hurried camp evacuation - and we spent a wet and cold night huddled under a survival blanket.

A late start after our 'rest', and we climbed for three hours to the Jule La. Again, *Lilium nanum* was common in the short turf with *Androsace* cushions plentiful on damp pathside slopes. An altogether bigger yellow *Corydalis* with coarser foliage appeared and the small primulas of these altitudes, *P. sapphirina, P. primulina* and *P. tenella* were a joy to behold. *P. glabra* was present too but in no great numbers. As we ascended the pass the ground became rockier and *Diapensia himalaica* appeared in the shelter of rocks alongside a gentian bearing white sessile flowers. Yellow saxifrage and blue *Primula tenuiloba* were constants in the landscape along with *Lloydia flavonutans*. A new *Chrysosplenium* with shiny leathery leaves and chestnut brown bracts grew on and around the stony path.

Once over the pass the sky cleared for us to see the wonderful mountain panorama ahead. The last of *Rheum nobile* could be seen on upper slopes as we followed the watercourse down, leaving the high alpines. Small rhododendrons and *Cassiope* were replaced by juniper, *Lonicera*

Down the valley from the Jule La

and *Rhododendron campanulatum*. *Fritillaria cirrhosa* was spotted growing through a juniper as were *Primula elongata*, *Meconopsis simplicifolia* and *M. sinuata*. *Cyananthus lobatus* grew in the shelter of berberis. This area was heavily grazed by yaks and coarser flora like dockens and ferns appeared, with the more herbaceous *Hackelia uncinata* and *Salvia wardii*. Looking up the valley we noticed a dew-like glistening on all the very high pastures. Binoculars confirmed it to be vast drifts of *Primula sikkimensis* var. *hopeana*. Our camp was set up at the end of the valley and we made an easy descent through fields of *Iris clarkei* and *Primula sikkimensis* which at this altitude was yellow-flowered. The other side of the valley was clothed with *Abies densa*.

On our penultimate day we left this lovely section of the valley with its winding river and green pastures, to walk downriver towards our end point. *Abies densa* clothed the opposite slopes as pink-flowered *Spiraea* and willows replaced the rhododendron and junipers. We saw our last *Meconopsis paniculata* and *Podophyllum*, while *Arisaema* and *Anemone rivularis* reappeared. *Cypripedium elegans* was spotted growing in the shelter of a shrub, as did a new meconopsis, small and pale, possibly *M. lyrata*. Following the path downriver through woodland we watched our footing; it was raining heavily and the ponies had churned the new sections of path into deep mud. Rounding a bend we found an open bank where I was pleased to see a group of *Cypripedium himalaicum*. However, steps away, was *Lilium sherriffiae,* named in honour of

Lilium sherriffiae

Betty Sherriff who found it in Eastern Bhutan. This elegant lily, wine outer with chequered inner, was scattered over this bank, whose lower sections had sadly already fallen into the river following the heavy 2009 monsoon. A fine clump of *Cypripedium tibeticum* lay further along but this find was eclipsed by the lily. The rain was impossibly heavy as we made our way to camp, ploughing and slipping through the mud. On seeing grubbed-up soil at the base of a tree we talked of Himalayan bears, only to find out later that not only were bears behind us on the trail but were also in front of us!

Day seventeen - a leech climbed into my washing bowl in the morning, a fine start to a long horribly muddy day walking downriver. The paths, rocky at best, were churned into boot-sucking sinkholes by the horses. The woodland was beautiful with moss-clad trees and elegant ferns. A fine patch of *Roscoea purpurea* appeared in an open clearing but I missed two good plants of *Cardiocrinum giganteum* because of watching my footing. I saw a specimen later on but it was far too far up a bank amongst bamboo to get a decent image. We climbed muddily at last to open pastures with asters and *Pedicularis* before dropping down to our camp at Chad Khang. A strenuous descent down deep earth-banked paths brought us to a bank with the highlight of the day, a tiny orchid, a spiral of wine-red on white, *Corybas elegans*. There were about twenty plants of this rarity on this bank and no more were ever seen.

Corybas elegans

The seventh of July was our last trek day and it was dry. There was a relaxed atmosphere in camp and we walked at a leisurely pace downriver through mixed woodland to our finishing point at Dur. The horsemen had come across a large wild boar on this path the previous night but we just saw *Arisaema* and *Podophyllum* in fruit, clumps of *Calanthe tricarinata* in the shade and a *Pyrola* with nicely marbled foliage. On a cliff face above the river we saw *Notholirion macrophyllum* and an attractive large-flowered purple *Thalictrum chelidonii* over the water. Outside Dur we came across fields of wheat and buckwheat, each with their guard-hut. All members of farming families watch at night to save their crops from the wild boar which, either singly or in groups, forage nocturnally. At our stop, beer and crisps were waiting for us and the boys played Dago while waiting for the horses to appear. Dago is a game similar to bowls but uses flat stones instead of bowls. Each player has two stones and throws in turn towards a marker. There are five sets, the person whose stone gets nearest the marker winning the set. Gambling makes the game more interesting! At the end, the horses romped down the last strait – they knew they were going home.

Sadly, we crossed the bridge to our bus; the trek was over but it was still to take us four days drive to cross the country to our exit point.

Trek's end

The Lower Ground

Our last few days were spent driving to our departure at Sandrup Jongkar. We said goodbye to Kaka, Pelden and Dhoji and drove eastwards, the road twisting along the sides of the valleys and over passes. We passed through woodland and a patchwork of fields of potatoes and buckwheat in the Bumthang valley, stopping every so often to look at plants. At the Sheylang La we found a white slipper orchid, *Cypripedium cordigerum*, on top of a banking by the road. Winding down to the valley bottom past spectacular rockfalls we left behind the *Abies densa* woodland and entered a subtropical environment with paddy fields, maize fields and monkeys, the vegetation becoming progressively more tropical the further south we went, with palms and bananas, towering

bamboos and tropical orchids. Black eagles soared over the valley. As we drove south the silver fir gave way to bottle brush pine and we again came across *Lilium nepalense* on banking. The white-flowered, yellow-centred *Lilium wallichianum* was a lovely find on a slope amongst lemon grass. The lemon grass scented the air. It is harvested in this area, the oil being extracted and sent to Germany.

At Trashigang we headed south hoping to find the location of *Primula sherriffae* which, according to Sherriff's diary, was found on a '*large cliff on the east side of the road*'. Sadly, we did not find it but, scattered up a slope, we found a very showy *Roscoea* – a large-flowered white with purple markings on the labellum. It was locally common and later we saw it with *Lilium nepalense* var. *concolor* at the top of a regraded bank. No one had seen this before and it is thought that it may be a new species.

Heading south we wound up and down valley sides amongst tropical vegetation. The slopes were very steep and the lush plants jostled for space. Plants I have only seen in heated glasshouses thrived – orchids, *Hedychium* and *Costa*. A charming little *Corallodiscus* was discovered running down a wet rock bank. Waterfalls gushed onto the roads and we were delayed by landslips.

For what seemed like days we slowly wended our way southwards. Every kilometre or so, road signs reminded drivers to take care – we started noting them for their humour: *'Be Mr Late, not late Mr'*; '*Be gentle on my curves*'; '*Reach home in peace, not in pieces*' ... rain had made the road treacherous with mud and there were very steep drops down the other side. Finally, the slopes flattened out to farmland and beyond the last mountains we saw the flat plains of India. Descending towards Sandrup Jongkhar we caught sight of a pair of great hornbills, huge flashy birds swooping through the trees, every bit as tropical as the land they inhabit – a fitting farewell and end to our adventure.

Problems *en route*

Our main problems owed to the terrain and the weather – neither of which we could change. The trek itself was physically demanding simply because of the steepness of the terrain. Trek days were long because of shortage of suitable camp sites (grazing land was also required for the animals) and at times we had to walk much further than anticipated. Many of the climbs and descents were on steep and rocky trails that were often a challenge, particularly when muddy. New sections of trail rapidly became mud-pits with the constant rain and animal traffic. Always at the back of the mind was the thought of jeopardising the expedition by having an accident – on one day alone I had seven falls! Thankfully, three months of gym training prior to the trek had strengthened my body and no real harm befell me.

Saussurea gossyipiphora

Altitude made exertion difficult, particularly on steep climbs. Even though I was taking Diamox to lessen the effects of altitude I suffered badly from headaches that worsened as the day wore on. As expected, it rained, and heavily. Quite often we started our day in rain, which made walking more treacherous and also made us physically cold as well as wet. Photography under these conditions was tricky, with erratic light levels and cold hands. I took a new camera with me as backup. This, in hindsight, was not a good idea as operating a new camera under difficult conditions is not advisable.

Nevertheless, despite these adversities we saw and managed to photograph a fantastic range of plants and their landscapes. And the restorative powers of a cup of tea and a biscuit at the end of a hard day cannot be overestimated!

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It was a great privilege to visit such an unspoilt country and to see such a wonderful range of alpines. It surpassed all expectations. I would like to return to Bhutan someday to study the alpine flora further. Of course, the Me La would be the ultimate destination, as no overseas botanist has visited 'The Pass of the Flowers' since Ludlow and Sherriff in 1949.

Further Reading

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Corallodiscus species

Pests and Diseases in Gardens
Mike Thornley

While the present crisis facing ash trees creates collective feelings of loss it should be appreciated that the cause of ash die back, *Chalara fraxinea*, is only one of a growing number of pests and diseases that have appeared in this country (UK) over the last ten years, with more anticipated. These include pine tree lappet moth, pine needle blight, chestnut leaf miner, as well as aggressive phytophthoras, all of which have been identified in the North of England and Scotland. The

Infection of *Fraxinus excelsior* (Ash)

Camellia leaf blight

principal causes of the spread of these pests and diseases lie in global markets in goods and the consequent movement of plants themselves. For instance, long horn citrus beetle came in timber crates containing stone from China. That some of the pests and diseases are able to establish themselves may sometimes be put down to climate warming.

Rock gardeners, while having to deal with their own particular problems, may consider themselves immune from these new pests and diseases until it is realized that they often have other plants in their gardens that complement their interest in alpines, such as collections of rhododendrons and magnolias and other members of the Ericaceae. Many of these are particularly susceptible to what are currently the most serious plant diseases in Scotland: *Phytophthora ramorum* and *Phytophthora kernoviae* and, to a lesser extent, soft scale (*Pulvinarea floccifera*).

Blackening around the tips and mid-ribs of rhododendron leaves

Flower and foliage dieback – *Viburnum*

Leucothoe leaf necrosis

Kalmia leaf blight

Foliage dieback on *Pieris*

Phytophthora ramorum and *Phytophthora kernoviae* are fungus-like pathogens whose spores can infect a healthy plant directly through its leaves or through wounds and other natural openings. The spores are transported on wind-blown rain, drips from trees, upwards splashes from the ground, and along water courses. The infections are often associated with leaf parts where water accumulates, their brown or black marks showing on the leaf tips, the petiole and along the midrib. The infected plants not only decline and die but also act as hosts, leading to the further spread of the disease unless they are removed.

Being water-borne diseases, *Phytophthora ramorum* and *Phytophthora kernoviae* have been seen primarily as a west coast problem although there are now reports of outbreaks in more easterly locations. In some gardens the outbreaks have been contained and, in a few cases, eradicated. In others the outbreaks have proved to be intractable, with losses of considerable numbers of individual plants or whole areas of gardens. The diseases have been identified in commercial forestry and there are serious concerns that they may spread into native heaths and moors.

The main cause of the spread of the diseases locally is through infected plants, either purchased or gifted, being brought into gardens. The diseases can also be spread on muddy footwear, vehicles and equipment. For these reasons it is recommended that all potentially

susceptible plants are put in a temporary holding site that, ideally, is isolated and where they can be monitored for a minimum of six weeks. Boots and shoes should be cleaned, particularly after visiting a garden where there is a known outbreak (and where a notice should be posted to this effect). Tools should be washed down at the end of the day and sanitizing spray (such as Cleankill) should be applied to loppers, saws and secateurs, even before moving on to work on another plant. Sanitizing sprays are often highly corrosive and tools should be wiped down after the final spray each day and coated in oil or WD40.

Being notifiable diseases, *Phytophthora ramorum* and *Phytophthora kernoviae* should be reported in Scotland to the SEERAD Horticulture and Marketing Unit which will serve a notice on the site requiring the diseased plant or plants to be cut down and burnt, and the roots grubbed out. Restrictions will be placed on movement of plants from the garden and on the replanting on the outbreak site with potentially susceptible material for at least three years. An inspection regime will be put in place until the outbreak is eradicated.

Soft scale *(Pulvinarea floccifera*) is not a notifiable disease. It manifests itself on susceptible plants such as rhododendrons as a white and woolly excrescence on the underside of the leaf, and by the soot-like honeydew on the upper side of the leaf. This inhibits growth and causes dieback, which may be terminal. Treatment involves the regular spraying of the underside of the leaves in summer using, for instance, SB Invigorator, which may be difficult to achieve effectively on old and large plants.

There is a growing recognition that, as with human populations, pests and diseases thrive in congested or overcrowded conditions - a not uncommon state of affairs in many of our gardens where enthusiasm for plants often exceeds the available space. Plants benefit from being placed well apart, with plenty of light and air, in a balance between the indigenous and the exotic.

In the UK, the most useful contact for SEERAD is at hort.marketing@scotland.gsi.gov.uk. A useful list of known host plants for *Phytophthora ramorum* and *Phytophthora kernoviae* can be found at http:/www.defra.gov.uk/fera/plants/planthealth/documents/sucept.pdf. A useful guide is '*Phytophthora ramorum:* A Practical Guide for Established Parks and Gardens, Amenity Landscape and Woodland Areas' which may be downloaded from www.defra.gov.uk

Images are by courtesy of the Scottish Government and Defra.

Larch, needle blight and shoot dieback

Experiences with the *Anemone biflora* Group

Darren Sleep

The dwarf, tuberous, summer-dormant anemone species of the *Anemone biflora* alliance have a natural distribution from Iran and the Central Asian republics to Kashmir and occur in seasonally arid rocky terrain alongside many true bulbs. Whilst some species are relatively distinct in appearance there is a particularly complex group of yellow flowered 'species' that are distinguished primarily on the differences between basal and stem leaves. The situation is not helped by variability in flower colour in some other species that one might have thought were distinct on the basis of this character. For example, most of us are familiar with the red flowered forms of *A. biflora* but in the wild this species varies from this colour through coppery shades to pure yellow. Brian Mathew in his *Smaller Bulbs* publishes a table that attempts to sort out the species. When I first became aware of them in the mid 1990s it was from photographs in books, especially *Bulbs* by Phillips & Rix. At the time they were rare in cultivation in Britain, the introductions of the 1960s having apparently died out. More recently, as their parts of the world have become more accessible, these plants have begun to appear on the show benches again and tubers are available to buy.

I grow three species where I am confident of the identification: *A. biflora* (red forms), *A. petiolulosa* (yellow) and *A. tschernaewii** (very pale pink). Several years ago I purchased some tubers of yellow flowered species under various names such as *verae*, *baissunensis*, *petiolulosa* or others. Most are very close in appearance to my 'authenticated' plants of *A. petiolulosa* (from Archibald seed). One is distinct in habit and is a bit of a mystery. Unlike the others it is quite vigorously clump-forming, though the rootstock resembles several typical tubers of this group but is clustered together and connected, although easily separable. The flowers are unfortunately rather small. There is a faint red flush on the reverse which makes it resemble the only photograph I can find purporting to be *A. verae*.

In 2004 a seed collector listed seed of '*A. biflora*' collected in Kashmir. They were only £1 for a bulging packet owing to concerns about their viability. Because I was curious to see if these summer dormant species had longer seed viability than many other anemones, I split the packet into four as an experiment. I sowed one quarter in September 2004 and then another quarter each subsequent year so

Anemone petiolulosa

the oldest seed had been in the fridge for four years. Interestingly, although the percentage germination dropped each year, I still got good germination from the final sowing. In 2007 the first flower appeared from the earliest sowing and confirmed my suspicions that it was actually *A. tschernaewii*. In 2008 I got enough flowers to produce my own seed, which germinated well. In 2009 I got a bumper seed crop and in 2010 harvested enough to donate to the SRGC seed exchange and send some to friends on our SRGC internet forum.

With *Anemone biflora* itself, I have purchased tubers from various sources, having failed to grow it from Archibald seed - which germinated, so the seed was not at fault. I am delighted with the germination of seed of this species I recently obtained from Kurt Vickery. Again, I am now able to produce seed of my own. *Anemone petiolulosa* I grew from Archibald seed and have a small plant from Holubec seed also. My oldest plants are now twelve years old and I get some seed each year. I would like to try to recreate the beautiful natural hybrid between this and *A. tschernaewii* which is illustrated in *Bulbs* – my next project!

Anemone 'biflora group' growing conditions

These are my standard bulb growing conditions. Adult tubers are treated pretty much as Kath Dryden described in her *Alpines in Pots*. I repot each year in September and dust the tubers with either Sulphur or dolomitic lime powder. They are then potted into 10 cm square plastic pots (the type with side drainage holes as well as bottom ones) in 50:50 JI Number 2 and grit. The pots are then plunged in sand under glass. These anemones are perfectly cold-hardy. They get a thorough watering in September, then again in October. After this I don't water into the pots again until growth is evident (late January for most of them; *A. tschernaewii* usually flowers first - in February). During the winter I water the plunge occasionally and then the drainage holes must allow some moisture to get into the base of the pot. Once the shoots are growing strongly I water freely into the pots again and feed occasionally with half strength tomato fertiliser. Later in March they get the 'Ian Young potash treatment' too – a sprinkle of potash powder on the top of the pot, to be watered in with subsequent watering. They are dried off as the leaves start to yellow in late April or May. Then I lift the pots from the plunge and put them under the bench for a totally dry but not over-hot summer rest.

Propagation

Seed is really the only option for propagation although division of a mature tuber with multiple growing points would seem feasible if you have more courage than I!

I hand-pollinate to ensure efficient seed set and to avoid hybridizing. Once the seed is nearly fully developed I wrap the flower in a piece of

Opposite: *Anemone biflora*

horticultural fleece tied with thread. Otherwise the seed becomes suddenly 'fluffy' and airborne when one is not looking. The very warm and late spring of 2011 and the resulting early dormancy of the plants adversely affected seed production, with the later flowering *A. biflora* and *A. petiolulosa* producing no seed.

I keep seed at room temperature if I intend sowing it the same year. Professor Deno in his *Seed Germination Theory and Practice* (see for example http://ddr.nal.usda.gov/dspace/bitstream/10113/41278/1/CAT10633450.pdf) claims that *Anemone biflora* will not tolerate dry storage. This is contrary to my experience and that of other growers. However, Deno also states that the species belongs to the group of

Anemone verae (possibly)

anemones that have naked and not woolly seeds, and that intolerance of dry storage is characteristic of this group. Given that *A. biflora* actually has woolly seeds I suspect that the sample tested by Deno was misidentified.

Seed is sown in September on either a sand & compost mix or an inert mix of seramis, perlite & vermiculite although, as initial growth is slow, I feel this latter is perhaps a little too Spartan. I find the seedlings very prone to damping off, especially if I use soil-based seed composts. The seeds are barely covered (vermiculite

Anemone biflora seedlings

Anemone tschernaewii seedlings

works really well for this) and then kept moist with tap water (only) until well after the seeds have germinated. The pots are placed outdoors but under cover. Germination is usually evident at around the time the adults pop up in January and then I bring the pots under glass. I try to feed with each watering but err on the dry side as damping off is a danger until the stems firm up a little around March when I am happier to water freely. I am considering putting the pots outside in April when it gets hot under glass, in the hope of keeping the seedlings green a little longer. You usually only get cotyledons in year one, but the *A. biflora* seed from Kurt Vickery surprised me by consistently also forming a small true leaf. Once the seedlings die back for summer I keep the pots under cool cover with the adults but I don't repot for at least another season as the seedling

Successful seedlings in year 2

tubers are really tiny. In year two you get the first adult leaves and you may get flowers in year three, certainly in year four. But note that the year two seedlings are also prone to damping off as the new shoots appear; once past this stage they seem to be more robust.

A Footnote

* In an editorial quest for rigour, binary plant names in the journal are checked against the International Plant Names Index (IPNI), which in this case gives *Anemone tschernaewii*, although *A. tschernjaewii* or *A. tschernaewi* are commonly used in e-floras and literature.

The Diana Aitchison Fund

This fund provides grants and bursaries to support young people who want to pursue a career in horticulture, and especially to further their knowledge of alpine and rock garden plants, and their cultivation. The fund was established thanks to a very generous sum of money made available from the estate of the late Diana Aitchison, a keen gardener and plantswoman who set up and ran her own nursery at Spindlestone, near Belford, Northumberland. The fund is managed by the Scottish Rock Garden Club. Details of how to apply for grants are on the club website.

Among the reports that recipients have submitted over the years, the following one will be of particular interest to readers for its combination of practical, botanical and regional enthusiasms. Emmi Klarer was funded to work with Julia Corden at the Pitlochry Explorers Garden in 2012. Here is her diary ...

Plants, People and Pitlochry
Emmi Klarer

5th June. For my first day in the Explorers Garden, one of the volunteers took me around and gave some history and other knowledge about the garden and Scotland in general. I learnt about the danger posed against the UK's native Red Squirrels, which are abundant along with Grey Squirrels in my home state of Wisconsin. One of my tasks during my stay here will be to weed out Willow Herb, which also comes from America. There are several types that occur here, including one that is not invasive, but today I am focusing on Rose-bay Willow Herb.

Rose-bay Willowherb, or *Epilobium angustifolium*, is a tall rhizomatous perennial with alternate lanceolate leaves with strong veins. The plant is dark green for the most part, with some hints of red and blue-green on the leaves. Flowers are a bright pink and clustered in a terminal raceme, with pink hued sepals. Petals are rounded and uneven in size. Flowering span is from June to September but we prefer to not let the plant get to the flowering stage in the garden. This willow herb, along with the other invasive species, often grows in clearings, footpaths, waste ground, and water banks – nearly anywhere it can. It is found in most of Europe, Asia and North America.

6th June. Being this time of year, I'm spending most of my first week learning all the weeds that are shooting up. This year seems to be particularly bad in terms of weed production, but that also means the other plants are doing well, too. It's really quite amazing how just a few weeks ago none of these weeds could be seen. That's not to say they didn't exist - they were only underground. Today's weed is Ragwort, or *Senecio jacobaea*. Technically it is a wild flower of the Asteraceae (daisy)

family native to northern Eurasia, but here it is a weed. Ragwort is a biennial plant with straight erect stems with little or no hair and pinnately lobed leaves. It has hermaphrodite flower heads that are in clusters with bright yellow florets, but we try not to let the plant reach its flowering stage between June and November. While ragwort provides shelter and food for over 70 insect species, it also contains many alkaloids that make it poisonous to other animals. Most animals, like horses and sheep, do not eat ragwort when it is alive as it has a bitter taste but when dead and dried it loses its bitterness. This can be a problem when dried ragwort is in hay or grass that these animals eat because it is still poisonous, but sheep and goats have a reduced level of liver damage when compared to horses and pigs.

Senecio jacobaea

7th June. I have a fascination with plants that lack chlorophyll or have dark coloured leaves. Many cultivars of Japanese Maple (*Acer palmatum*) fall into this category. The Explorers Garden has at least one *palmatum*, but my photo was taken at Drummond Castle where there is an abundance of these deciduous trees. They are often small, even being called shrubs, reaching around ten metres which makes the trees ideal understorey plants in woodland areas. The leaves are four to twelve centimetres wide and palmately lobed with five, seven, or nine pointed lobes. The flowers are collectively in small cymes, the individual flowers with five red-purple sepals and five white hued petals. The fruit is a pair of winged samaras, requiring stratification for germination. The root system is compact, non invasive, and prefers well drained soils that are not over fertilized.

Acer palmatum at Drummond Castle

8th June. Today I learned about a new weed that could easily be mistaken for an intentionally planted flower. The native perennial's common name is Creeping Buttercup, or rather *Ranunculus repens*. In the Buttercup family, it has leafy, rooting runners that choke out surrounding

plants. Its distinctive feature is a stalked middle lobe on the basal leaves. The plant boasts small (about 3 cm) yellow flowers with five petals and hairy sepals that are out between May and August. It grows in a wide range of woodlands, meadows, farmland, footpaths, and wastelands which also contribute to its survival. This species of buttercup is distributed across Europe, Asia, and North Africa – nearly all over the globe.

11th June. Continuing my weed education, today's plant is what my Julia (Corden) calls Poppers. Poppers are what I found to be called Hairy Bittercress, or *Cardamine hirsuta*. This is an annual plant with erect stems branching at the base, with the potential of reaching thirty cm in height. Luckily it has a single taproot, which makes it easy to pull, but it still spreads like wildfire because of its fruit. The fruit is a siliqua (dehiscent) which pops open releasing far too many seeds to count that can spread as far as three metres from the parent. Leaves consist of two to four pairs of round leaflets arranged alternately along a central leaf stem. The small flowers, occurring in clusters on the terminal flowering stems with four petals and hairy petioles, make what can be a tiny but widespread plant barely visible.

Alchemilla mollis under rhododendron

12th June. Lady's Mantle, genus Alchemilla, is part of the Rose family. The main characteristics include palmately lobed, toothed, and hairy leaves that hold water droplets. Clusters of tiny, yellow-green or chartreuse flowers with green sepals and no petals appear in the late spring and summer, making this plant a subtle complement and good ground cover for gardens. It is an herbaceous perennial with about 300 species within the genus, the majority being native to cool temperate and subarctic regions of Europe and Asia. A few species are native to the mountains of Africa, North America, and South America. Most are clump-forming or mounded with basal leaves coming up from woody rhizomes.

13th June. Today I think it's about time I feature the famous and beautiful *Meconopsis* 'Lingholm', our Himalayan Blue Poppy. The flower petals are a deep blue, unlike the mauve and purple shades seen in George Sherriff's *Meconopsis*. The best Lingholms have four petals that overlap one another. The protruding ovary, style and stigma are surrounded by golden stamens. The fruit is an oblong-elliptical capsule that, at maturity, is about four cm long, covered in bristles, and full of plump seeds in appearance. While this poppy is a true perennial,

Meconopsis 'Lingholm'

Lewisias at the Explorers Garden

individual plants may be relatively short-lived (2-3 years) and others relatively long-lived. Julia tells customers to not let the plant flower the first year and to prune it, as the flowers the following year will be well worth the wait of looking at only large, elliptical hairy leaves.

14th June. Today was my first day of planting! First job was to clean off the dirt of the *Lewisia* plugs because they were to be planted in the sandy crevice gardens. This is essential so the plants would root in the sand and thrive. The plugs I planted were cotyledon hybrids but we sell both hybrids and 'Little Plum' at the kiosk and theatre.

Lewsias are herbaceous perennials native to western North America. They form low, fleshy rosettes of deep green leaves, bearing relatively large flowers in the late spring and early summer and often repeat flowering in autumn. The 'Little Plum' variety has flowers that range in colour from cotton candy pink to deep salmon. Cotyledon hybrids have flowers of white, yellow, pink, salmon, rose, orange, red, and magenta. All lewisias grow best in rock garden settings with excellent drainage as the lower leaves rot easily when wet. Once established, lewisias can be drought tolerant and spread 20 cm.

15th June. Some of my favourite plants in bloom at the moment are the aquilegias. Those in the garden are *Aquilegia* Songbirds (*Aquilegia hybrida*, family Ranunculaceae) that come in a wide range of colours from blues and purples to whites, yellows, and pinks – my favourite being the deep rose with inner yellow petals. The Aquilegia genus consists of about 60 to 70 species of perennials that are found in meadows, woodlands, and high altitudes in the northern hemisphere. The genus name derives from the Latin for eagle owing to the shape of the flower petals, which are said to resemble an eagle's claw. This shape also gives them the common name Granny's Bonnet. Flowers bloom in the spring and summer. Leaves are divided or lobed, but can also be heart shaped, arising from the base

Aquilegia 'Songbird' series

Cytisus scoparius

of the plant and alternately up the stem. The fruit is usually a follicle (dehiscent). Members of the Ranunculaceae family contain protoanemonin, toxic to humans and animals.

18th June. Anywhere I go in Scotland, whether it be by bus, car or train, I see a shrub people call Broom. This, or *Cytisus scoparius*, is scattered along roads and railways and tucked into fields and mountainsides, showcasing bunches of tiny yellow flowers and green leaves. Up close, however, one can see why the plant's common name is Broom. This perennial shrub flowers between May and June in clearings, along roads, and non-calcareous soils in western, southern and central Europe. Looking beyond the flowers, the inner part of the shrub is much like the brush of a broom - dead branches held on and intertwined with new ones creating a busy and tangled appearance. However, when maintained, Broom can make a lovely roadside view or accompaniment in a garden.

19th June. Continuing my affection for plants with dark coloured foliage, today I focus on *Sambucus nigra*. Commonly known as Black Beauty or Elderberry, this deciduous tree also combines my love of plants and food. The fruit is a dark purple to black berry produced in drooping clusters in late autumn. The berries can be eaten when fully ripe but are mildly poisonous in their unripe state (as are all green parts of the plant). Elder berries are used in cooking to make jam, jellies, chutneys, pies, and are infused in drinks. The hermaphrodite flowers in large corymbs bloom in midsummer, the individual flowers being white with five petals, can also be eaten fried, in soups, or infused in drinks. Leaves are opposite, pinnate with five to seven

Sambucus nigra

leaflets, and serrated. The bark is light grey when young but changes to a coarse, dark grey with furrows when older. It can grow up to ten metres high, but usually only reaches four to six metres and grows in a variety of wet and dry fertile soils with sun.

Primula flaccida

20th June. Today we had a customer who saw a flower she wanted to buy in the garden, but wasn't sure of the name. I was able to deduce that what she was talking about was *Primula flaccida*. While this was exciting for me, we didn't have any to sell. *Primula flaccida* is a short-lived, deciduous perennial with downy, serrated, green leaves that can reach twenty cm in length. Flowers are fragrant, purple to blue, bell shaped, and dense in conical spikes that fully bloom late in the summer season. It is often found in rocky pastures and open forests in the Himalayas of Szechwan and Yunnan.

21st June. One of the genera found in the New Zealand section of the garden is Leucogenes, otherwise known as New Zealand Edelweiss. Leucogenes species are perennial herbs in the Asteraceae (daisy) family, with leaves densely covered in silky hairs. Flowers are in clusters of 8 to 15 that bloom in summer, surrounded by woolly bracts.

Helleborus foetidus

One of my absolute favourite plants is quite similar to Leucogenes and although they are not planted in the garden they are sold at the kiosk. *Leontopodium alpinum*, or Edelweiss, has leaves and flowers covered with white hairs, giving the plant a woolly appearance. These hairs have a purpose - the plant prefers rocky limestone areas at 2000 to 2900 metres in altitude - they protect the plant from cold, aridity, and ultraviolet radiation. Flowers bloom between July

and September, consisting of 5-6 small yellow flower heads surrounded by woolly bracts in a star formation.

22nd June. Last week I had the good fortune to visit a nursery and see how to collect seeds and grow plants and plugs for gardens and the like. Today I got to collect seeds myself, which was a nice change. The seeds I collected were from Stinking or Bear's Foot Hellebore (*Helleborus foetidus*). Hellebores are a member of the Ranunculaceae family and are native to the mountainous regions of central and southern Europe, Greece, and Asia Minor. They are herbaceous perennial plants often found wild in many parts of England, especially in limestone soil. They have thick, succulent stems and glossy evergreen leaves. Flowering is in spring, with drooping, yellow to green (often with a purple edge) flowers with five petal-like sepals. The flowers contain nectarines which make them attractive to bees and other insects. All parts of the plant are poisonous because of glycoside.

25th June. Plants that are everywhere and difficult to miss, especially when in bloom, are rhododendrons. The genus Rhododendron contains over 1000 species of woody plants, most of which have showy flowers. Azaleas make up two subgenera and are quite common in gardens. One we have is *Rhododendron arborescens*, also known as Sweet Azalea after the flower's sweet aroma. They range in colour from white to pink with red stamens, blooming in late spring and summer. The flowers can also contain substances poisonous to wild animals and humans. Leaves may be deep red to purple in the fall, but are a glossy green otherwise. It is usually found growing near moist areas or streams and is indigenous to the United States.

Digitalis purpurea

26th June. A beautiful plant in the garden that can sometimes be a weed is the Foxglove, or *Digitalis purpurea*. Foxglove is an herbaceous biennial plant with spirally arranged hairy leaves, native to most of Europe. Flowering stems develop in the second year of growth with terminal flowers in a cluster, blooming early summer. Each flower is tubular and pendant, usually in shades of purple but sometimes in pinks, yellows, and white. The fruit is a capsule. Extract from this plant contains cardiac glycosides which aid treatment of

heart conditions. However, too much of this can be dangerous.

Primula vialii

27th June. Another primula that is just as popular but is completely different in physical appearance from *Primula flaccida* or *P. waltonii* is *Primula vialii*. It is a deciduous perennial with hairy leaves appearing in May and conical shaped heads with hundreds of tiny flowers of red calyces and blue to violet corollas flowering in mid-summer. One of the Scottish plant hunters, George Forrest, introduced them to Scotland in 1906 (from Northwest Yunnan and Southeast Tibet) and believed the primula to be a new discovery, consequently giving them the scientific name of *Primula littoniana*. It proved not to be new and its title was later changed back to the original, *Primula vialii*.

28th June. Many plants grown in gardens and sold in places like Explorers Garden are in the genus Dianthus (family Caryophyllaceae). There are about 300 species of flowering plants alone in this genus. Most are native to Europe and Asia, but some are also native to North Africa and arctic North America. Most are perennial herbs, but some are annual and biennial. Leaves are opposite, simple, and often linear. Flowers have five petals, usually with a frilled margin, and are mostly pale to dark pink. The ever popular carnation is included in this genus, which flowers from June to August.

29th June. The plant that forms the emblem of Scotland, as well as many garden entrances, is known as the Scots Thistle, or Cotton Thistle (*Onopordum acanthium*). Part of the Daisy family, this biennial thistle has purple-pink (sometimes white), solitary and terminal flower heads that are surrounded by spiny bracts and flower July through September. Its spiny leaves have shallow lobes with short stalks on the lower part of the plant. The Scots Thistle resides in roadsides, waste grounds and fields in most of Europe and where introduced in North America. Interestingly, the thistle may have been introduced to the British Isles rather than being native but nevertheless is scattered here. It may be used in homeopathy for heart and circulatory problems.

Dianthus 'La Bourboule Albus'

2nd July. It was a rainy day in Edinburgh today, so I warmed myself

up with a hot mug of peppermint tea and decided to find out a little more about this plant. There are many types of peppermint but this one is a variation called *Mentha citrata*, commonly known as Eau de Cologne Mint. Generally speaking it is a hairless variety of peppermint with a fine perfume. All peppermints are perennials with erect stems and opposite, narrow, serrated leaves. Flowers are stalked with pinkish corollas, blooming July to September in Europe, America and the British Isles on damp ground and waste land. Oils, tannins and flavonoids are used medicinally for digestive disorders, flatulence and nausea (often in the form of tea via steeping the leaves).

3rd July. It's my second day at the Royal Botanics of Edinburgh and today I was reacquainted with a primitive plant that is a weed in the glasshouses here. Horsetail (genus Equisetum) has jointed ribbed vegetative stems with funnel-shaped sheaths and long, dense whorls of branches that are hollow and ridged. The vegetative stems are green for photosynthesis but the cone-bearing stems that appear beforehand are the brown reproductive stage of life. Spores ripen between March and April. Horsetails contain flavones-glycosides, silicic acid, and saponins that make it useful in treating kidney and bladder disorders.

4th July. Andromedas, or *Pieris* (family Ericaceae), are currently in beautiful flower. Also commonly known as Fetterbush, Andromeda is a genus of seven shrub species native to the mountainous regions of eastern and southern Asia, eastern North America and Cuba. Their leaves are broad and spirally arranged, sometimes mistaken for being in whorls. The leaves are leathery in texture, and brightly coloured when young. The flowers are bell shaped, white or pink, and arranged in racemes. Their fruit is a woody capsule that splits into five sections with numerous seeds inside.

5th July. Bergenia is a genus of ten species of flowering plants in the Saxifragaceae family that are just starting to flower in the Explorers Garden. Native to Asia, especially the Himalayan region, the plants are a perfect fit for this garden. They are evergreen perennial plants with spirally arranged leaves that are leathery, heart shaped, and often with wavy edges. In cooler climates the leaves turn from a glossy green in the summer to red or bronze in the fall. The flowers are often bright pink, but range from reds to purples and even white, and are produced in a cyme.

6th July. A group of plants in the garden that just went out of flower is the trilliums. Trillium is a genus of about 40 to 50 species of perennials native to temperate regions of North America and Asia. I often wish we had a sign next to these beautiful plants to tell visitors that picking a trillium injures it by preventing the bracts from producing food for the next year; when people pick them it ends poorly for the garden and the visitor. Trilliums have an organ that attracts ants, who pollinate them. Ants

take seeds from the decaying ovary to their nest where the seeds then germinate.

Club Moss ready for weeding

9th July. Forget-me-not is another plant that is sometimes a weed, sometimes not. Today where I was working along the banks in the Himalayan valley part of the garden, it was a weed. *Myosotis sylvatica*, commonly known as Wood Forget-me-not, is a part of the Borage family with lanceolate, hairy leaves. It flowers between May and July with soft blue corollas. It is fairly widespread, except in northern regions, and naturalizes easily into gardens, meadows, and woodlands, creating the potential for this plant to become a weed.

10th July. One job that I always come back to because I can only stand it for an hour or so, is picking the single stalks of club moss out of the peat garden. Club mosses belong to the class Lycopodiopsida, commonly called Fern Allies. The group traditionally included fir mosses, quillworts and spike mosses but this is now debatable. Club mosses are thought to be structurally similar to the earliest vascular plants with small, scale-like leaves, homosporous spores, (usually) dichotomous branching stems, and simple in form. Interesting fact: dried spores of the common club moss created a powder called lycopodium that was used in Victorian theatre to produce flame effects with little heat.

11th July. I finally went to Pitlochry's Highland Night where nearly every song sung mentioned the plant that adorns the hills of Scotland, known as heather. *Calluna vulgaris* is a shrub in the heather family with branching stems and un-stalked evergreen leaves. The flowers that bloom between July and November appear in clusters along one side of a stem in dense racemes with pink sepals. Heather can grow in poor soils, moors, pinewoods, and dunes in Europe, Western Siberia, and North America. The flowers have antiseptic, diuretic and sedative properties and are subsequently used in tea, honey, and as a dye.

Rheum palmatum

12th July. Probably the most massive plant I've seen in the Explorers Garden or other gardens, excluding trees, is *Rheum palmatum*. This rhubarb plant is a perennial that can grow three metres in height and

Camellia sinensis

two metres wide. Its hermaphrodite flowers bloom in June and July, and are pollinated by wind. The seeds ripen July to September, but the leaf stem is prized by many people. Raw or cooked, the stems have superior rhubarb flavour and are tender in texture. Both the stems and roots have a history of herbal and medicinal use, mainly as digestive aids. The roots have also been used for external burns on the body.

13th July. As it's my birthday and I'm in the United Kingdom, I'm going to feature one of my own and the country's favourite drinks that comes from a plant, *Camellia sinensis*, commonly known as tea. White, green, oolong, pu-erh, and black tea are all harvested from this same species but are processed differently. It is native to China and South or Southeast Asia but is cultivated across the globe in tropical and subtropical regions. Tea is an evergreen shrub with a strong taproot and yellow or white flowers that have 7 to 8 petals, blooming between March and May. It is a hermaphrodite plant pollinated by bees. Leaves of different ages produce different tea qualities. Usually the bud and first two or three leaves are hand-harvested for processing every week or two.

16th July. Last weekend I went to Glasgow and visited two gardens, the People's Palace Winter Gardens and Glasgow Botanics, so this week I feature plants I saw there. At the Botanics, one of the glasshouses had an extensive collection of begonias. The genus Begonia lies in the family Begoniaceae and contains about 1000 species from the tropics and subtropics. Begonias usually have four coloured petals and sepals in two pairs of different sizes, as well as three wings on the ovaries of female flowers. Begonias are cultivated for pot plants indoors or for gardens so the varieties and hybrids are nearly endless. Most varieties are in one of three groups: fibrous-rooted, rhizomatous, or tuberous-rooted. The one shown, Magic Coffee, is rhizomatous. Its sterile flowers bloom white or off-white in late winter and early spring, repeatedly. It is an herbaceous plant grown for its dark black to burgundy foliage and

Begonia 'Magic Coffee'

can be propagated by dividing the root ball, rhizomes, or from leaf cuttings.

Pistia stratiotes

17th July. Another plant is from the greenhouse – *Pistia stratiotes* or Water Lettuce. Water Lettuce is a perennial free-floating aquatic weed with thick soft leaves that have no stems and form a rosette. Floating on the surface of the water, the plant's roots hang submerged beneath the leaves. Its dioecious flowers are hidden in the middle of the plant and turn into small green berries after fertilization but it also reproduces by asexual reproduction (stolons connecting mother and daughter plants). The plant's growth habit causes it to be considered a weed; its dense mats cover rivers, dams and irrigation canals and may restrict water flow, decrease biodiversity and serve as a breeding ground for mosquitoes. The plant is not a complete nuisance, however, as the Tikunas Indians crush the leaves, mix with salt and use the mixture for wart removal on the body.

18th July. Some of the most beautiful plants to my eyes form in extreme or strained conditions, including rock plants. *Oscularia deltoides* is a trailing succulent perennial with characteristically three-angled grey to green leaves that are tinged with red in the dry season. Its scented flowers are bright pink, blooming in early summer and autumn but only opening in the afternoons. The white stamens are in a cone in the centre of the flower. Its fruit is also sensitive to external conditions, repeatedly opening when wet and closing when dry.

Oscularia deltoides

Houttuynia cordata

19th July. From the vegetable garden comes *Houttuynia cordata*, an herbaceous perennial plant with adventitious roots and trailing stems. The leaves are alternately arranged, broad and heart shaped. The flowers are green-yellow with white bracts on a terminal spike and bloom in the summer season. *H. cordata* is

Papaver commutatum

Cardiocrinum giganteum

grown as a leaf vegetable, largely in Vietnam, and is often eaten raw. The leaf plays the role as a garnish, as a herb such as basil or mint would, and has what some people call a fishy taste.

20th July. One of my favourite plants from the vegetable garden – *Eruca sativa*, or rocket. Members of the Brassicaceae (cabbage) family, all rocket species have a pungent, peppery flavour in the leaf that increases with age. It is an annual plant with pinnately lobed leaves, native to Central and Southern Europe but also naturalized in Northern America. The flowers are typical of the cabbage family; arranged in a corymb, white petals with purple veins and yellow stamens. Its fruit is a siliqua that contains several edible seeds.

23rd July. Finally the Himalayan lilies are in bloom! Both the beautiful flowers and seed pods are a main attraction at the Explorers Garden. *Cardiocrinum giganteum* of the Liliaceae family is a large bulbous perennial that reaches two metres in height, sometimes more. The flowers are arranged in a terminal raceme and are fragrant, trumpet shaped, and white with purple marks. The hermaphrodite flowers bloom around August, are pollinated by insects, and the seeds ripen in September. The plant dies after it flowers. The broad leaves have been used as a cooling agent for wounds and bruises. The roots have been made into pastes to aid in bone therapy.

24th July. Today I went on a trip to Blair Castle and the famous Hercules Garden. While the orchard trees were looking sort of sad with no fruit, the

Ladybird Poppies in the herbaceous borders were looking brilliant. *Papaver commutatum* (part of the Papaveraceae family) is an upright annual with simple, oblong lobed leaves. Its solitary flowers have four bright crimson petals, each with a black spot at the base. Flowers bloom from June to August. This poppy grows best in full sun, in well drained, deep and fertile soil; this makes sense since the plant is endemic to Turkey and parts of Iran.

25th July. As I was cutting out rhododendrons today, I found myself wishing my encounter with Brambles was with their fruit on a buttered piece of toast rather than with their thorns in my arms. A member of the rose family, *Rubus fruticosus* is a spiny shrub with lobed leaves and prickly stalks. Its flowers bloom May through October and appear in clusters at the ends of side branches with five sepals, many stamens and white or pink petals. The fruit is clusters of juicy drupes that are black when ripe and contain tannins, acids, and vitamin C, often eaten raw or in drinks and desserts. Brambles grow in woodland areas and hedgerows in most of Europe, Asia and North Africa.

26th July. I only have a short time left in Scotland and I already miss the land, the people, everything. Scotland is special in so many ways, but since I'm writing about plants I'll focus on the Grand Fir found in Argyll that is the tallest tree in the U.K. *Abies grandis* is native to the Pacific Northwest of North America, but was first described by Scottish plant hunter David Douglas in 1831. Grand Firs are large evergreen coniferous trees that may reach heights from 40 to 80 metres. The needles are glossy green on top with two white stomata on the underside and a slightly notched tip. They are arranged spirally on the shoot. Cones are 6 to12 cm long with 100 to 150 scales and hidden bracts. Seeds have wings and are released when the cones hit maturity at around six months after pollination.

27th July. The Scots Pine is one of the only coniferous trees native to Scotland, along with Common Juniper. *Pinus Sylvestris* (Pinaceae family) is an evergreen coniferous tree that can grow up to 35 metres in height, sometimes more in particularly well suited sites. The bark is dark grey to brown, scaly on the lower trunk and thin, flaky and orange on the upper trunk and newer growth. Needles are glaucous and blue-green in colour, becoming darker green in the winter. Seed cones are globular at pollination and become ovoid to conic in the second year at maturity. Cone scales are pyramidal with a small prick on the umbo. Seeds are dark black with wings that are released nearly two years after pollination.

I am particularly grateful to the Aitchison Fund for this wonderful opportunity and I hope that my account has given my Scottish friends a North-American perspective while giving my North-American friends a perspective on Scotland.

Mendoza - High and Dry in the Andes

Liam and Joan McCaughey

Patagonia has been a popular destination for alpine enthusiasts, and several articles have appeared in *The Rock Garden* and the AGS Bulletin. Mendoza, which is the province of Argentina bordering on Neuquen, the most northerly province of Patagonia, has been less popular, in part because it is drier and somewhat less floriferous. Ger van den Beuken recently described his visit to the southern parts of Patagonia in the Rock Garden (2010 125:50-67). In January 2012, we joined a trip organised by Ger to Mendoza, including the northern part of Neuquen. This was a very international set - 16 people and 8 nationalities, and one of the most compatible groups we've travelled with.

After flying into Zapala, we drove west, and the first spectacle we encountered was not botanical. In a small museum in Plaza Huincul is an excellent display of dinosaur skeletons from local excavations, including an awe-inspiring replica of *Argentinosaurus* (accompanied by *Tyrannosaurus rex*, which looks like a terrier in comparison!)

In this short photoessay, we will skip over our first few days in northern Neuquen, which were mostly at lower altitude, and where the weather was very overcast, mainly owing to volcanic dust from the *Puyehue – Cordon – Caulle* volcano in Chile, which inevitably turned up on the sensors of our cameras. However, we spent two days exploring the Parque Provincial Volcan Domuyo, based at Vavarco in comfortable

Calandrinia picta

apartments run by the local community. Volcan Domuyo at 4709m is the highest mountain in Patagonia. Driving toward the higher slopes, we passed some impressive hexagonal rock columns, to remind us of the Giant's Causeway or Fingal's Cave.

Here at higher altitude, up to 2800m, the flora was excellent – *Calandrinia picta* with its painted seed capsules, *Chaetanthera chilensis*, *Chaetanthera villosa*, *Oxalis erythrorhiza*, *O. adenophylla*, *Perezia pilifera*, *P. recurvata* and much more, all in a dramatic bare mountain setting, while lower down a patch of yellow on a shaded wet bank were *Calceolaria biflora*, *C. dentata* and *C. polyrhiza* along with *Mimulus luteus*.

Above: *Perezia recurvata*

Below: *Perezia pilifera*

Detail of the hairless *Viola atropurpurea*

Often it is essential to look very closely to appreciate the detail in these small flowers. *Chloraea chica* at first seems quite disappointing in comparison to the much larger *C. magellanica* from further south but, in close-up, its flower - about 1cm across - shows its true character.

Chloraea chica

Viola atropurpurea

The *Viola atropurpurea* pictured here is from Volcan Domuyo, a typical form with tiny hairs, while on the left is an unusual form without hairs which we found a couple of days later at Laguna Escondida, with other rosulate violas – *V. philippii* and (perhaps) *V.* aff. *pusilla*.

Rosulate violas that we found in Mendoza were generally much smaller than they are in the wetter regions further south, and we had to look closely to see whether there was a flower at all, and could only appreciate the detail in retrospect from macro photos.

The mountains around are remarkable too: shaped by tectonic and volcanic activity as the Pacific plate is subducted along the western edge of the continent, and by the effects of glaciation, the structures and colours can be breath-taking. I cannot better the words of Charles Darwin from *The Voyage of the Beagle*, written in the Uspallata region further north – '*red, purple, green, and quite white sedimentary rocks, alternating with black lavas, were broken up and thrown into all kinds of disorder by masses of porphyry of every shade of colour, from dark brown to the brightest lilac. It was the first view I ever saw, which really resembled those pretty sections which geologists make of the inside of the earth.*' Charles Darwin was famously impressed with the majestic geology that he encountered in Patagonia and in the Mendoza region that we are exploring. He was equally unimpressed with the plant and animal life, famously writing '*The zoology of Patagonia is as limited as its flora*'.

Oxalis erythrorhiza

Laguna Escondida, the 'Lost Lake', lies remote above the Las Leñas ski resort, at 3100m, visited on our second full day in Mendoza Province. *Calandrinia* shone out as we arrived. Around grew low mounds of *Mulinum albovaginatum* and *Junellia ulicina*, strange rosettes of *Nastanthus ventosus*, brilliant white *Leucheria candidissima* with silvery foliage, *Tristagma sociale* with white trumpets rolled at their margins, *Calceolaria filicaulis* ssp. *luxurians* growing by a stream – and in just one place a small *Olsynium* aff. *philippii* stood out against a shaded rock.

The *Oxalis erythrorhiza* contrasted and complemented the dry rock slopes above. *Calandrinia affinis* was in a wide range of colours from white through varying shades of pink to

Laguna Escondida

Olsynium aff. *philippii*

red, while the smaller flowers of *Calandrinia caespitosa* were conspicuous in a brilliant saturated red, complementing the colour of the rocks in which it grew.

On our second day based near Las Leñas, we continued above the lake, up the slopes of Cerro Torrecillas, our 4wd cars stopping on a high

Opposite: *Calandrinia affinis* & *C. caespitosa* Above: *Olsynium* aff. *philippii*

ridge at 3400m. At the bottom of the cirque (just hidden behind our pictured *Nassauvia*), ice peeped out from below the debris. John Birks identified this as an ice cored moraine – a small glacier, perhaps dating from the Little Ice Age in the latter 18th century, which had been buried in and protected by the moraine.

Marcela Ferreyra seated on *Azorella monantha*

The flowers here were all hiding between rocks, or growing very low. There were *Adesmia capitellata*, *Astragalus vesiculosus*, *Junellia uniflora* and *Oxalis erythrorhiza*. We did not venture into the cirque, but walked down the rough mobile scree on the other slope. This needed careful steps, but is a spectacular situation with perfect backgrounds for pictures.

Opposite: *Nassauvia pinnigera* Below: *Nastanthus ventosus*

Senecio subdiscoideus

Volcan Maipo over Laguna Diamante & the memory of Henri Guillaumet

Outlined against a more conventional snow slope, *Nassauvia pinnigera* stood on the rim of the massive glacial cirque while lower down were *Nastanthus ventosus* and *Senecio subdiscoideus*. Robert Rolfe visited the area some twenty years ago (AGS Bulletin, 57:296, 58:23) and chose *N. pinnigera* as his favourite in this area. Much of the vegetation forms remarkable spreading cushions.

Leaving Las Leñas, we again had a long drive to our next destination. This is a big country, with sparse settlements between the towns, and routes are constrained by the mountain ranges. This meant that we generally had to come down into the edge of the plains and drive many hours before going up again. However this gave an opportunity to see some of the cacti and other xerophytic vegetation in this hot and dry region.

At Laguna Diamante, dominated by the perfect cone of Volcan Maipo, which straddles the border with Chile, we camped overnight. Walking along the beach and manoeuvring to photograph the Guanaco to best advantage, we came across a small plaque marking where pilot Henri Guillaumet crashed in bad weather in 1930 while carrying mail. He survived, and his exploits inspired Antoine d'Exupery's classic story *Night Flight*. The lakeshore is sandy gravel; the tiny viola there, *Viola vallenarensis* is for once not rosulate, but so small that a thumbnail will cover the whole plant.

As we approached our campsite, *Jaborosa laciniata*, almost black, was hard to spot, so different from the pure white *J. volkmannii* we had seen at Copiahue on another trip. Our guides set up tents and cooked an

Cristo Redentor

Viola vallenarensis

excellent meal before we hurriedly got into our tents as a sleet storm came in from the mountains. This was our only night under canvas and the only time on the whole three weeks that we had any rain. The most interesting flora was in fact found next morning as we walked along the road leading down from the lake, including a very attractive and so far un-named bronze-leaved *Oxalis*, together with *Calceolaria pinifolia*, *Caiophora coronata* and of course another tiny rosulate viola, this time *Viola montagnei*, in the *Viola volcanica* group.

Jaborosa laciniata

Wildlife - the Guanaco

Unnamed bronze-leaved *Oxalis*

Further down we had earlier had a rare hint of colonial history when we stopped for lunch in the small town of Villa 25 de Mayo and wandered around the ruins of the old Spanish fort, the *Fuerte San Rafael de Diamante* This was built in 1805 as the most southerly of a line of forts to guard against attacks from the Indians after the conquest of this part of Argentina. Not much later, the forces of General San Martin were in town, as Argentina fought its war of independence (1810–18) from Spain. The name is from the Rio Diamante, the river which flows down from the high Andes from the eponymous lake.

Rosette and detail of *Viola montagnei*

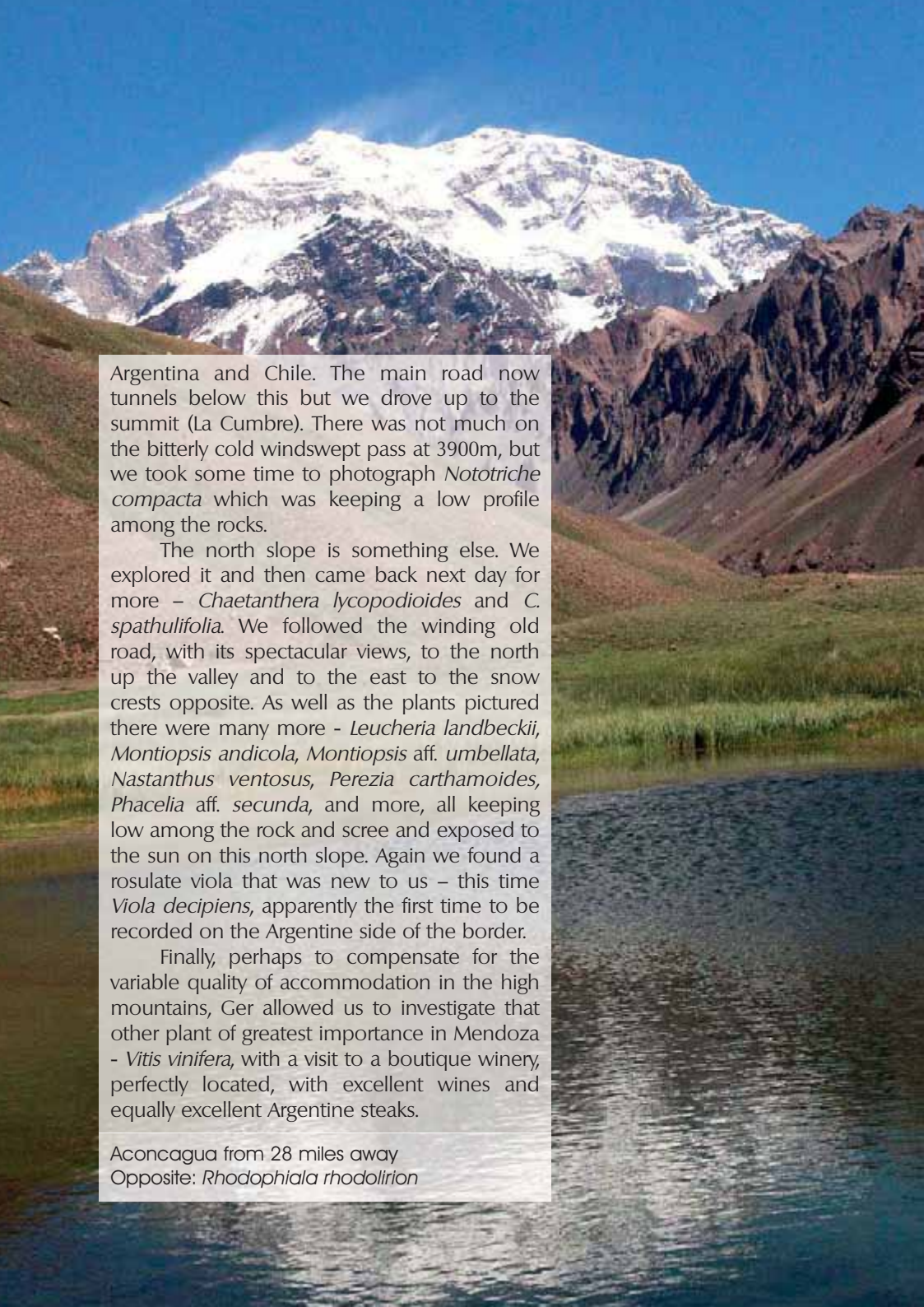
Nototriche compacta

Opposite: *Chaetanthera lycopodioides* & *C. spathulifolia*

Above: *Adesmia subterranea*

Below: *Viola decipiens*

Departing from Laguna Diamante, we drove north to the city of Mendoza, then west on the road which leads over the frontier to Santiago in Chile. This took us through the Parque Nacional Aconcagua, where we stopped to view the summit of Aconcagua, which at 6961m is the highest in the world outside the Himalaya. It didn't seem so high until we realised that it was still 28 miles from us. We followed the route of the Uspallata pass (part of the Pan-American Highway) whose highest point is at almost 4000m, crowned by the huge statue of *Cristo Redentor*, erected in 1904 and cast from the bronze of melted cannons as a sign of newly friendly relations between



Argentina and Chile. The main road now tunnels below this but we drove up to the summit (La Cumbre). There was not much on the bitterly cold windswept pass at 3900m, but we took some time to photograph *Nototriche compacta* which was keeping a low profile among the rocks.

The north slope is something else. We explored it and then came back next day for more – *Chaetanthera lycopodioides* and *C. spathulifolia*. We followed the winding old road, with its spectacular views, to the north up the valley and to the east to the snow crests opposite. As well as the plants pictured there were many more - *Leucheria landbeckii*, *Montiopsis andicola*, *Montiopsis* aff. *umbellata*, *Nastanthus ventosus*, *Perezia carthamoides*, *Phacelia* aff. *secunda*, and more, all keeping low among the rock and scree and exposed to the sun on this north slope. Again we found a rosulate viola that was new to us – this time *Viola decipiens*, apparently the first time to be recorded on the Argentine side of the border.

Finally, perhaps to compensate for the variable quality of accommodation in the high mountains, Ger allowed us to investigate that other plant of greatest importance in Mendoza - *Vitis vinifera*, with a visit to a boutique winery, perfectly located, with excellent wines and equally excellent Argentine steaks.

Aconcagua from 28 miles away
Opposite: *Rhodophiala rhodolirion*

Reflections on the Fife (East) Group - *Sic Transit Gloria Mundi*

Robert Mitchell

The SRGC was founded in 1933 and Andrew Harley of the Fife Forge Company was elected president. He was a fine alpine grower and won the Forrest medal in 1946 with *Nomocharis aperta* (above: photo Stephen Covey). Andrew raised two fine gentians, *Gentiana* 'Glendevon' and *G.* 'Devonhall', both grown today. John Mowat, curator of St Andrews University Botanic Garden (SAUBG), was also a founder and in 1962 gained an award of merit from the Royal Horticultural Society for his *Pinguicula grandiflora.*

As membership expanded, county groups were formed from 1950. In 1951 Fife group north and east members attended winter lectures with the Angus group in Dundee while south and west members went to Edinburgh. The first St Andrews evening meeting was hosted by Miss Pirie in Greyfriars Gallery on 16th November 1951, and George Sherriff lectured to the second meeting in February 1952. The group was obviously increasing, for in 1953 the county split into East Fife, convened by John Mowat, and West Fife, run by Edith Wilson. Sadly, the West Fife group folded in 1975 and now, almost forty years later, East Fife has followed it into abeyance.

The Fife (Dunfermline) Show

John Mowat and Edith Wilson cooperated to bring the SRGC shows to Fife. The Dunfermline shows commenced in 1952 in the music pavilion in Pittencreiff Park. Three trophies were presented to the group. Charlie Halley of St Andrews, a keen grower of dwarf conifers, inspired the Institute of Quarrying silver quaich for highest points in the Fife section, first won in 1952 by Jim Weir and his wife from St Andrews. In 1953 two cups were given to the group: the Carnegie Dunfermline Trust trophy for the highest points in open section was won by Mrs W Bell; and the Mrs W B Robertson cup for the best three pans of distinct genera was won by Mrs L C Boyd-Harvey from Edinburgh. One of the great innovations at the 1954 show was the children's section, with miniature gardens and wild flower classes. There was '*an enormous*' number of entries – at that time a good omen for the future. The Dunfermline show continued to 1977 when Bette Ivey won the Mrs W B Robertson cup, now called the Fife County trophy. This trophy, the Institute of Quarrying silver quaich and the Carnegie Dunfermline Trust trophy are now all awarded at the Stirling show.

The Journal

Over the years our members contributed many articles. The first journal in 1937 included *Ferns for the Rock Garden* by John MacWatt from Duns – the father of Anne Robson, one of our staunch members. *Primula* 'MacWatt's Claret' and 'MacWatt's Cream' remain well known to members and are still listed in The Plant Finder. John Mowat featured regularly with group and show reports, and articles such as *Some Dwarf Brooms* (1946) and *Native Plants worth a Place in the Rock Garden* (1948). He became editor in 1951 until he retired from St Andrews University in 1967. As editor he sought articles from far and wide, but always kept in touch with his colleagues. Jimmy Keenan, one of his apprentices, was appointed to the RBGE and wrote on *Some Daphnes for the Rock Garden* (1952). Mowat continued to contribute, publishing *Spring Flowering Crocus Species* in 1953. From St Andrews, I myself later became editor from 1976 to 1983, and re-introduced colour illustrations.

Our Conveners

Amazingly, in the first fifty years we had just three conveners. John Mowat (1950-67) built two fine and diversely planted rock gardens in the old botanic garden. Both have now long gone but his wealth of plants flourishes in the new garden at Bassaguard. I was convener (1967-84) and my research work on genus Trillium appeared in journals 11 to 13, continuing into Paris and now Paeonia. I was privileged to redevelop SAUBG on its new site from 1962. Ian Douglas (1984 – 2000) is a founding member and sometime chairman of the Scottish Rhododendron Society.

In recent years Bette Ivey, Marigold Speir, Angela Montford, Meg Pringle, Jim Thomson and Ian Scott helped keep the group active. Ian is interested in the genera Primula and Meconopsis. One of Jim's passions is gentians and the charming *Meconopsis* 'Mildred' is named for his wife. Brian Cunningham was in charge of the SAUBG rock garden before leaving for Scone Palace. In 2011 Marigold was awarded the Alpine Garden Society painting of *Crocus imperati* 'de Jager' - the President's Prize for outstanding service to a local group.

Conferences in St Andrews

In 1959, J L Mowat pioneered a new venture, *The Week*, a series of morning lectures, garden visits and evening sessions. SRGC discussion weekends had started in 1956 in Edinburgh. In 1976 and 1978 they were organized by the Fife (East) group in St Salvator's College, St Andrews. In 1993 (and 1994) the group hosted the Jubilee discussion weekend in University Hall, where Bill Mackenzie, one of the founding members of the SRGC, was presented with engraved Caithness glass before cutting the Jubilee cake with SRGC president Bette Ivey. Proceeds of the rare plants auction went to the Exploration Fund and one of the recipients was John Mitchell for his first of many official visits to China, in 1994.

Seed Exchange

We ran the seed exchange for several years from SAUBG with considerable help from Angus group members and the Friends of the Botanic Garden. Morris Wilson presided with great humour and thoroughness. He had been smitten by gardening on his retirement from dairy farming and, to his surprise and delight, was given the Golden Jubilee salver in 2002 for outstanding services. Jim Christie, another team member, was awarded the same trophy in 2003 for his unstinting support of the club and the Angus and Fife groups in particular.

Links to Other Groups

With the Ayrshire group, we financed colour pages in the journal in the days before universal colour in the hope that other groups would follow suit. Bette Ivey from Ayrshire was president of the club in 1992 – 1994, when she came to Fife. She is indeed a weel-kent group member and in 2002 was appointed SRGC honorary president. Typical of the SRGC, Fife and Angus groups were always very friendly, sharing lectures and garden visits. The fellowship remains strong and, with our own group in abeyance, we have been warmly invited to join the Angus programme.

St Andrews Botanic Garden

John Mowat arranged regular group visits from 1950 until his retiral in 1967 when I became convener and inaugurated hands-on practical evenings, affectionately called *Kindergarten Groups*. They included rock garden construction (we were developing the new rock garden and scree at that time), seed sowing, potting mixtures and methods, Jim Christie's show presentation techniques, and Mollie Harbord's huper-tufa troughs - complete with lists of approved plants.

My account of our group surely reflects similar experiences and enthusiasms of many other SRGC members and other groups. However, after decades of happy contribution to the club, our group now sleeps and we await either the turn of the wheel or the handsome prince who will bring it back to life.

Ian Douglas with the Fife (East) group around 1990. How fashions change!

James Pulham in Scotland

Claude Hitching

James Pulham & Son are best remembered these days for the picturesque rock gardens, ferneries, follies and grottoes they constructed during the Victorian years. This was the time when tourists returning from their Grand Tours of Europe sought to create natural habitats in their gardens for the ferns and Alpine plants they had collected during their travels. If natural rocks were not economically available, the Pulham craftsmen would fabricate their own by building up heaps of rubble and old bricks, and coating them with a proprietary brand of cement that soon became known as Pulhamite. The craftsmanship of these rock builders lay in their ability to sculpt the surfaces to simulate the colour and texture of natural rock.

As garden fashions evolved throughout the Edwardian period, the Pulhams extended their repertoire to include grand formal balustraded terraces, as Italian- and Japanese-style gardens were becoming popular with the travelling gentry. The full story of the lives and work of this remarkable firm is told in *Rock Landscapes - The Pulham Legacy* (see page 113) and its latest updates at www.pulham.org.uk. Suffice to say here that there were four generations; all those most directly involved in the business were named James, so in order to avoid confusion I find it easier to refer to them individually as James 1, 2, 3 and 4. The firm became established as James Pulham & Son when James 2 took his son, James 3, into the business in 1865.

Most of the firm's work was in England but there were clients in Scotland, Wales, Ireland and even Denmark. This article deals with their known gardens in Scotland, although I admit that I have not yet had the pleasure of visiting any of them. My account is based on historical records that I have discovered and on notes and information received from my many friends and contacts in Scotland who have direct personal knowledge of these sites.

1890–91: Ross Hall Park, Glasgow, Strathclyde

One of the best surviving examples of the Pulhams' work in Scotland is the first they constructed north of the Border. It was in Ross Hall Park - an area of just over thirty acres, set by the White Cart Water in the Crookston area of the south side of Glasgow. In fact, owing to the absence of any definitive records after 1877, this garden might easily

The boathouse in the rock pool at Ross Hall Park during the 2008 restoration (Photo: Ian Fraser)

have remained unknown outside its immediate vicinity had it not been for its recent rediscovery, in which Christopher Dingwall - the then Scottish conservation officer of the Garden History Society - played a significant part. The park was owned by James Cowan, a wealthy businessman and enthusiastic connoisseur of the arts who commissioned James 2 to '*reconstruct the garden, regardless of expense*'. As a result, the little rivulet that once flowed through the estate was transformed into '*... a layout of artificial lakes and rockwork, waterfalls and grottos, furnished with a great variety of plant life.*'

Ross Hall Park has recently been restored, thanks largely to funding from the Heritage Lottery Fund. A useful historical collection - *Letters of Mr Lachlan Cowan – written during his journey round the world to his uncle, James Cowan Esq, of Ross Hall* - was discovered by Catriona Morrison, who worked on the project. The restoration was completed in 2010; the picture shows the boathouse and surrounding rockwork in the rock pool, originally designed and used as a swimming pool.

1898 – Mount Stuart, Argyll and Bute

James 2 worked with the eminent landscape architect, Thomas Mawson, on a number of occasions. Their first collaboration came in 1893 at Belle Vue Park, Newport, Monmouthshire, Mawson's first contract for a municipal park project. The two evidently got on well because, when Mawson was commissioned by the 3rd Marquess of Bute to design a new garden to the west of his house at Mount Stuart in 1898, he invited James 2 to work with him again.

His plan was quite small, inasmuch as he created woodland walks that took advantage of the existing trees and other features close to the house, but it seemed not to include an overall scheme for the policies, the outer environs of the estate.

The most prominent feature was the rock garden, centred around two burns, crossed and re-crossed by a network of gravel paths and stepping-stones that snake down the hill, finally converging in a large fish-filled pond. Mawson was asked to help make more of the Racers Burn -

Top: The Calvary Walk at Mount Stuart c1905 (by permission of the Bute Archive)

Below: The rock garden at Mount Stuart 2009 (Photo: Graham Alcorn)

originally an unassuming small stream running from the hill above Mount Stuart to the sea - and so created of a series of pools and spectacular cascades that are said to replicate the Via Dolorosa, the route of Christ's suffering and death. It stretches from the shore to the Calvary Pond at the top of the hill and was described by Mawson as '*indeed a spot for meditation*'.

The rock garden was restored and reworked during the 1950s and 1980s. Part was also replanted in 2002 but the Via Dolorosa was overgrown and almost forgotten until 1993 when it too was cleared and largely restored. In 2001 the full shape and beauty of the Calvary Pond itself emerged from the surrounding woodland after dredging and drainage work. The concept and features of this project are very similar to those used by Pulhams at Batsford Arboretum in 1902.

The rock gardens at Mount Stuart (www.mountstuart.com/gardens/rock-garden/) and Ross Hall Park are not only very good examples of the firm's ability to create picturesque gardens that blend seamlessly into their natural surroundings, but also of the results that can be achieved by the hard work and generosity of people who are concerned about the preservation of our garden heritage.

1901 – Ballimore, Cowal, Isle of Bute

Thomas Mawson's autobiography also includes references to Ballimore, across the Kyles of Bute in the Cowal Peninsula, where he designed the gardens for Angus Fletcher of Dunans. Michael Davis, a local historian in Argyll and Bute, has written extensively about Ballimore ...

One of Mawson's most successful works was his least known – Ballimore Estate, in Cowal. There, his design control extended far beyond the garden to embrace roadways, park trees, and the wider landscape. Within the garden itself, landscaping was carried out on a monumental scale! Ballimore displayed Mawson's '*composite style*' wherein the formal and informal were bonded together by an intricate mesh of vistas and controlled views. Close to the house, the garden assumed a formal and architectural form with terracing, obelisks, elaborate bedding and clipped yews. But, in a variety of ways, this formal setting

Bridge and waterfall at Ballimore in its heyday
(Picture from Mawson's autobiography

inter-related and interlaced with the informal gardens and, beyond them, with the wider natural landscape. Thus, from the yew walks along the most formal terrace, stunning views appear over the stream below with its informal plantings and choice rhododendrons towards the wild garden and hence to the hills. Rhododendrons are a key component but, in order to retain balance, Mawson took care that they did not dominate the garden.

Mawson's description of the stream at Ballimore as '*a somewhat extensive piece of work*' was a jovial understatement. Its rocks, pools and falls were all artificially formed from little more than a walled ditch. Such work required the skills of specialists such as Mr Pulham and Mr Cadder to create the effect of natural stratification and its consequences. The result was so successful and so well publicised at the time through Mawson's own book that it very probably influenced the design of the new rock garden at the Botanic Gardens in Edinburgh. The gardens at Ballimore are now largely lost but Mawson's garden at Mount Stuart in Bute, laid out at the same time, offers an immaculately tended image, on a smaller scale, of the stream at Ballimore. Despite the poor state of the Ballimore gardens today, Mawson included a couple of photographs in his autobiography that nevertheless show the rocky stream and cascades in their prime.

1901 – Kelvingrove Park, Glasgow

According to Pulham's promotional booklet c.1877, the firm constructed a *'temperate and exotic fernery with waterfalls and stream throughout ...*' for a Mr J Findlay of Kelvingrove Park in 1873. However, this is a rather confusing reference because, in 1852, Glasgow City Council purchased land forming Kelvingrove and Woodlands Estate to create an area for the recreation and amusement of the citizens of the city's rapidly growing West End. Designed by Sir Joseph Paxton, it was the first purpose-designed and constructed park in Scotland and now represents an enduring legacy of Victorian urban parks. It soon became one of the city's best-loved historic parks although its connection with Mr Findlay remains unclear. Maybe he commissioned James 2 to construct the fernery as a gift to the local community, but today's surviving rockwork bears little or no resemblance to an '*exotic fernery*', so the indications are that his residence and gardens no longer exist.

Kelvingrove Park (see www.kelvingrovepark.com/heritage.html) was used for international exhibitions in 1888 and 1901, as well as for the Scottish National Exhibition in 1911. It was for the 1901 exhibition that James 3 was brought in to construct a rockwork feature close to the Kelvin Way, between two of the park's main access routes. It occupies sloping ground approximately 300m x 50m and forms an artificial zigzag cliff about 10 to 15 metres high. It is composed almost entirely of natural sandstone blocks arranged in courses to resemble rock strata and, although the

Formal east garden at Ardross Castle c1920 (Picture: Ros Jemmett)

original layout included a cascade and pools, these have long been dry.

1909 - Ardross Castle, Alness, Ross-Shire

The Pulhams' next assignment in Scotland was around 1909, when they travelled north to Ardross Castle at Alness in north-east Ross-shire. The castle was then the summer retreat of Charles Dyson Perrins, director of the family firm of Lee and Perrins, makers of the famous Worcestershire Sauce. Perrins had his main home at Malvern, where he engaged James 3 to landscape his gardens around 1901 to 1905. One of its most striking features was a Pulhamite-lined tunnel, complete with a liberal scattering of '*stalactites*' that ran beneath a road separating two parts of the garden. The family spent several months each year at Ardross, with house parties enjoying the grouse moors, fishing and deer forests.

Perrins took a keen interest in his gardens and in 1909 engaged Edward White, son-in-law of Henry Ernest Milner who designed gardens in England, Scotland, Denmark and Sweden and was author of *The Art and Practice of Landscape Gardening* (1890), to design a formal garden and terrace for the east front of the castle. It consequently falls slightly outside the terms of reference for rock gardening, being in the Italianate style with an impressive curved double staircase from the balustraded forecourt to a stone-flagged terrace landing. A single stone flight of steps leads down from here to the central rectangular compartment that is set to lawn and lined with cypress trees within a cypress hedge, while rectangular formal beds flank the central path as shown in the picture.

The Ardross estate was broken up and sold in 1937. The next owners lived there until 1983, when the estate was purchased by the McTaggarts, who have since been extremely active in bringing the formal and walled gardens, shrubberies and lawns back into good management. It is another excellent example of what can be achieved by people who are prepared to invest time, hard work and money in the restoration of their Pulham legacies, and of how rewarding and worthwhile this work has proved.

1910-15 - Craigengillan, Dalmellington, Ayrshire

During the following year, 1910, James Pulham and Son constructed a '*Rock and Water Garden*' for the McAdam family, of tarmacadam fame, on their estate at Craigengillan, near Dalmellington in Ayrshire. Over the succeeding years, the gardens became completely overgrown and were

effectively lost until remnants were rediscovered in 2010 by Mark Gibson, their present owner.

1922-23 - Dunira, near Comrie, Perthshire

The final currently known Pulham site in Scotland is at Dunira, near Comrie in Perthshire; very little now remains. Like Mount Stuart and Ballimore, these gardens were designed by Thomas Mawson and were also one of the very few gardens constructed by James Pulham & Son after the First World War.

The original Dunira House, whose name probably derived from the Gaelic Dun-iar-a, or '*fort of the west water*', was situated alongside the Boltachan Burn but was so close that it often flooded. In 1852, at which time the estate was about 5600 acres, Sir David Dundas ordered the demolition of the house and its replacement in the Scottish baronial style on higher ground a half mile to the east of the old site. In 1919, Douglas Macbeth Munro, a wealthy Clyde shipbuilder during the First World War, purchased the estate as a wedding present for his son, William Gilchrist Macbeth. William immediately redeveloped parts of the estate and commissioned Mawson to create terraced gardens around the house.

There is an interesting reference to these gardens in Mawson's autobiography, in a chapter entitled *Post-War Activities*. Part of it reads: '*The beginning of 1920 marked further progress in the post-war reorganisation of the practice. Old members of the staff resumed to their accustomed work, and pupils whose studies had been interrupted returned to complete their course of tuition. Old clients looked out their progress schemes, and new clients for both public and private projects were filling the office with interesting work ... Dunira is one of the most beautiful estates it has ever been my pleasure to study ... My instructions were to design the gardens, in both their character and extent, as I would like to see them ... On the west side one of the most interesting features is the rose garden and lily pond, the pond fed from a wall fountain by way of a narrow canal which was constructed with a number of side recesses, planted with iris and reeds. The feature my client most appreciated is the rocky stream which enters the gardens to the north and passes southward beyond the line of the rose gardens until it loses itself in the artificial lake below.*

Rocky pools and stream at Dunira (from Thomas Mawson's *The Life and Work of an English Landscape Architect*)

The rock-builders were fortunate in having to hand an abundance of picturesque moss-grown rocks, which they handled with great skill to construct the cascades, pools and the alpine gardens. In this work we had the able assistance of Mr Pulham, who continues the sterling reputation of his father and grandfather as rock-builders ...'

Dunira was used as a convalescent hospital during the Second World War and, sadly, it was almost totally destroyed by fire in 1948. It changed hands a number of times after William Macbeth's death ten months later, and parts of the estate have since been sold off into various private ownerships. The gardens were then totally neglected until 1999, when Channel 4 produced its television series *Lost Gardens*. One of these was Dunira; the tale of the research for these programmes is told in Jennifer Potter's eponymous book. However, it was of no long-term help. Ted Rushworth, author of *The local history of Dunira* (www.rushworth.com/dunira) brought me up to date in 2007 to say '*Outline plans were submitted for a large house quite sometime back, but nothing seems to be happening. The garden which the TV programme restored has gone back to nature! I have no idea what is likely to happen. It is a local firm that has bought the policies with the gardens, but there is a rumour that the entire Dunira estate may be sold before too long. Come what may, I doubt very much if the gardens are ever likely to look anything like they ever did just before World War II.'*

This is realistic assessment that our garden heritage can only remain intact if a large number of interested people devote considerable amounts of energy and hard work towards its restoration and preservation. The Heritage Lottery Fund may be able to help, but it can only do so if backed up by the support of local people and their elected representatives. Scotland contains some good examples of the various garden styles with which James Pulham & Son were involved over the years, and of how their work has fared as a result of varying levels of care and attention throughout their lifetime.

There is undoubtedly still a lot to learn about this remarkable firm, and, if anyone has further information that may be relevant or of interest, I would be delighted to hear from them.

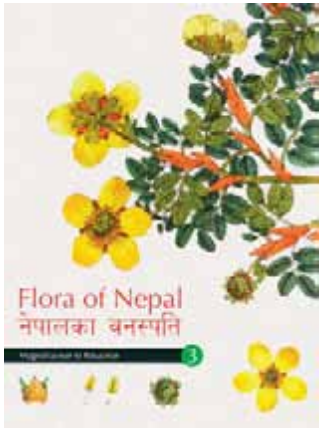
Further Reading

• Michael Davis (1966) *Seeing the Wood and the Trees – Thomas H Mawson and Garden Design in Argyll and Bute*, in the Argyll and Bute Local History - Issue 1, Argyll and Bute Library Service, 1996

• Thomas Mawson (1927) *The Life and Work of an English Landscape Artist*, Richards Press

• Jennifer Potter (2000) *Lost Gardens*, Pan MacMillan

Flora of Nepal Volume 3
425 pages including line drawings and distribution maps
ISBN 978-1-906129-78-1
Royal Botanic Garden Edinburgh £95



The Royal Botanic Garden in Edinburgh is at the forefront of botanical research in the Himalaya and Western China. After the completion of the *Flora of Bhutan* it was a natural follow-on to produce a *Flora of Nepal* and this is the first volume (3) published in a series predicted to run to ten volumes. They will be published as and when sections are completed and not in numerical volume order. This is a joint project with many other institutions, especially in Nepal and Japan.

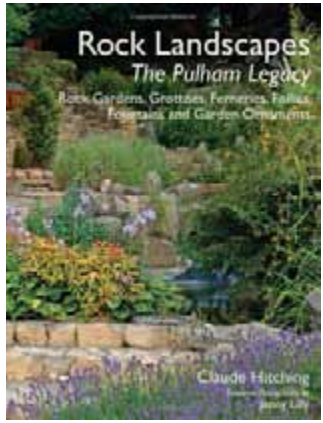
Volume 3 covers families from Magnoliaceae to Rosaceae and includes many plants of interest to alpine plant enthusiasts because it covers the Fumariaceae with 45 species of Corydalis, Papaveraceae with 22 species of Meconopsis, Cruciferae with Draba, Crassulaceae with Sedum and Rhodiola, Saxifragaceae with 87 species of Saxifraga, and the Rosaceae.

There is a key to the genera in each family and a key to the species in each genus. The account of each species covers its description, distribution, altitudinal range, ecology, flowering time and often some other notes. There is a map of Nepal for each species showing its known distribution in that country. Line drawings are scattered throughout the book to illustrate important botanical points; for Saxifraga there are six pages of line drawings to illustrate the sepals, petals, ovary and other parts of each species.

This is a large, authoritative and heavy book - some 285mm x 220mm - and it is certainly not a pocket field guide. It is very strong and well-produced with an attractive colour cover of a *Potentilla fruticosa* var. *arbuscula*. For any serious student of Himalayan plants this book is an essential purchase. It is just a pity that it has to cost so much; it will be expensive to purchase all ten volumes, but quality and thoroughness always come at a price!

Ron McBeath

Rock Landscapes
The Pulham Legacy
Claude Hitching, with photography by Jenny Lilly
300 pages, many colour and black & white photographs
ISBN 978-1-87067-376-1
Antique Collectors' Club Ltd £35



This lavishly produced book is the result of Claude Hitching's researching the work of his great-grandfather, William Hitching, William's brother George and William's three sons Arthur, Frederick and John who all worked as 'rock builders' for the firm of James Pulham & Son, the eminent Victorian and Edwardian landscape gardeners.

Four generations of the Pulham family, all named James, managed the landscape business, based in Hertfordshire, which specialised in the construction of large and ornate rock gardens for wealthy land owners with large estates. In areas where natural stone was unavailable or too expensive to transport to a construction site the Pulhams made their own artificial rock, '*Pulhamite*' – '*with burrs, rough bricks or concrete for the core – which is then covered with cement to imitate the colour, form and texture of the real rock most consistent with the geology of the district*.'

The first part of the book covers the history of the Pulham family and its various businesses other than the landscape gardening.

The bulk of the book covers forty major gardens constructed, starting in 1847 with Highnam Court in Gloucestershire through to the 1930s with Winterstoke Gardens at Ramsgate and the Memorial Gardens at Stoke Poges. The business finally closed sometime around 1939.

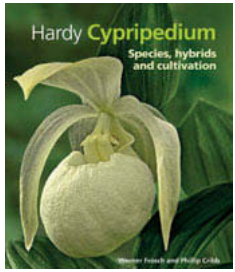
The gardens and estates selected for this book are described in great detail and are lavishly illustrated with photographs in black & white, where early photographs or sketches exist, and with many colour photographs of the gardens as they are today. The sizes of many of the rock gardens they constructed are almost unbelievable, as are the amounts of rock they used and how good the gardens still look today.

One of their large Scottish rock gardens at Ross Hall Park, Crookston, in Glasgow was constructed in 1890–91; this garden is now owned by the City of Glasgow Council and I am sure is worth a visit.

This is a beautiful book and a must for anyone interested in the history of rock gardens and their construction.

Ron McBeath

Hardy Cypripedium
Werner Frosch and Philip Cribb
ISBN 978 1 84246 464 9,
Kew Publishing 2013
£45 via www.kewbooks.com



This book has been eagerly awaited by enthusiasts since rumours first arose about its publication and it fully lives up to expectations. A large format, lavishly illustrated overview of the whole genus, the book begins with a history of Cypripedium discoveries, detailed descriptions of the plant structure and life-cycle, background information on the plants in the wild, and a balanced view of conservation aspects. This section is illustrated with habitat views and a detailed well labelled view of a dissected flower that is extremely helpful for reference when reading the botanical descriptions of the species.

The bulk of the book comprises species descriptions by section; this contains brief but updated information similar to that in Phillip Cribb's 1997 book on the genus in the Kew monograph series, but reflects the latest inevitable botanical changes and also includes new species described since the earlier work. Each species chapter has a detailed description - an invaluable aid to confirming identification and one that may give useful clues to the possible parentage of hybrids. Many species are highly variable; a range of colour photographs has been chosen to show the plant in the natural habitat and also close-ups show as wide a range of flower form as possible. A following section illustrates hybrids, both natural and man-made, and illustrates well the wide range of flower forms that have arisen as a result of hybridization programmes. Of the 123 registered man-made hybrids (84 illustrated), Werner Frosch has raised 48, giving an indication of his depth of knowledge of this genus.

The final section on cultivation seems at first sight to be relatively short, perhaps curious in a book with the aim of encouraging cultivation, but detailed reading reveals that this chapter is wonderfully concise. Everything is covered, from garden to pot cultivation, with further information on raising seedlings and dealing with pests. Ethically grown Cypripedium plants, raised in cultivation from seed, are labour-intensive and perceived to be expensive but careful study of this section should enable even the most novice grower to grow these plants successfully.

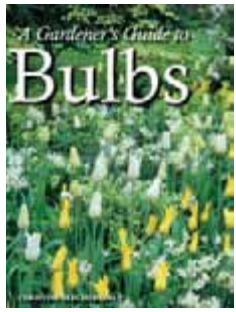
I have briefly touched upon the photographs; this is a book which depends highly upon its pictures - but they are little short of superb. The flower close-ups, especially, are a series of technically perfect portraits that will only encourage newcomers to try these plants. Most seem to be taken in garden surroundings and by a range of photographers but even

those photographed in the wild are of excellent quality. Some of the habitat scenes that seem to come from scanned transparencies earlier in the book perhaps suffer in comparison but this merely reflects the extremely high quality of the other photographs.

In their forward, the authors express their wish to encourage non-orchid growers to try growing Cypripediums, and in this they have succeeded admirably. A strong but subtle conservation message runs throughout the book. Now that an increasing range of relatively easily grown, man-made and vigorous hybrids is being raised, this should encourage cultivation of these plants and reduce pressure on wild populations. For those of us already converted, this is a book to return to frequently as it shows a standard of cultivation that we can all appreciate and to which we can all aspire. I thoroughly recommend it to you.

Peter Maguire

A Gardener's Guide to Bulbs
Christine Skelmersdale
208 pages, 350 colour photographs & 3 diagrams
ISBN: 9781847973764
Crowood Press 2012; about £20



This is a book that does exactly what it says on the cover. It is indeed a gardener's guide to bulbs. Christine Skelmersdale has forty years of experience of gardening with bulbs and it is the wealth of practical and first-hand knowledge gained from growing bulbs in a five acre garden and running the associated bulb nursery that makes this book so readable. I still have the receipt from my first mail-order purchase of dwarf bulbs from 1989, bulbs and corms purchased from Christine's Broadleigh Gardens and some of these are still with me, nearly a quarter of a century later.

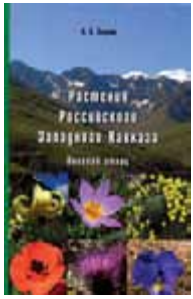
With a forward by Alan Titchmarsh and acknowledgements including Kit Grey-Wilson, Martyn Rix and Brian Mathew, the book has an excellent pedigree. It is well laid out, with an introductory section covering the nature of bulbs and general advice on cultivation, planting opportunities and aesthetics. There follows a seasonal guide to a wide variety of genera that can be grown outside in gardens. The book does not cover many of the more fussy small bulbs that grace alpine show benches but concentrates on those more widely available that are suitable for growing outside. With such a wealth of bulbous material available to the gardener the book understandably has to have boundaries. A few familiar plants are therefore missing but the species covered are wide ranging and, most importantly, growable.

For each genus there is an introductory discussion with cultivation hints and planting ideas that include both dos and don'ts. For example, I learned that the small reticulate irises if planted in cooler, well drained positions, perhaps among shrubs, stay in leaf longer than those grown in traditionally favoured sites in full sun. This in turn ensures repeat flowering the following year. Genera such as Narcissus and Tulipa which include a large variety of cultivars are given extended coverage. There follows a review of selected species, again with appropriate growing advice.

The book is copiously illustrated with high quality pictures. Very occasionally, wrongly spelled names accompany these images while perhaps two or three of the crocus species show signs of virus infection. However, these are very minor quibbles with a book that is in so many ways excellent. This publication will be a valuable resource for gardeners new and old who want to grow more bulbs and to grow them well; I heartily recommend it!

Tony Goode

Plants of the Russian Western Caucasus: a Field Guide
A S Zernov
More than 1700 colour photographs
ISBN: 978-5-87317-587-1
KMK Scientific Press, Moscow, about £50



This handsomely produced book is a guide to the identification of the plants of Adygea, Karachaevo-Cherkessia and part of the Kuban region south of the river Kuban. It contains information on 1211 species and is generously illustrated. Brief Russian text accompanies each photograph but all species are given their Latin names, for which there is an index. It is the photographs that make the book so attractive and, although often quite small, they are generally of a high standard and clear in detail.

The naming of species occupies a half-way house between the lumpers of the *Flora of Turkey* and the rampant splitters of the *Flora of the USSR*. The plants are arranged by the colour of their flowers. I might have preferred the arrangement to be systematic but I admit that it is sometimes useful to organize it by colour – especially for a botanical illiterate. This publication is a very welcome addition to the very small number of books useful for identifying the Caucasian flora, even if it does not always agree with the other two. If you are interested in the flora of the Caucasus, it would be well worth seeking out a copy.

Michael J B Almond

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