

THE ROCK GARDEN 148



January 2022

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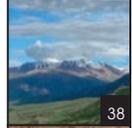
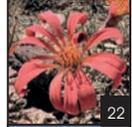
The Rock Garden

The Journal of the
Scottish Rock Garden Club
January 2022

Number 148

Cover: *Galanthus lagodechianus* in Armenia
(Photo: Tamar Galstyan)

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Anton Edwards
Duguid's Wark
Manse Road
Caputh
Perthshire
PH1 4JH
01738 710774
editor@srgc.org.uk

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Enquiries about advertising to:
Ngaire Burston
The Scottish Rock Garden Club
14/6 Roseburn Place
Edinburgh
EH12 5NN
Tel: 07523 325906
nburston1@outlook.com

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Dear friends, I feel very honoured and humbled to be writing this as your new president of the Scottish Rock Garden Club. It's always a role that you expect other people to be doing and never yourself!

I would like to take this opportunity to pay tribute to the immediate past president, Julia Corden and thank her for all her hard work. Julia had hoped to be organising the International Rock Garden Conference in Perth last year. However, Covid changed everything and Julia has navigated the club through one of the most difficult and challenging periods in our history. Julia and all the club council deserve great credit for the way they have managed to ensure that meetings and lectures have continued online using modern technology.

Many of you may know me but for those who don't here is a brief history. I was born and bred in Kirkcudbright where as a youngster I developed a great passion for plants and gardens. I worked at the West of Scotland Agricultural College before undertaking the National Diploma in Horticulture. From there I started working in the Savill and Valley Gardens in Windsor Great Park before becoming Head Gardener to her Majesty Queen Elizabeth, the Queen Mother, at Royal Lodge, Windsor. After leaving Windsor I became superintendent of the Woody and Ornamental and Alpine Plant Department at RHS Garden Wisley, eventually becoming Curator of the garden.

I returned to my beloved Scotland 6 years ago to set up my own horticultural consultancy business and also to lead garden & botanical tours around Britain and the world. At home I am creating a garden at Dalswinton Mill which contains an eclectic range of trees, shrubs, choice woodland perennials and bulbs. It's a garden where I really do indulge my passion for plants. We open it under the Scotland's Garden Scheme each year and you are all very welcome to visit.

I am excited to be taking on this new role and look forward to working with the trustees to ensure we go forward in the new evolving situation we find ourselves in. I look forward to meeting as many of you as possible during my time as president where we can enjoy the fellowship and community for which the Scottish Rock Garden club is famous. I wish you all happy gardening!

Colin Crosbie



Autumn in North-East Scotland

Ian Christie

So many people have discussed the weather whenever they met this year – so many highs and lows were recorded. Scotland has had its fourth hottest summer on record, and it is very seldom that we can say we are roasted here, with many months when the temperature was around 15°C, some days reaching 23°C; rain was also sometimes at record levels, with about 66 to 80 mm recorded over three weeks in September. The erratic and high temperatures affected plant growth and flowering so much that in consequence some only bloomed for a day or so while others produced huge and colourful longer-lasting shows.

We had many plants flowering out of season. *Meconopsis* loved the wet and the warmth, with *M. quintuplinervia* and the hybrid *M. x cookei* 'Old Rose' producing several blooms during September; even the big blue poppies produced a few. One of the problems with the extreme heat is that we did not get much seed to set. Flowers just dried up, and the lack of bees was perhaps another problem, although we seemed to have a reasonable number around at times. There were problems with seedlings because what shade we had was not enough to save the many delicate little plants. This also happened with some divisions that failed, notably with several early *Meconopsis*. Thankfully, later ones were very good, although we were compelled to set pots in trays of shallow water.

Above: *Acer* tints are not the only Autumn colours we may enjoy: read on!



Meconopsis cookei 'Old Rose'
Meconopsis quintuplinervia





Gentiana

During lockdown, we certainly had more time to look after plants, and the garden was our saviour during those lonely times. Additionally, our local farmers' fields have two-metre uncultivated margins, so we were able to walk around the countryside hardly ever meeting anyone. Back in the garden I nowadays collect whatever seed we have: *Lilium* did very well, and we have hung up some stems to dry out their seed heads a little. Where plants died down, I top-dressed their beds to help *Gentiana* 'Saltire'





Gentiana paradoxa hybrid

conserve moisture. Perhaps this was not entirely necessary, as we have had a few monsoonal autumnal showers more recently, which encouraged a multitude of weeds. Ann is great at keeping those in check. At the time of writing (end of September) I had lifted and potted several *Lilium*, *Nomocharis*, *Meconopsis* and *Trillium* for the spring sales (we live in hope). I have also lifted, split, and replanted several *Meconopsis*. I am very pleased we had a good shower of rain last night,

Gentiana septemfida





Roscoea 'Royal Purple' at Branklyn Centre: *Colchicum* group

having just read that our September has been the hottest on record, so the rain is at last welcome.

Some plants flower several times in Autumn, giving us pleasure and surprises. *Gentiana septemfida* offers a wonderful carpet of deep blue flowers, then *Gentiana*



Veratrum fimbriatum



Roscoea 'Red Ghurka' at Branklyn and at home (inset)

sino-ornata hybrids display remarkably rich shades of blue, and *Gentiana* 'Saltire' enchants us with a real mix – white with a blue cross. *Anemone japonica* and its hybrids give their tall elegant white flowers in abundance,



Anemone japonica 'Double Pink'





Kirengeshoma palmata

with the new hybrid 'Double Pink' lasting for months. This double pink plant is perennial and forms clumps with dark-green divided leaves. The graceful flowers that appear in Autumn are on tall spires. Protected from strong sun, it is a wonderful plant for shady areas even as drifts under trees, where it will flourish in moist and well-drained soil. Another striking shade-lover is *Kirengeshoma palmata* (one of only two species in the genus,

Phylliopsis [*Kalmiopsis* x *Phyllodoce*])

Facing: *Colchicum albanense* 🍁







Gentians



The attractions of *Actea simplex*

the other being the similar shade-loving Korean *K. koreana*), whose unusual buds and flowers are also to be found at Branklyn Garden. Several dwarf shrubs such as *Phylliopsis* hybrids showed us superb pink thimbles for weeks on end. A rare *Veratrum fimbriatum* with white frilly-edged flowers with a yellow centre is still flowering as I write. *Codonopsis* trails across shrubs and rhododendrons: *Codonopsis grey-wilsonii* syn. *nepalense* is an exceptional plant that gives startling blue flowers in succession while *Codonopsis grey-wilsonii* 'Himal Snow' is – as the name suggests – white. Another spiky beauty, the tall feather-like white flowers of *Actea simplex* attract many butterflies, bees and other pollinators.

Alstroemeria hybrid





Gentians

Lower to the ground, cyclamen are in abundance at this time of year with their seeds being spread around by ants who love the sticky coating around the seed. *Colchicum* with wonderful pink and white forms make a big splash, although the leaves that follow can be over-powering. *Roscoea* 'Red Ghurka' gave us welcome red colour, also found at Branklyn. But the most dramatic reds surely come from my concluding *Arisaema consanguineum*, whose berries are simply astounding.

Nights draw in now with much cooler temperatures, heavy rain and stormy winds as I guess we head towards the winter in which I hope you will read this to recall warmer months.

Arisaema consanguineum





Bulbs at the Botanics

Elsbeth Mackintosh

Bulbs have long been a feature of the British garden and landscape. Many are easy to grow in our temperate British climate, none more so than the snowdrop, which is regarded as the herald of spring, flowering towards the end of, or after, our sombre winter months. This bulb naturalises so easily that it is often regarded as native but is thought to have been brought here by the Romans. A great many bulbs grown in British gardens hail from Europe through to Central Asia towards the Himalayas and around the Mediterranean basin. Indeed, narcissi are thought to have originated in Spain while crocus are thought to have Turkey as their evolutionary epicentre. The Mediterranean climate common to much of this whole area with its long dry summers and cool moist winters has led to the evolution of thousands of bulbous species and their differing storage mechanisms. They lie dormant during the hot summers only to burst into life with falling temperatures and autumn rains. Some react by flowering immediately, such as the autumn-flowering crocus and colchicums, while many other well-known bulbs such as *Galanthus*, *Crocus* and *Narcissus* slowly grow roots over winter and then flower in spring when rising temperature, light and moisture levels trigger growth.

Facing: Wild-collected *Frillaria imperialis* *Galanthus nivalis* Sandersii Group



A wide range of bulbs comprising over 1000 taxa from temperate to tropical climates is grown at the Royal Botanic Garden Edinburgh and these are used for research, education and display. In the Alpine Department, bulbs play a significant role, with bulbous species numbers comprising a significant part of the total five thousand accessions and taxa. We mostly cultivate temperate bulbs not only from Europe, Turkey, the Mediterranean and North America but also from the southern hemisphere, notably South America and South Africa. Most of our bulbs are winter growers flowering in spring and are grown in cold glasshouses and frames. The summer growers and flowerers are grown in a frost-free glasshouse.

Wild-collected *Iris iberica* ssp. *elegantissima*



Our collection is ever-increasing. It is added to annually with both wild-collected material from expeditions and, to a lesser extent, by material from private donors. New accessions come in as both seed and living contributions. Bulbous material is grown both for the alpine bulb collection and for planting out in the rock and woodland garden, with some taxa being grown specifically for outdoor planting – such as trilliums, lilies and arisaemas. All living material brought into the garden is grown on



The alpine house in autumn

for six months in quarantine conditions and is checked pre- and post-quarantine by our pathologist to ensure that no diseases are brought into the garden.

Once bulbs have been incorporated into the alpine collection, we aim to repot them all annually. The repotting season starts in late summer once the bulbs have had a summer rest: *Muscaria*, *Colchicum*, *Sternbergia* and autumn- and spring-flowering *Crocus* are repotted. These are followed by *Galanthus*, *Narcissus*, *Erythronium* and *Fritillaria*. The repotting of other genera is fitted in between these large groups. The large *Fritillaria* and

Iris graeberiana

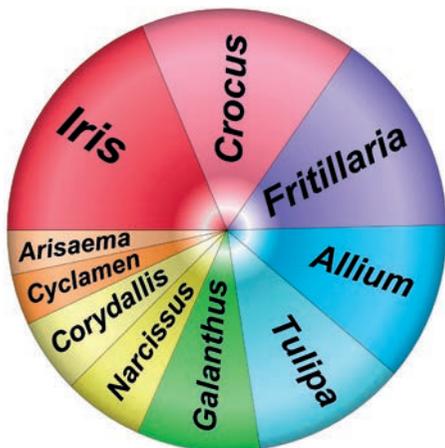
Juno iris collections are both very time-consuming but we aim to have the majority potted by the end of September. However, growing seasons vary and sometimes bulbs may be too far into growth by the time we get to them, so we then simply replace all removable spent compost with a top dressing of fresh. Tulips as a genus are generally much more forgiving and may be potted later (even into November!) without affecting their growth or flowering.

Most species are grown in the same growing medium,





comprising 50% loam-based John Innes No 2 compost and 50% sharp grit by volume. A slow-release fertiliser (Osmocote) is then added to compensate for the dilution of fertiliser by our addition of grit to the mix. This basic mix is tweaked depending on the species so, for example, we add composted bark to woodlanders and more grit for the Juno irises.



Proportions of the 675 taxa in the ten main alpine genera cultivated at RBGE

We always use clean clay pots and place each bulb a third to half of the pot depth –

depending on the species and bulb size. The bulbs are placed in a single layer close to each other without touching. Proximity aids bulb growth as well as providing a good display. Pots are filled to within 15 mm of the pot rim and then top-dressed with a layer of hen grit 10 mm deep, helping conserve moisture. We plunge pots to their rims in sand bays in our glasshouses and frames. The sand bays provide a cool and damp but free-draining substrate, protecting pots from extreme moisture and temperatures. The bulbs are then watered thoroughly twice, a month apart, the first time generally at the end of September. This frequency mimics the autumn rains of their native habitats. We keep the sand plunge damp throughout winter and only water the pots if they start to dry out. The bulb roots grow throughout winter and pot watering resumes once leaf growth starts, when the bulbs require more moisture. We water the bulbs well while in growth and feed frequently with a high potash liquid feed after flowering. Watering and feeding are reduced as the foliage dies back and the bulbs are given a summer rest, depending on individual requirements.

Patience is needed. Many bulbs come to us as seed, the majority being of wild origin. It can take five or more years to reach flowering size, with some seed such as iris taking almost the same amount of time to germinate. It is a lengthy process!

We sow seed in late autumn or late winter, depending on the species. If we have had to store the seed or are unsure of how long it has been off the plant, we soak it in lukewarm water – mixed with a dab of washing-up liquid to reduce viscosity and promote permeation of the seed – for 24 hours before sowing. All seed is sown in a compost comprising three parts of riddled John Innes Seed Compost to one part chick grit by volume. We use clean seven cm square plastic pots, sowing

Facing: Wild-collected *Fritillaria bucharica* 🍁



IRIS
Iris sibirica
Blossom 27. 2001. 10
Blossom 27. 2001. 10

multiple pots if we have a lot of seed, rather than using a larger sized pot. Generally, flat seed is sown on the surface of the compost and round seed is buried to ten mm. Unlike normal alpine sowings, bulb seeds seem to prefer company and can be sown quite thickly. We cover all pots with a layer of chick grit and then water from the bottom. This ensures that the seed compost is evenly moist and the seeds bed in without being washed into corners or lifted above the grit. We then put out the pots into an open seed frame where they are left to the elements until they germinate.



Bulb friends - surrogate bulbs are used to match real bulbs to compost volume

After germination, the seed pots are removed from the seed frame and grown on in a bulb frame with other small bulbs. We keep them in their original seed pot and feed often while in growth. They are never allowed to dry out completely. After a year, and once the seedlings are growing strongly, they are re-potted, but only by moving the whole pot of seedlings, compost and all, into a larger pot with fresh growing-on compost. This ensures that the tiny bulbs remain undisturbed. They are then fed and watered and the process continues until the bulbs are of handleable size. We then incorporate the bulbs into our collection or further bulk them up by growing on in pond baskets plunged in compost.

Seedlings are very vulnerable and can fail for several reasons, resulting in small numbers of bulbs. Similarly, over years of cultivation, mature bulbs may bulk up very slowly or even fail, leaving a small number of offsets that must then be bulked up to maintain the collection.

In general, when potting, the pot size is dictated by the ultimate size and root volume of the species. However, whenever there are only a few bulbs or the bulblets are small, the size cannot be reduced too much, because of the danger of drying out. Nor can a small number of bulbs be put in a disproportionately large volume of compost. This would stay too wet and consequently rot the bulbs. Our solution is to use what we call bulb 'friends' or – more professionally termed – surrogate bulbs.

The origin of this method is lost in the mists of time but it is used by numerous growers. We select an average pot size and place the bulblets at the appropriate depth with our chosen companions: quartz stones of a size similar to the bulblets are placed around and amongst the

Facing: Wild-collected *Iris nicolai* 🍁

little bulbs. The pot is then filled and finished as usual. Ian Young, one of Scotland's most accomplished bulb-growers and author of *The Bulb Log* (<https://www.srgc.net>) uses S-shaped polystyrene packing bits. Stones and polystyrene shapes perform the same function: neither of them degrades and both mimic bulb companions, providing a drier growing environment. By reducing the volume of compost in the pot, they perhaps enable the compost to dry out, and encourage the bulblets into summer dormancy.

These growing methods have been used and refined over the years I have worked in the Alpine Department. We thought it particularly important to re-pot the bulbs annually, not only to give the bulbs fresh compost to ensure good flowering but also to assess their general health and to check for hidden pests such as the dreaded narcissus fly, which can cause major destruction in a collection. Sitting here writing this in early 2021, I admit that we couldn't follow these practices in 2020. Covid-19 not only had a devastating effect on the whole world and no doubt will have far-reaching consequences for the future, but has also managed to affect every facet of our lives, both working and home. For us at the Edinburgh Botanic Garden, the garden shut and went into lockdown with a skeleton staff maintaining its most important collections. After lockdown, staffing levels were low, with staff all working in isolation without assistance from volunteers, students or interns. This has affected our collections, and the potted ones have

Fritillaria chitralensis



not been potted up. Here in the alpine garden, we sorely missed our helpers at bulb-potting time. We had to change our methods and only managed to repot the most essential bulbs. All the rest were top-dressed – and it still took the two of us three months to complete! It remains to be seen what impact this will have on the collection. We are hoping that the top-dressing with adequate feeding later will compensate for the lack of a full pot-up. We have found that necessity is the mother of invention and we have devised quicker and more efficient practices which we will take into the future and, who knows, maybe the bulbs will benefit from being undisturbed! Time will tell.

Spring in the alpine house



An Essay from Argentina and Chile

Ger van den Beuken



It is now four years since I finished organizing tours to South America. Mariet and I still remember and extend special thanks to our good friend and remarkably informative Argentinian guide, Marcela Ferreyra. It was at the time quite emotional to say goodbye to Patagonia, to all those awesome plants and to the spectacular nature of this astonishing land. But, in issue 145 of this journal we embarked on a quite different journey of sharing our memories with you. We started with those species beginning with the letter A and we continue our alphabetic expedition here with recollections of the letters L to O. Although unknown to many alpine growers, we hope these plants may encourage you to make a start with this fantastic vegetation.

Lithodraba mendocinensis grows to a hard-domed cushion 20 cm high and 60 cm across. Tight rosettes of white sessile flowers form the cushion. It comes from exposed places on the Patagonian steppe and in the high Andes up to 4000 m on gravelly summits. Propagation is from cuttings or seeds.



Loasa nana is a neat mat-forming species with solitary white-centred yellow flowers. It comes from the southern volcano district in Argentina and Chile on steep mobile screes and bare rocky slopes to 2500 m high. It may be propagated from seeds or cuttings. If possible, it could be an excellent show plant.



Maihuenia poeppigii forms spiny cushions on lava fields from South to North Patagonia, 8 cm high and 1.5 m across. The stemless yellow flowers are as much as 5 cm across. This is a hardy species suitable for a dry and sunny spot in the rock garden. Propagation is from seeds, cuttings or division.



Montiopsis andicola* syn. *Calandrinia andicola is a slender-stemmed species with narrow spatulate leaves. The deep pink flowers are solitary or in pairs and are 2.5 cm across. The species is found in Chile, particularly on hot dry rocky slopes to 4000 m. It is propagated from seeds, needing a cold period to break dormancy. One for the alpine house.



Montiopsis gayana* syn. *Calandrinia gayana is a more or less cluster-forming species with stemless purple flowers. It especially grows in Central Chile but also occasionally in North Patagonia in steppe communities and on arid barren slopes to 3800 m. Propagation of this species is from seeds.



Moschopsis leyboldii comes from the Central Andes in Argentina and Chile to 4000 m high. It forms a succulent-like rosette and grows mainly on slopes in rocky or sandy conditions. The white stemless flowers are 3 cm across. Propagation is from seeds.



Mulinum echinus is a deciduous 15 cm high domed cushion-forming semi-shrub about 30 cm across. The small yellow flowers are decorated by beautiful purple cotyledons. In Patagonia it is found in dry steppe conditions to 1200 m high. Propagation is from seeds. If successful, it is a plant for the dry rock garden.





Mulinum valentini is from Santa Cruz and adjacent areas of Chile at 2000 m. This species is found in the open steppe communities in dry and all weather conditions. It forms cushions about 10 cm high and 20 cm across. The yellow flowers are stemless. Propagation is from seeds.



Mutisia linearifolia is a short branched compact green shrub, only 20 cm high. The plant grows in the southern Andes on volcanic slopes around 2000 m high. The inflorescence is close above the branch and the flowers have a special shape in a yellow-orange colour. I regret that I can offer no details of cultivation and propagation.

Mutisia sinuata is a species from the northern Atacama in Chile, only 20 cm high. However, according to various descriptions it is a climbing plant that overgrows shrubs. The leaves are grey and strongly divided with pointed tips. The flowers are bright orange. Propagation is from seeds.



Mutisia subulata grows mainly in Chile all along the Central Andes on rocky slopes to altitudes of more than 3000 m. This dwarf shrub has bright-green leathery leaves and large orange-scarlet flowers. The species is in cultivation and in the right dry and well-drained conditions specimens retain their character. The propagation is from seed.



Nardophyllum bryoides is an attractive cushion-forming species, mainly growing in Tierra del Fuego and the southernmost regions of Chile and Argentina. The plants grow between big rocks in a sandy substrate at low altitude. The leaves are recurved and tomentose on the surface. The golden yellow flowers are almost stemless. It is possible to grow this plant in the alpine house and the propagation is from seeds.



Nassauvia ameghinoi grows as soft cushions only 3 cm high with nice recurved leaves and stemless white flowers. It comes from the dry Patagonian steppe in Argentina. Cultivation is possible in the alpine house in a well drained mineral mix. The propagation is from seeds.



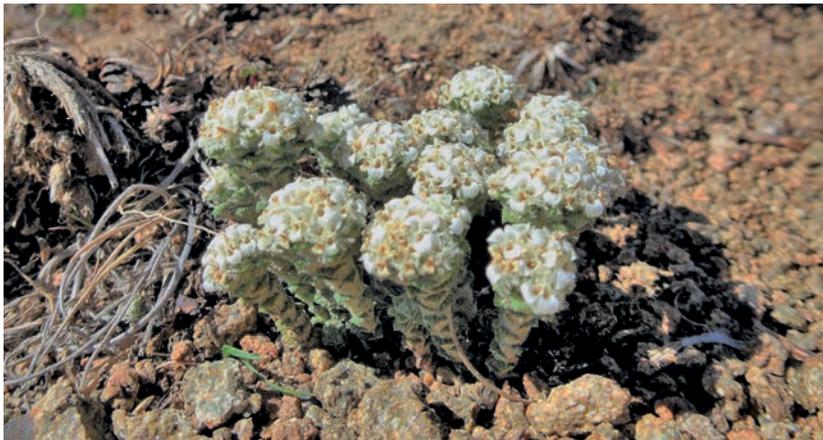
Nassauvia juniperina is a domed hummock-forming species about 10 cm high and 50 cm across, a nice species with stemless white flowers. It grows on the dry Patagonian steppe and on rocky slopes to 1200 m. Propagation is from seed.



Nassauvia lagascae ssp. *globosa* is an impressive subspecies that forms a larger rounded white or pink inflorescence about 5 cm across. It is restricted to the southern part of Patagonia.



Nassauvia lagascae ssp. *lagascae* is a widely distributed species from the South to the Central Andes in Argentina and Chile. Growing on volcanic rock and rocky slopes to 4000 m high, it is an attractive plant with rather more open rosettes that form a small cushion. The flowers are white or pink, about 6 cm high. Propagation is from seed.



Nassauvia pinnigera stands out as the most spectacular species in the genus. We found it growing in a huge scree in Mendoza at an altitude of 3400 m. It has a cylindrical habit with 10 cm high, white or purple inflorescence. It is always a dream that this plant might be satisfactorily grown. Propagation is from seed.



Nassauvia revoluta is a small cushion-forming perennial with curving rosettes and upright pure white inflorescence up to 20 cm long. Coming from the Central Andes in Argentina or Chile, it grows in lava sand and rocky slopes exposed to all weather conditions at altitudes from 3000 to 4000 m. Propagation is from seed.



Nassauvia uniflora is found in the central Andes of Argentina and Chile to 4000 m as a cushion-forming plant only 5 cm high. The leaves are a bit spiny with pointed tips. The white sessile inflorescence nestles in the crowns of the shoots. Propagation is from seeds.



Nastanthus agglomeratus is a monocarpic plant from Tierra del Fuego to the North of Mendoza. It is about 10 cm or more high with white flowers. It occurs mainly on rocky slopes at altitudes greater than 2000 m. Propagation is from seeds.



Nastanthus patagonicus is an erect perennial growing from a 5 cm basal rosette to 20 cm high. The white flowers make a large round inflorescence that may be 5 cm across. It occurs mainly in South Argentina on rocky terrain up to 1500 m. Propagation is from seed.



Neobaclea crispifolia makes an amazingly beautiful plant with alternate cordate leaves and brilliant deep-blue flowers, about 20 cm high overall. The species comes from the Patagonian steppe and enjoys extreme weather conditions at altitudes around 1000 m. Propagation is from seed.



Nierembergia patagonica* syn. *Petunia patagonica is a semi-shrub cushion species about 25 high and more than 1 m across. The sticky leaves are coloured from yellow to bronze. The flower colour can range from yellow to violet or purple. This is one of the most spectacular species from the dry steppe in Santa Cruz and South Patagonia. It can be shy in flowering so you need to be lucky to see it bloom. Various forms are in cultivation – but only in the alpine house. Propagation is from cuttings but be warned that this species is not easy to root.



Nototriche compacta is the only species of this genus found in the region from Patagonia to Mendoza. Many other species grow in the high Andes from Peru and Bolivia. The plant grows as a silver-white cushion about 30 cm across with stemless white to lilac flowers. The plants we saw in northern Mendoza were growing at 3400 m in the most extreme places – pure lava rock without any particle humus. It is almost unbelievable that these plants can grow here: imagine the development from seedling to mature plant in such habitat! Unsurprisingly perhaps, I have no details about cultivation.



Olsynium junceum is a very variable species with nice white to blue veined flowers. In bare wet soil it grows 10 cm high but on rich soil it may reach up to 70 cm high. It extends from south Patagonia along the Andes into Peru, and is always near melting snow. Propagation is from seeds.



Oreopolus glacialis is distributed from Tierra del Fuego, 200 m high, to Central Chile at 3500 metres. The mat-like cushions are 3 cm high and up to 1 metre across with yellow or orange-yellow flowers. The plant is usually found in volcanic sand or scree. The mats can be very attractive when hundreds are found together. Propagation is from seeds.



Ourisia alpina is a quite delightful cushion-forming species that grows 20 cm tall when in flower. The flowers are pink to red. It is found to occur in Argentina and Chile in the southern volcano and lake district in moist peaty soil. Propagation is from seed.



To Ak-Jailoo by Horse

Frazer Henderson and Nuraiym Syrgak



The four-wheel drive could go no further, beaten by the incline and the state of the badly rutted track. We unloaded our bags, crossed by footbridge a stream in full spate, its blue-white, ice-cold glacier meltwater tumbling joyously. Once across we bade goodbye to our driver and vehicle and awaited the arrival of the pack horses to continue our journey up the foothills to our yurt accommodation. Some twenty minutes later they arrived: a motley group, sinewy, small and docile. With our bags safely lassoed we made our way on foot across a steppe landscape which at a distance looked verdant but under close inspection was stony with sheep-cropped herbage. We reached the yurts some 45 minutes later.

Above: stream crossing, Temir-Kanat

We had come ostensibly to explore the flora of a high meadow summer pasture that sits at the base of a receding glacier on the north-facing slope of the Teskey Alatau range of the central Tien Shan in Kyrgyzstan. The area of our exploration is known as Ak-Jailoo, which translates as white (Ak) summer pasture (Jailoo) though in June snow was scarce and restricted broadly to altitudes above 4000 m.



After depositing our bags, and while a much needed dinner was being prepared by our hosts, we left to explore the nearby hills and, in particular, a nearby outcrop of rocks at about 2700 m, which seemed to have escaped rapacious attentions of the mixed sheep and goat flocks.

A chattering of Red-billed Choughs (*Pyrrhocorax pyrrhocorax*) announced our arrival with their short sharp calls and then engaged in an aerial display of agility, speed and bravado. A couple of sombre Black Kites (*Milvus migrans*) sauntered to inspect the commotion and then disappeared; the exuberance of the Choughs was apparently not to their liking. The closely banded friable rock-face was covered in closely-packed *Rosularia alpestris*, the low-growing rosettes forming a green

Above: Temir-Kanat, yurt camp at 2450 m



Linum olgae protected within a thicket from grazers

mortar between the linear rock layers. Despite our being present in June, none was yet in flower. *Klasea lyratifolia* with its asterisk-shaped purple inflorescence punctuated and enlivened the otherwise grey-green rock face. This member of the Asteraceae family, which is endemic to the Tien Shan and Pamir, looks as though it puts all its energies into flowering as it is almost stemless and its lyre-shaped, deeply-lobed leaves have the air of someone exhausted by effort as they lie untidily across the stony surface.

In scree at the base of a substantial rock-face, small-leaved honeysuckles – *Lonicera microphylla* – had formed a dense thicket and within their tangled base where more substantial soils had formed a few

Klasea lyratifolia





Phlomis pratensis

blue-flowered *Linum olgae* and *Iris ruthenica* had managed to escape the rapacious intentions of the local goats. An attractive Azure Tit (*Parus cyanus*) was accidentally flushed, its yellow breast showing well in the shadiness of the plants. Further up the hillside, at a rock

Inula macrophylla



extrusion, shrubby cinquefoils lay long across the stony earth, the occasional splash of their yellow flowers contrasting with the russet-orange of rock



lichens. A few upright, climate-distorted *Spiraea* species caught the fading sunshine on their white umbellate racemes as we made our way to the top of the hill. Low-growing hummocks of *Juniperus communis* var. *saxatilis* containing busy Brown Accentors (*Prunella fulvescens*) hugged the ever-steeper incline. As we stood at the top and

Iris ruthenica

caught our breath, we surveyed the view to the south – snow-capped mountains, U-shaped valleys and distant glaciers – and contemplated our intended destination of tomorrow with, hopefully, its floral riches.

As the sun accelerated its westward movement the temperature fell sharply and we returned by a slightly less vertiginous route towards the yurts, stopping only briefly to inspect purple-flowered *Phlomooides pratensis* and the striking lemon-yellow inflorescence of a few *Inula macrophylla*. A family group of Altai or grey marmots (*Marmot baibacina*) some 50 metres away on more open ground announced our presence with short piercing calls before they all bolted to their burrow.

The following morning, after a hearty breakfast and lashings of strong tea, we made ready our horses. We placed a small light blanket before an even smaller saddle with rope stirrups on each horse and then with reins in hand mounted our steeds. We made our way steadily southwards across a rising plain devoid of any notable flowering plants towards a distant and degraded terminal moraine. The Kyrgyz horses, being extremely sure-footed, determined our path without guidance through the rocks and at the top of the moraine we gave them and ourselves a break. At this elevation, more than 3000 m, we could taste more clearly the air and its increasing freshness. Time was taken to enjoy the sweeping panoramic views and a wide range of bird life. Gldenstdt's Redstart (*Phoenicurus erythrogastrus*), Northern and Isabelline Wheatears (*Oenanthe oenanthe* and *O. isabellina*) flitted from rock to rock and in the warming sun we looked skyward to marvel at a flock, or more properly a kettle – who makes up these collective nouns? – of majestic Cinereous and Himalayan vultures (*Aegypius monachus* and *Gyps himalayensis*) and a solitary Golden Eagle (*Aquila chrysaetos*) riding the thermal currents no doubt searching for fallen stock or, in the case of the eagle, unwary marmots.

A close inspection of the ground revealed a small community of *Androsace fedtschenkoi* (syn. *A. septentrionalis* var. *breviscapa*), its delicate white flowers held in a widely spaced umbel. The epithet *fedtschenkoi* honours the Irkutsk-born naturalist and explorer Alexei Fedtschenko (1844-1873) whose travels in central Asia were published posthumously as *Journeys in Turkestan* (1874), *In the Khanat of Khokand* (1875), and *Botanical Discoveries* (1876). Close by we found, appropriately, the central Asian Edelweiss *Leontopodium fedtschenkoanum* which commemorates the considerable achievements of Alexei's son Boris (1872-1947) who, as well as being botanist at the St Petersburg Botanic Gardens, instigated the *Flora of the Soviet Socialist Republics* and conducted extensive fieldwork in central Asia during the 1920s. His mother Olga was herself a noted botanist who on the death of her husband, Alexei, continued his work and together with her son published *Flora of the Pamirs* (1901) and *Conspectus Florae Turkestanicae* (1913). She is commemorated by the epithet *olgae*

in over forty species, including the aforementioned *Linum olgae*. Clearly a notable botanical family.

We remounted and continued our journey onward and upward. A crested lark (*Galerida cristata*) accompanied us for a short while always staying just a few metres ahead and watching us intently. We passed by a herd of pasturing horses and fortunately the stallion seemed more interested in his own harem than our steeds otherwise we all, horses and riders, might have had an unwarranted experience. A few native Kyrgyz cattle moved slowly gaining sustenance where they could; they are small-framed and docile. In the lower parts of the country in the Chui valley they have been crossed with Brown Swiss to increase milk production and produce a larger beast. A lone and confiding citrine wagtail (*Motacilla citreola*) was busy searching for spoils within their dung.

After a considerable time in the saddle we gave the horses another short relief period. We had to remember at such elevations with thinning oxygen the horses in also carrying us were engaged in demanding exertion. We dismounted in a dampish meadow consisting predominantly of the pretty little yellow wallflower *Erysimum kamelinii*. Until 2012 this species had been incorrectly considered to be *E. humillimum*. Its correct attribution commemorates Rudolph Vladimirovich Kamelin (1938-2016), a former president of the Russian Botanical Society and the driving force behind the concept of the *Flora of Altai*. The meadow also comprised specimens of the mountain buttercup *Ranunculus albertii* as well as the alpine forget-me-not

Myosotis alpestris with guest



Valeriana fechtschenkoi





Doronicum turkestanicum

Myosotis alpestris. Where the meadow was incised by small rivulets, clean-stemmed *Valeriana fedtschenkoi* rose 20-30 cm on a gearstick-like stem. Its white flowers, with their exerted stamens and styles, were held in tight format, though their supposed fragrance was not discernible despite the freshness of the upland air.

A further shorter ride and we finally reached our destination. We left the horses, once tethered, to water in a seasonal pool and consume the sparse alpine grasses while we explored the valley sides and moraine at the glacier's snout. On the slopes we saw a few *Doronicum turkestanicum* with their lemon-yellow inflorescences buffeted by the down-draught from

the glacier. A low-growing almost prostrate honeysuckle *Lonicera hispida* with its twin flowers pressed itself groundwards to escape the attentions of the chilly draughts. The thin herbage contained the common *Bistorta elliptica*, presumed *Parrya lancifolia*, and *Aster vedenskyi* with its 'golden-eyed cartwheels of purple', as Farrer once said of its close relative *A. alpinus*. Numerous *Tulipa heterophylla* festooned the lower valley sides. Here the red veining in the leaves was more prominent than seen elsewhere in the

country. The species, which has a central Tien Shan distribution, is notable for its flower's possessing a discernible waist and a nodding or less erect habit.

Moving off the shoulder of the valley and down into the lee of the moraine where the temperature improved dramatically merely by being out of the glacial down-draught we found two *Allium* species. The scape of the yellow-flowering



Allium semenovii

A. semonovii extended about 15 cm, its erect leaves slightly more. Not too far away and in much greater numbers were clumps of *A. platyspathum*, some adorned with nectar-seeking Tien Shan Apollo butterflies (*Parnassus tianschanicus*) which in flight resembled scraps of illuminated manuscript dancing in the breeze. Their food plants are *Rhodiola* species, two of which – the blood red *R. coccinea* and the more statuesque *R. linearifolia* – were present amongst the moraine.

In a very sheltered rock cleat we found *Cortusa brotheri*, a close relative of the primula family. Its delicate mauve-flushed flowers held on thin wiry stems belie its general hardiness. It seeks the shade and dampness but can take the low temperatures particularly under a light duvet of winter snow. In other cleats we discovered the pretty white flowered *Callianthemum alatavicum* as well as the many-hued *Geranium saxatile* which is found throughout the Tien Shan range.

After a few hours fossicking and plant-hunting the weather closed in and a thick cold mist enveloped the valley. We decided, in view of the poor visibility and the inability to see clearly safe footings amongst the rocky topography, to return to the horses and make our way back. One of us (FH), somewhat saddle sore and used to more heavily fleshed horses, decided to take the proverbial Shank's pony and walked back instead. Some three hours later, having taken a more direct route, we arrived back at the yurt camp and reflected, as we looked northward to the alpine lake Issyk-Kul and the Kungey Alatau range, on yet another day of broadening our knowledge of the range and altitudinal distribution of alpine species in the central Tien Shan.

Cortusa brotheri

Allium platyspathum with Tien Shan Apollo butterfly





Instead of spending time during the Covid period planning our next expedition, I have been looking back on previous trips. Since last I wrote anything in *The Rock Garden* about Turkey, Lynn and I have been back there on numerous occasions, and I thought to share some memories with you. We start with a coast-to-coast excursion. In May 2006 we travelled across western central Turkey from north to south. This is an account of that trip, with additions from some other trips whose routes meshed with it in places.

Our journey begins on the Black Sea coast, almost due north of Ankara. The climate here can best be described as *dreich*, with annual precipitation of about 950 mm, and as you move south into Anatolia it gets drier (annual precipitation in Ankara is about 400 mm). Inebolu would be a picturesque little town in the sunshine, with its many old, wooden buildings, but it was heavily overcast when we were there and it looked rather forbidding. Along the coast near Inebolu in April 1993 we had seen a sprinkling of *Primula vulgaris* ssp. *sibthorpii*, some fine stands of *Leucojum aestivum* in a

boggy area, *Scilla bithynica* and a field blue with a species of *Muscari*, probably *M. armeniacum*. ***P. vulgaris* ssp. *sibthorpii*** is often a light pink



*Photographs by Lynn and Michael Almond, highlighted by nearby bold text

but varies in colour between white and deep magenta. It grows all along the Black Sea coast of Turkey, as well as in Greece and eastwards into Georgia and the Caucasus. In Greece and most of its range in Turkey, it grows only at low elevations; it is most common, in our experience, in the tea-growing areas of north-east Turkey, where it colonises the terraces on which the tea bushes are grown and turns them a vivid pink. In the far north-east of Turkey and in Georgia however, it grows at much higher altitudes. Around Inebolu therefore, it only grows near sea-level and is replaced a few hundred metres higher up by *Primula vulgaris* ssp. *vulgaris*. Alongside the road south of Inebolu, particularly around the low col known as Cuhadoruğu (995 m) where the two populations meet, in both 1993 and 2006 we found several interestingly **coloured hybrids between the two subspecies** (something we also found, further west near Bartın, in 1993). Some *Scilla bithynica* and *Serapias feldwegiana* (*orientalis*) also grew at the roadside.

The hillsides overlooking the coast are often home to both *Rhododendron luteum* and *R. ponticum* (here in its native land, whose classical name is *Pontus*). At the beginning of May 2006 we



found flowers of both species within inches of each other, even though the yellow *R. luteum* usually flowers earlier (and grows lower down) than the mauve *R. ponticum*. On another road south from the coast several miles east of Inebolu, at the Yaralığöz Pass (1440 m) and also south of the pass, we found *Primula vulgaris* ssp. *vulgaris*, *Helleborus orientalis* and *Corydalis solida*. Further east again in the first half of April 1993, between the Diranaz Pass and Boyabat, south of Sinop, we had found more *Primula vulgaris* ssp. *vulgaris* and *Helleborus orientalis* in addition to *Scilla bifolia*, *Crocus ancycensis* and large

quantities of *Cyclamen coum* with *Galanthus plicatus* ssp. *byzantinus*.



A little to the west of the busy town of Kastamonu and east of the village of Daday, while *en route* to the medieval Mahmut Bey mosque at Kasaba, with its wooden structure and celebrated wall paintings, we came across *Globularia trichosantha* and *Iris suaveolens*. *Iris*



suaveolens may have purple or yellow flowers; all those we saw were either bright yellow or occasionally a dirty yellow with hints of purple – but we saw none with purple flowers. Further along the same road, at the village of Akpınar, we found more *Iris suaveolens* and, to the south of Akpınar, a drift of *Dactylorhiza romana* with mostly yellow flowers but a few pink mixed in.

South of Kastamonu lie the Ilgaz mountains, rising to a height of 2587 metres. The main road south from Kastamonu towards Ankara goes over the Ilgazdağı Pass at 1775 m and in this area, among the detritus of skiing earlier in the year, we found *Primula vulgaris* ssp. *vulgaris*, *Scilla bifolia*, *Colchicum triphyllum*, *Ornithogalum* species, *Corydalis solida*, *Fritillaria pinardii* (many with beautiful, bright lemon-yellow insides to their flowers) and hillsides dotted with the bright yellow *Crocus ancyrensis*. We had passed this way previously early in July 1984, driving from Istanbul to Trabzon, and in the woods on the north side of Ilgazdağ we found *Cephalanthera rubra*, *Orchis coriophora* and the parasitic *Monotropa hypopitys*. In the open areas there were a lot of colchicum leaves. Another road from Kastamonu crosses this range a little further east, leading to Tosya by way of the Ilgaz Pass (1625 m). A little to the north of this pass we found more *Primula vulgaris* ssp. *vulgaris* together with *Muscari armeniacum* and *Globularia trichosantha*. Paddy fields come into view east of Tosya: this area grows about a third of Turkey's rice crop. Alongside the road we found *Adonis aestivalis* and an attractive poppy (possibly *Papaver lacerum*).

We turned off the Amasya road to explore towards Vezirköprü, which we had heard was good for orchids – and it certainly was. Between Havza and Vezirköprü we passed three old-established cemeteries beside the road. Cemeteries are always good places to look for interesting wildflowers: not only are they protected from grazing animals but the relatives of the deceased often introduce them (especially irises) from the wild to decorate the graves, in addition to lacking the time to keep the graveyard “tidy”. On the graves in the first cemetery we found *Orchis simia*, pink *Dactylorhiza romana* and *Orchis purpurea*; in the second we found ***Paeonia mascula (daurica?)***





planted with its big bright red flowers; and in the third there were purple *Iris germanica* and more *Orchis simia*.

South-east of Amasya, on the road to Sivas and just before Ezinepazari, we saw magnificently robust specimens of *Muscari armeniacum*. It was just south of here at Zela (modern Zile) that Julius Caesar gained the victory that led to his famous boast *Veni, Vidi, Vici* (*I came, I saw, I conquered*). Further on towards Sivas, north of the Çamlıbel Pass (*Pine Tree Pass*), there were more *Muscari armeniacum* and also an attractive white to pale pink *Convolvulus* species, probably *C. lineatus*. At the Çamlıbel Pass itself we found a *Centaurea* (possibly *C. pichleri*), ***Fritillaria caucasica*** (or possibly *F. armena*) and ***Iris caucasica* ssp. *turcica***. Diverting to



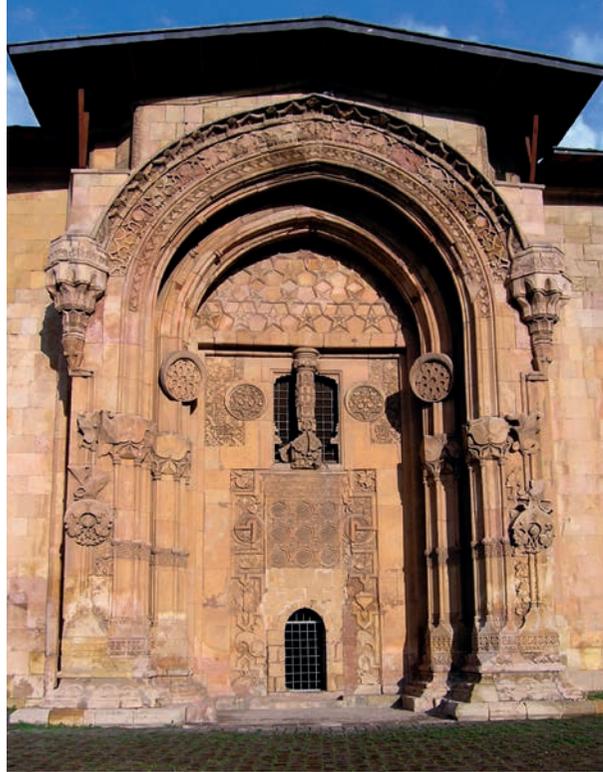
the east of the main road to Sivas, we explored the Çakmakbeli Pass, where we found some rather rain-battered specimens of a red *Tulipa* species (possibly *T. armena* ssp. *lycica*) and more *Iris caucasica* ssp. *turcica*. We also visited the area round the village of Çırçır, where the fields were blue with *Muscari armeniacum*. Sivas itself is a fascinating city, packed with venerable and highly decorated Turkish architecture dating from well before the time of the upstart Ottomans, whose domed mosques provide the cliché Turkish building.

Having driven 65 km east of Sivas on the main highway towards Erzurum and Iran, we turned south at Zara and headed into the remote fastnesses of central Anatolia. Below the Karabel Pass (1810 m) we saw a *Bellevalia* (like *B. trifoliata*), in addition to the first of numerous populations of red tulips we would see along this road. They could well have been *Tulipa armena* ssp. *lycica* again, as could be many of the other tulips we saw *en route*. South of Karabel we found fritillary leaves, but no flowers, and a very attractive *Sempervivum* with a large rosette of dark maroon and green leaves not yet in flower (possibly *S. armenum*). Further along the road, north-west of Sincan, was another large group of tulips, mainly red with a few yellow (suggesting *Tulipa julia*), and a considerable number of *Fritillaria pinardii*, many with very yellow-coloured flowers, both inside and out. Further on, south-west of Sincan, we were surprised and delighted to be confronted on the roadside embankment by a few magnificent almost football-sized clumps of bright pink crucifer flowers; this was the equally magnificently named *Tschihatchewia* (to pronounce it just try sneezing) *isatidea* (or *isatidaea*). It looked like nothing we had ever seen. More prosaically, the *Flora of Turkey* describes it as a *monotypic genus of doubtful affinity* – there is a photo of it in captivity on page 65 of *The Alpine Gardener* vol 88, no 1, March 2020. Neither IPNI nor *The Plant List* acknowledge the genus, although it appears in *ecologia mediterranea* vol 23, ISSN : 0153-8756.





Tschihatchewia isatidea



The Great Mosque and Hospital

Divriği is a rather unprepossessing town lost in the middle of Anatolia, but it is home to one of the glories of medieval architecture, the 13th century Seljuk Great Mosque and Hospital, a UNESCO World Heritage Site in its own right, and the reason for our detour from a more direct route south from Sivas ([see whc.unesco.org/en/list/358/](https://whc.unesco.org/en/list/358/)). This was our second visit since a diversion when driving from Ankara to Van in May 1988 – just a calendar week later than in 2006. The difference was that the hotel had improved from rudimentary to basic; the only flower we noted on either occasion was an *Onosma* (probably *O. albo-roseum*).

West of Divriği, at the Karasar Pass, we found *Corydalis nariniana* and then continued west to join the main road south from Sivas towards Malatya. Beside this road, near the village of Boğrudelik, we were rewarded by a veritable feast: *Aubrieta canescens* in large, bright lilac-



coloured clumps on the limestone rocks, *Tulipa armena* ssp. *lycica*, *Anemone blanda*, *Muscari armeniacum*, *Gagea* and – one of the main



objectives of this trip – *Fritillaria aurea* in considerable numbers along the bottom of the low cliffs. In 1988, east of here near Hekimhan,



we had found *Gladiolus atrovioleaceus* and *Moltkia coerulea*. At Gürün, we turned west and drove 100 km to join the main road from Kayseri to



Maraş at Pınarbaşı. South of Pınarbaşı we came across *Onosma albo-roseum* once more, with some *Primula auriculata* in a boggy area – a plant we have only come across previously in alpine areas and a reminder that we were driving at an altitude of over 1500 m.

North of the Demirci Pass is the village of Kıskaçlı. Alongside a small stream behind the village we found more red tulips but round the corner, on the great hillside scree overlooking the main road, was the main prize – more *Fritillaria aurea*, growing with *Hyacinthus orientalis* ssp. *chionophilus*. This latter is similar in habit to *H. orientalis* ssp. *orientalis* but grows at higher altitudes (hence the name *chiono-philus*, snow-loving) and has much more attractive flowers – sky-blue and white as opposed to the rather muddy mauve of ssp. *orientalis*. In places, large rocks emerging from the lower parts of the scree were festooned with *Saxifraga juniperifolia*, whose flowers had gone over and lost their yellow colour. Between the Demirci Pass and Sarız we found *Anemone blanda*, more *Corydalis nariniana* and a pale lilac-coloured *Crocus biflorus* with no distinctive markings – were you a splitter you would say it was *C. biflorus* ssp. *tauri*, but most of the so-called subspecies are only local colour variations and the species is simply very variable. At the turn to Sarız there was a patch of an attractive yellow buttercup (possibly *Ranunculus reuterianus*) and several clumps of

an impressive crucifer which looked for all the world like a yellow version of *Tschihatchewia*, except that its leaves were very different (probably *Erysimum thyrsoides*). Near Göksün we again came across *Aubrieta canescens* and some *Onosma albo-roseum*.



At Göksün we turned east once more towards Malatya to visit the shrine of Eshab-i Kehf at Afşin near Elbistan, where there is a caravanserai, a mosque, and a fort dating to the 13th century, adjacent to a cave associated with the legend of the Seven Sleepers. Here we found *Ixiolirion tataricum*, bright blue *Moltkia coerulea*, a big cushion of a paler blue *Veronica* (possibly *V. cinerea*) and an attractive poppy with large black blotches inside its petals (possibly *Papaver lacerum*).

Continuing towards Malatya, near Akçadağ we saw a striking bush of bright yellow *Rosa foetida* and, alongside the road to Levent, some statuesque *Arum elongatum*, *Asphodeline tenuior* (like a smaller and more graceful version of the yellow asphodel but with white flowers) and masses of *Gladiolus atroviolaceus* in the flanking fields. At the Sürgü dam we found bright yellow *Linum flavum*, *Gladiolus segetum*, *Glaucium corniculatum* with the bright crimson of its flowers emphasised by the blue of the reservoir behind, and a large clump of an intense blue *Alkanna* species (probably *A. tinctoria*). On the hillside above the Sürgü dam we found *Onosma albo-roseum*, a purple *Salvia*, *Globularia trichosantha*, *Hyacinthus orientalis* ssp. *orientalis* and more *Tulipa armena* ssp. *lycica*. Above Yeşilyurt, on the western outskirts of Malatya, were more *Onosma albo-roseum* and also the brilliant pink *Aethionema grandiflorum*.

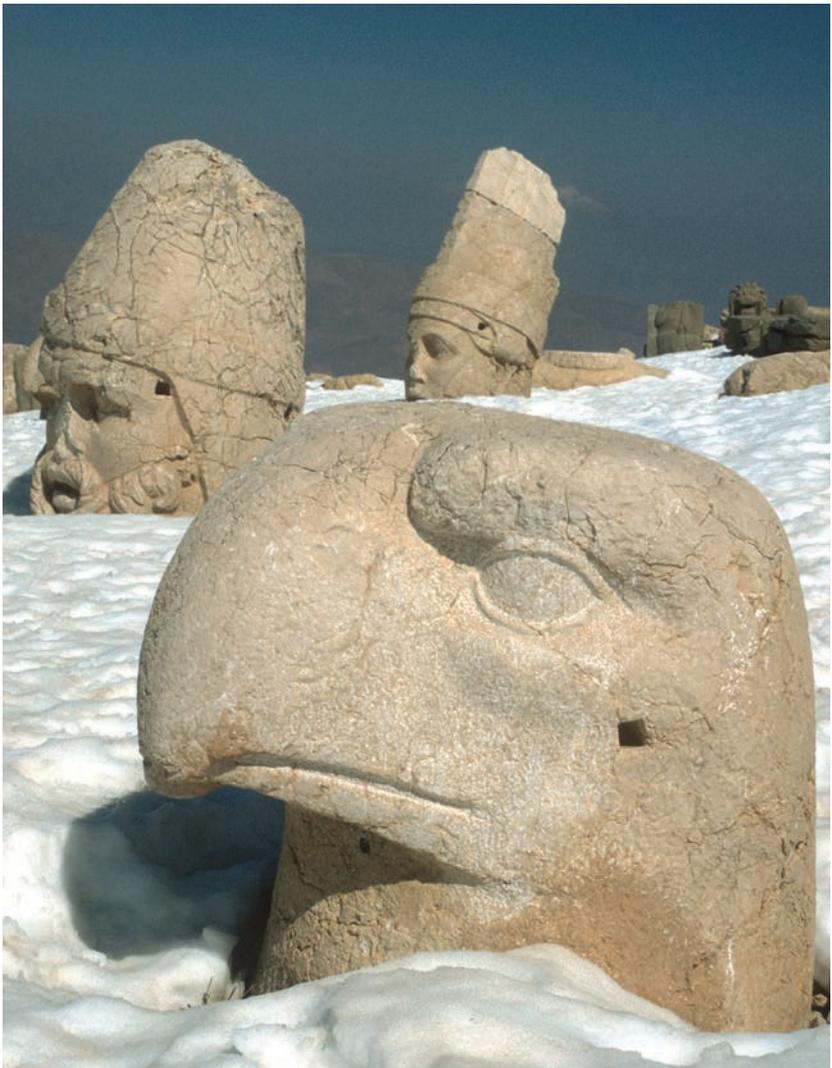
From Malatya we drove south to reach Nemrut Dağ, which we had ascended from the opposite (south) side in 1989. Below the Kubbe Pass we found more red tulips and, further on north of Tepehan, a different *Onosma* (possibly *O. bornmuelleri*), *Linum flavum*, *Gladiolus segetum*, *Papaver* species, and a *Campanula* (possibly *C. stricta*). Near Tepehan we encountered *Muscari comosum* (*Leopoldia comosa*). On the northern slopes of Nemrut Dağ, just below the final ascent to the summit, on the open hillsides and among the chaos of rocks above the pastoralists' summer steadings, which they were preparing for the arrival of the flocks, there was plenty of interest: pink hummocks of a spiny pink *Astragalus*, *Globularia trichosantha*, a bright yellow species of (probably)

Saxifraga, *Fritillaria pinardii*, **more red tulips** (generally taller than the *Tulipa armena* ssp. *lycica*, so this may have been *T. sintensisii*), a *Corydalis* (which looked more like *C. solida* than *C. nariniana*), and what seemed to be the elusive *Scilla mesopotamica*.



The road up the final ascent looked a bit dicey and, as we were a long way from base and out of range of any form of assistance, we decided not to risk it.

After all, we had already been to the summit in 1989, when we had driven up from the south. It may be seen from a great distance on its south side: in the middle of the first century BC Antiochus I Theos (*The God* – you can tell he was not the shy, retiring type) chose it for the site of his tomb and bid for immortality. He was king of Commagene, a small kingdom that was part of the debris of the Seleucid Empire, later to be swept up by the Romans. This is another UNESCO World Heritage Site (whc.unesco.org/en/list/448). The overall summit of the mountain (the highest in Commagene) stands approximately 2150 m (authorities differ) above sea level but the top 50 metres or so is an artificial mound of small rocks that may enclose the tomb of the king (or may not – no excavations since 1881 have ever found any traces of an actual tomb). Around this tumulus are three groups of **massive statues**, many originally eight to





nine metres in height: of the king himself, two lions, two eagles, and various Greek and Iranian deities – whose heads have been dislodged by either earthquakes or very strong vandals. The approach from the south is quite an experience. Passing the great tumulus of Karakus (*the black bird*, named after the great **stone bird** atop the column beside it) the summit of Nemrut Dağ is clearly visible on the skyline. Next you drive over the Roman bridge at Çendere and come to the great fortress of Eski Kâhta and the site of



ancient Arsameia, with its **superb bas-relief** of Antiochus shaking hands with Heracles (the king dressed in his oriental finery and the hero naked à *la grecque* – and proof that the handshake is not a modern invention). Only then do you begin the final long, steep approach to the summit.

On this last section, on 2nd April 1989, we found several of the plants that we were to find again on the north side on 13th May 2006: *Scilla mesopotamica*, *Tulipa armena* ssp. *lycica*, *Crocus biflorus* (or *leichtlinii*), *Corydalis nariniana* (?) and also *Hyacinthus orientalis* ssp. *chionophilus*, *Puschkinia scilloides*, *Gagea*, *Eranthis hyemalis*, *Hyoscyamus albus* and – growing on the citadel at Eski Kâhta – *Onosma albo-roseum*.

In 2006 our trip from coast to coast went no further south than Nemrut Dağ but on two occasions (end of March/beginning of April in 1989 and 2002) we briefly explored the area of the Amanus Mountains (Nurdağları) from south-west of Maras down to Antioch (Antakya) and on south to the Syrian border. In 1989, along the road to the neo-Hittite site of Karatepe, at the northern end of the Amanus range, we found *Cyclamen pseudibericum*, *Orchis provincialis* and *Iris unguicularis*. At Hasanbeyli, on the old main road over the Nurdağı Pass between Adana and Gaziantep, we found fine specimens of *Fritillaria alfredae* ssp. *glaucoviridis*, together with *Hyacinthus orientalis* ssp. *orientalis* and what we identified as *Scilla ingridiae*. Above Hasanbeyli we found *Helleborus vesicarius* and, at the Nurdağı Pass itself, *Muscari armeniacum* and a small, bright-yellow *Viola*.

The only other main road to cross the Amanus Mountains runs east from Iskenderun on the coast towards Antioch and Aleppo via the Topboğan Pass. Above the village of Belen and west of the pass we found *Iris unguicularis*, *Ophrys sphegodes* ssp. *amanensis*, *Ophrys bornmuelleri* ssp. *grandiflora* and *Orchis anatolica* (including one with a white flower, which you could call *Orchis anatolica* var. *albiflora*). Near the summit of the pass a well-made side-road turned off the main road, with no indication of its destination. We drove up it for a kilometre or so and found *Daphne sericea*, *Omphalodes luciliae*, ***Scilla ingridiae***, *Fritillaria amana*, *F. elwesii*, a small mauve violet (possibly *Viola heldreichiana*) and ***Corydalis tauricola***. We were just photographing a rather



fine specimen of this corydalis at the side of the road when a car drew up alongside us and a young man in military fatigues jumped out brandishing a sub-machine gun. He stood smartly to one side as an authoritative-looking gentlemen got out of the car and, in impeccable English, asked us if we knew that we were in a restricted military zone. We did not, as we had seen no notice to that effect at the bottom of the road. He advised us that it was indeed the case and politely but firmly advised us to turn round and head back immediately to the main road. The car drove off and we duly followed his advice. Later, consulting the map, I realised the top of the mountain whither this side road led was an ideal place for a radar station to monitor aircraft movements over the whole of northern Syria, it being almost 1800 m high and only about 30 km from the Syrian border.

Antioch (Antakya) was one of the great cities of the ancient and medieval world and is home to a superb collection of Roman mosaics as well as various other historic monuments, including the cave church of St Peter. Tradition has it that early adherents of the new sect worshipped secretly here and elected Peter as their leader (*episcopus*: overseer) and it is here that the name *Christians* is said to have been first applied to the followers of Jesus of Nazareth. When we visited, the medieval façade built in front of the cave was festooned with *Cyclamen persicum* while on the rocks nearby were bright yellow and orange patches of *Onosma rutilum*.

We came across various flowers alongside the main road south of Antakya: a pale cream *Onosma* that might have been *O. taurica*, and several orchids that included *Orchis anatolica*, *O. iricolor*, and *O. lutea*. We also explored several side roads. Beside that to the village of Hanyolu we found *Ophrys bornmuelleri* ssp. *grandiflora* and a well-developed bud of what was probably *Cephalanthera grandiflora*. On the outskirts there was an olive grove and underneath its trees a multitude of ***Fritillaria latakensis*** (Latakia is less than 100 km away to the south) with a few red tulips – probably *Tulipa agenensis*, which according to the *Flora of Turkey* has been found in this area. We took the road to Çatbaşı to visit the



Assyrian rock reliefs of Karabur. Beside it were masses of red *Ranunculus asiaticus*, *Cyclamen coum* (leaves only, but nevertheless unmistakable), *Iris unguicularis* and *Ophrys bornmuelleri*. South of the village of Şenköy we made our most exciting discovery: at the base of a rocky outcrop covered in oak scrub, and spreading out onto the field margins was a veritable swarm of *Fritillaria persica*. The flowers sometimes looked almost black in the sunlight, dark red with the sun shining through them *contre jour* and a steel-blue colour in the shade. As a bonus, among the tree-covered rocks were also many *Fritillaria latakiensis*, together with some plants of *Paeonia mascula* (or *daurica* – the flowers were over). *En route* to the village of Kışlak we found *Cyclamen coum* (in flower this time), a small white *Viola* (possibly *V. kitaibeliana*), *Iris unguicularis* and the leaves of a *Sternbergia* (probably *S. clusiana*).

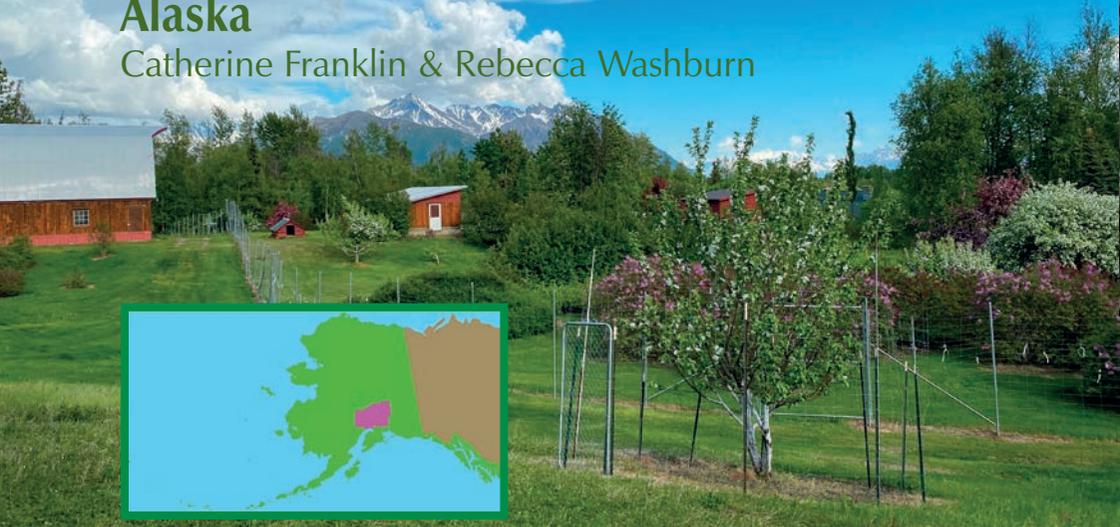
Further south along the main highway, towards the Syrian border north of Latakia, we came across *Anacamptis morio* ssp. *syriaca* and *Ophrys omegaifera*. Near the village of Yeditepe we found the pink *Linum pubescens* and a *Bellevalia*, then along the road to Yeditepe were *Ophrys lutea* and a white primrose, *Primula vulgaris* ssp. *sibthorpii*. Rural taxi service, Malatya



Rather than being mainly pink, as on the Black Sea coast, the flowers of this species are hereabouts reputed to be entirely white – certainly the clump we saw had pure white flowers. And so it is that I end this part of our Turkey adventures with same species as I began.

Spring and Summer in the Matanuska Valley, Alaska

Catherine Franklin & Rebecca Washburn



The Matanuska Valley in south central Alaska is bounded by the Chugach Mountains (4016 m) on the south and east, and on the north by the Talkeetna Mountains (2697 m). We can see Pioneer Peak (1950 m) from our front door. Our soil is mostly acidic wind-blown silt. With glacial rock dumps, areas on our farm vary from deep topsoil to gravel and then back to topsoil or subsoil. Winter snowfall is historically variable. In October we cover our rare alpines with spruce boughs or raked leaves bound by layers of landscape netting and held down by rocks or metal posts. This covering preserves them in our potentially desiccating winters. Belonging to SRGC, AGS, Fritillaria Society, NARCS and RHS gave us access to garden and wild seed exchanges and to their excellent journals, leading us to seeds from Czech collectors Vladislav Piatek and Mojmir Pavelka, and to bulbs from Janis Ruksans.

When does spring appear? It depends on how far the October frost penetrates before snow first insulates the ground – then on how much snow continues to fall and stays. Spring is usually here by the first or second week of April. Most snow is gone then except for snowdrifts in the shade. Then the chickens can go out-doors after being locked up since October. Lawns and grass are brown and snow mold (a fungus) is disappearing from the lawns, but the lawns are still too soggy to walk upon.

At the end of May, snow is melting on the Chugach Mountains beyond our renovated 1935 colony barn. The snow is usually gone by July. The buildings inside the fence are the renovated pig house and colony chicken house (with a new roof). Plants that bloom inside the 2.5 metre tall moose fence would have few flowers were it absent.



Colchicum vernum
Crocus heuffelianus 'Dark Eyes'
Crocus chrysanthus

Janis Ruksans's *Colchicum soboliferum*, *C. vernum* and *C. trigynum* suddenly appear. Long narrow petals in shades of bright pinkish lilac are the only colour in the flower bed. Within a few days his crocus are blooming. White *Crocus albiflorus* brightens up a clump of purple *C. heuffelianus* 'Dark Eyes'. Yellow *C. korolkowii* and *C. chrysanthus* are vigorous and seed around.





In the shelter of the red chicken house wall: *Iris reticulata* 'Harmony';





Allium nevskianum;



Ruksans tulips



The first iris to bloom is Ruksans's purplish *Iris reticulata* ssp. *caucasica*. It is the only reticulated iris that copes with our potentially wet summers and autumns out in the flower bed. Other reticulated and juno irises and most tulips can be perfectly hardy but need gravelly soil and a building overhang or they just fade away.

In 2016 we built a new chicken house with infloor heating in our very gravelly chicken yard. It is covered with barn-red metal siding (no more painting!) and has a 60 cm roof overhang. We buried 15 cm rubber lawn edging so only the top peaks out, to slow down water flowing in by capillary action from the soil beyond the overhang. Now, *Iris reticulata* 'Harmony' and other selections, *Chionodoxa lucilliae*, *Allium nevskianum* with its large umbel of reddish-purple flowers between two wide bluish green leaves, and Ruksans's mixed tulips bloom against the red metal.

In the flower bed near the house there are many pale bluish white flowers on 10 cm stems on *Scilla mischtschenkoana*, our first squill to bloom. From Piatek's seed, *Daphne domini* is the first shrub to bloom, with red flowers on bare stems that are 30 cm tall. *Tulipa tarda* grows nearby in full sun and is the only tulip we have that does well living out in the open for years undisturbed.

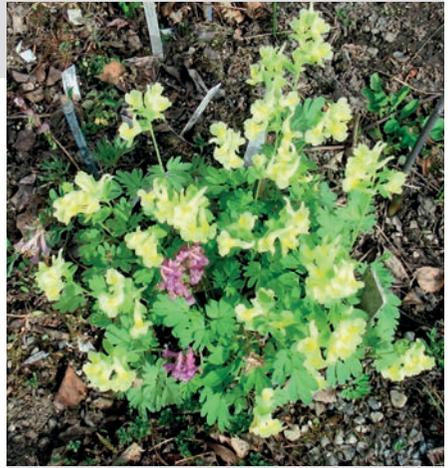
Chionodoxa lucilliae
Scilla mischtschenkoana
Daphne domini





Corydalis turtschaninovii
C. bracteata
C. solida f. *transsylvanica*

Also, in May, Ruksans's *Corydalis solida* selections and his eastern woodlanders thrive in sun, shade or in between if they are watered when later dormant. Blue *C. turtschaninovii*, large yellow Siberian *C. bracteata*, bright red *C. solida* f. *transsylvanica* and bluish-violet *C. solida* ssp. *subremota* are slowly spreading and mixing





Facing: *Corydalis solida* ssp. *subremota*

around. From Piatek and Pavelka seed, pulsatillas are greeting spring. With finely dissected foliage, the expanding clump of *Pulsatilla halleri* unfolds large, long lasting purple flowers.

Pulsatilla halleri
Pulsatilla vulgaris 'Dissecta'



The *P. vulgaris* 'Dissecta' clump is two seedlings, one burgundy and other pink. The pale-yellow blooms on *P. alpina* ssp. *apiifolia* are abundant on 20 cm or more stems in a row west of them inside a moose-

proof fence (if the gates stay shut in the winter), are white and pink versions of *Androsace carnea*. About 2 cm tall in bloom it is a lovely contrast with the nearby old three-metre tall Rescue crabapple.

Pulsatilla alpina ssp. *apiifolia*





We enjoy dog's tooth violets blooming for weeks in varied shady to sunny locations, especially in cool springs. *Erythronium dens-canis* 'Rose Queen' and white *E. dens-canis* ssp. *nivium* look dainty next to the taller and robust white flowered *E. sibiricum* ssp. *altaicum* and dark pink *E. sibiricum* ssp. *sibiricum*.

Scilla siberica and *S. siberica* 'Alba' comprise another small spring delight. Vigorous *S. rosenii* is blue with a white centre and when *S. rosenii* crossed with *S. siberica* it created breath-taking *S. x sibrose*



Androsace carnea

Erythronium sibiricum ssp. *altaicum*

Erythronium sibiricum ssp. *sibiricum*

Primula algida



with many large blue flowers on 20 cm stems. *Scilla* variety 'Kemele' looks like *S. x sibrose* but has dark blue blooms. They all look lovely amid blooming yellow *Primula vulgaris* and *P. veris* in red, yellow or orange. From the Siberian Sajon Mountains comes pink *Primula algida* blooming at the same time as *Primula denticulata* in lavender or white. Deep lavender *P. macrophylla* from the Himalaya is 20 cm tall, while reddish *P. marginata* 'Boothman' is like a miniature *P. auricula* as is *P. pedemontana* with reddish flowers.

Scilla 'Kemele'
Primula denticulata, white
Primula pedemontana
Primula macrophylla





Fritillaria michailovskyi
Glaucidium palmatum, lavender



Fritillaria meleagris
Fritillaria pallidiflora



Fritillaria does well here in partial shade, beginning with *F. meleagris* in purplish or white, then large pale yellow belled *F. pallidiflora* and short dark yellow *F. collina*. *F. michailovskyi* is a darling with a bonnet of marron and yellow.

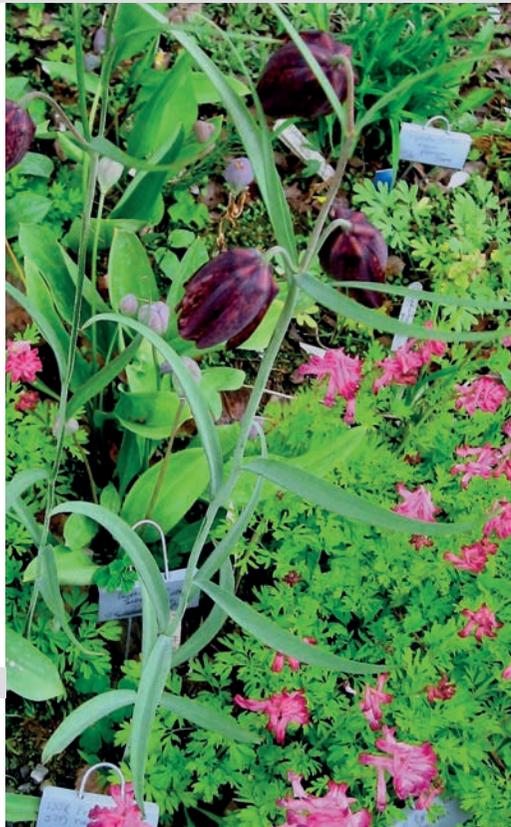
Unmowed roadside verges can be full of hairy, smelly wild celery (*Heracleum lanatum*). We despise it and often celebrate



Anemone nemorosa 'Vestal' Insets: *A. nemorosa* 'Robinsoniana'; *A.* mixed

the 4th of July by chopping off the flower heads. A few seedlings do appear and look like juvenile *Glaucidium palmatum*. When the lavender and the white versions of this plant bloom in partial shade at the end of May, people are dubious about the leaves but do enjoy the large single flowers. They germinate well from seed sown in January and put out under the snow to freeze. Beside the *Glaucidium palmatum* 'Alba' in the shade are varied selections of *Anemone nemorosa*. Stunning in double white, 'Vestal' covers the ground and bumps shoulders with single flowered selections of *Anemone nemorosa* in yellow or white or pale blue 'Robinsoniana'. These anemone bulbs look like tiny brown birch roots and they take several years to settle down and bloom after planting.

Fritillaria ruthenica





Fritillaria thunbergii



Fritillaria camschatcensis

The rest of our fritillary also bloom at the end of May. Short purplish *Fritillaria meleagroides*, pale greenish checkered *F. thunbergii* and sixty cm brownish *F. ruthenica* are lovely then. Our native *F. camschatcensis* is 45 cm tall with large beautiful brown bells. If it ever gets into a flower bed, it is impossible to get out owing to the rice shedding off the bulbs.

Soldanella cyanaster





Lewisia tweedyi

Lewisia tweedyi does well here at sea level in good soil and grit near the collar. In partial shade *Soldanella cyanaster*, *S. carpatica* and *S. montana* thrive with plenty of moisture. The coin-shaped leaves and lavender fringed cut bells are lovely. Looking like a robust muscari, *Bellevalia paradoxa* from the Caucasus has large blackish purple flowers

Bellevalia paradoxa





Muscari 'Blue Boy'



Muscari pallens

in May. Much smaller and flowering later is bright blue *Muscari azureum*, *M. 'Blue Boy'* with pale blue on top and darker blue on bottom, and very pale blue *M. pallens*. In full sun is rhizomatous *Iris mandshurica*, 20 cm tall with large yellow dark-veined flowers. This iris has bloomed up to three times a year! Close by and surrounded by grit is *Silene acaulis*. The pink flowers begin in early June and it reblooms three or four more times a season. Lawn grass and *Primula veris* seedlings have colonized in the 30 cm wide dome. Among the plethora of pink primroses with farinose leaves we enjoy *P. halleri* with long flower tubes, 15 cm tall *P. scandinavica* and its six cm lookalike *P. scotica*.

Iris mandshurica





Primula halleri

Several alpine *Dianthus* – *D. alpinus*, *D. subacaulis*, and *D. petraeus* do well if covered for the winter. The fringed pink, *D. superbus*, self-seeds and survives even snowless winters well. When we built our red metal chicken house in 2016, we cut down the hill of dropped glacier rock on the west side so we could walk on that side of the new building. Fearing erosion, we planted *Aquilegia alpina*, *A. canadensis*, *Clematis alpina*, *Myosotis alpestris*, the above dianthus and more on that steep slope that July. After watering in well, we covered the plants with old bed sheets for two weeks to lessen any transplant shock. On the slope above this new flowerbed is the 1936 barn-red log building called *The House on the Hill*. The gutter from this building runs off just above these lucky dianthus. A deep snow drift covers all in winter.

At 1.5 metres, *Lilium martagon* prefers a spot that has afternoon shade. They are beautiful in white, pink, red or a multicolour selection of pink, yellow and silver on the petals.

Erupting from the soil in late May, *Oxalis adenophylla* (lilac-pink), *O. adenophylla* 'Purple Heart' and *O. ennaephylla* (pinkish) come up in sunny spots. The finely divided leaves are almost as beautiful as the large flowers in mid-June. Our two seeding *Daphne alpina* are in bloom by mid-June. The daphne in full sun is the happier and was covered with white flowers to a height of 45 cm. Beside the daphne is a clump of Ruksans's large-flowered daffodils. We received them gratefully as a gift long after the *Fusarium* fungal infection destroyed all of his *Narcissus*.

Our old cotoneaster hedge that shaded the corydalis, anemone and dog's tooth violet in spring will benefit the blue *Meconopsis baileyi*, *Cremanthodium* and late primroses in July. 20 cm lavender *Primula alpicola* and 35 cm orange *P. cockburniana* 'Kevock Sunshine' grown from 2014 SRGC seed flourish there. Nearby pinkish *Lilium nanum*



Lilium nanum
Oxalis 'Purple Heart'



Oxalis adenophylla
Primula alpicola





The House on the Hill overlooks rosybloom crabs, Heyer 12 and Westland apples, and varied American hybrid lilacs in bloom. White native paper birch woods and our crucial moose fences are readily visible.

bloomed for the first time in 2020 from wild collected SRGC seed. Next to them we have many yellow daisies of *Cremanthodium reniforme* on 20 cm stems and, from SRGC seed, 6 cm *C. rhodocephalum* had its first pink downward facing bell in August 2020.

Growing spring flowering bulbs, alpine and perennials is a challenge and a joy, but you can't or shouldn't eat them. Much of the spring,

Cremanthodium reniforme

Cremanthodium rhodocephalum





A general view over our soils, by the chicken house

summer and fall is focused on vegetable and fruit production to freeze or put in the vegetable storage. Mid-March, when the frozen ground is still covered with snow, we seed broccoli, red cabbage, Romanesco and cheddar cauliflowers, Brussel sprouts, Ailsa Craig onions, fifteen different selections of leaf lettuce and twelve varieties of greenhouse tomatoes. We start them in our south-facing daylight basement.



Our Matanuska Valley 1935 colony house had an open front porch when our parents bought the abandoned farm in 1950. Our mother was on the Palmer Territorial School Board in 1952 when the board decided to replace the tall banks of double pane windows in the only school in Palmer – the grades one to twelve Central School. To this day, our share of those old windows does a superb job of enclosing that porch (and helps heat the house on sunny days). As soon as the planted tomato pots are soaked up with water, they come upstairs to sit on a 60° F. heating pad on a shelf in front of those windows.

Facing: *Colchicum soboliferum*
Daffodils from Janis Ruksans





Soldanella montana

The tomatoes germinate well, are transplanted and stay on the heating pad until May when they go out to the natural gas heated greenhouse in the chicken yard. We seed bush beans in the boxes with the tomatoes.

The typhoons that batter the Philippines, Japan, China and Korea feed their fury into our Aleutian Islands, which funnel the wind and rain into south central Alaska and the Panhandle (the portion of southeast Alaska that borders Canada). Glass greenhouses like neither earthquakes nor those sixty to eighty mph (hurricane force) fall and winter winds. Our modern greenhouse is covered with polycarbonate sheeting that does not break in heavy snow and wind.

After hardening off, our vegetable sets go out to the garden and are joined by seeded carrots, peas and storage radishes inside the moose-proof fence. In a hot summer the lettuce bolts, so it is cut back to re-grow, the cut tops going to the chickens. As we harvest our cauliflower and broccoli, we leave the plants in the garden until the fall. After the lettuce are gone, they are lopped off to go to the chickens. By the end of October even the Brussel sprouts are gone.

Red, white and black currants plus Canadian apples and crabs do well inside our tall fences, but the moose leave our yellow and red

Hinamaki gooseberries alone. In September, we paint young apples and crabs with white exterior latex paint to prevent deadly sunscald on the bark in the winter. We dig our potatoes in September when the ground is not wet and before any hard frost turns the vines slimy and the ground slippery.

As time has passed and affluence increased, the Matanuska Valley has become more residential, and many of the 1935 colony farms have become subdivisions. Because the colony buildings were built on topsoil or gravel many have rotted and collapsed. The last dairy farm and creamery just closed – a victim of the high cost of labour, fertilizer, plastic jugs, feed and property taxes. Cows can only graze outdoors from mid-May to mid-October. Vegetable farming is profitable, as are farm markets. There are a lot of three-to-five-acre hobby farms. Our grocery store has a large animal feed section for chickens, turkeys, cattle, goats, sheep and horses.

The frozen ground from the end of September into April gives us a lot of time to read journals, contemplate, clean and plan for the next planting season. We will be looking forward to April and the emerging flowers of *Colchicum*, *Crocus* and *Scilla mischtschenkoana*.

We hope that our account of our beloved garden, its cultivation and its many plants has helped persuade you that Alaska is not all snow and mountains. Despite the hard work and some aspects of the weather, the rewards are enormous.

Colchicum trigynum

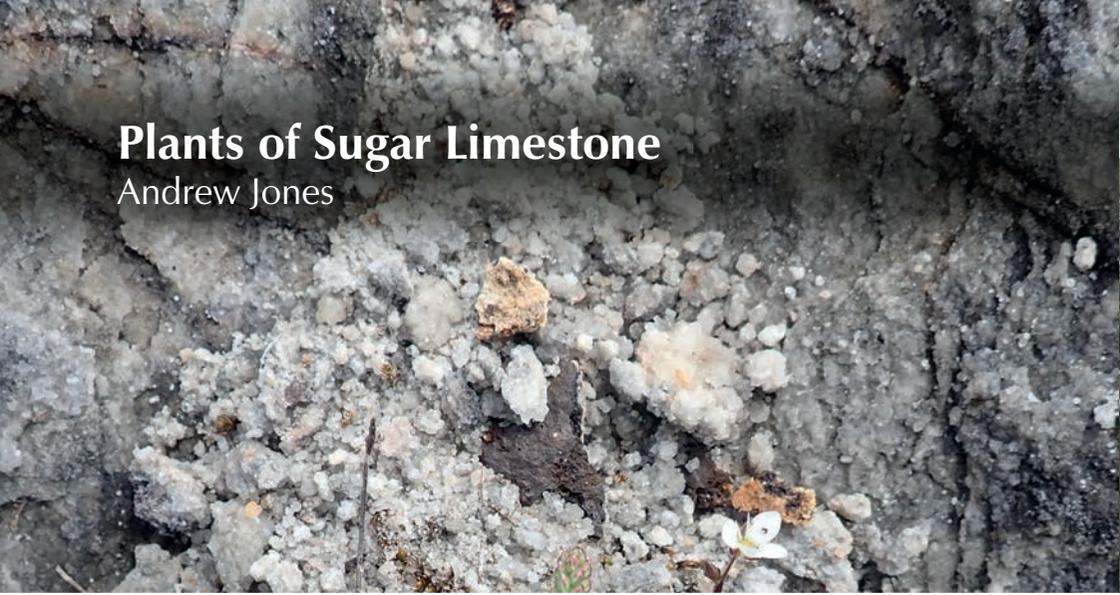


Primula marginata 'Boothman'



Plants of Sugar Limestone

Andrew Jones



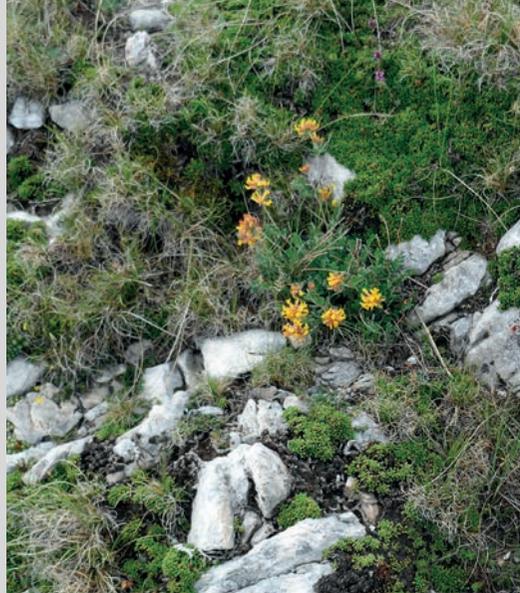
Sugar limestone is a rare and strange rock, patchy in its occurrence and with a bit of an odd name, for it doesn't always look like the sugar you would want on your cornflakes. It often surprises botanists, as its free-draining calcareous nature creates the perfect environment for rarer alpinists that require specialised conditions. It is a final stage in the metamorphosis of limestone, having gone beyond the medium heating of marble and proceeding to the point of overcooking, so that it develops a crumbly fragile surface, cracked and easily weathering to a fine sand. This rock is easily missed in the mad stampede of botanists to north facing cliffs on a new mountain; they may additionally pause if they can restrain themselves to look at wet flushes – if there any.

This particular rock's most famous manifestation is the fell area around upper Teesdale, above the shores of Cow Green reservoir. I once briefly visited the area but only had time to skirt the edge, as I was working on the upland hay meadows on the other side of the Tees. A great deal of research has been done on the plant communities found there. They contain at relatively low altitudes such surprising alpine rarities as *Gentiana verna* (spring gentian), *Minuartia stricta* (arctic sandwort), *Myosotis alpestris* (alpine forget-me-not), and the aptly named Teesdale violet, *Viola rupestris*. It has been concluded that because of its properties of free-drainage and instability, the rock was not able over millennia to provide suitable conditions for shrub and tree growth. Consequently, its areas remained thinly wooded during the post-glacial climatic optimum, thus being open enough for some of the rare plant species to persist in conditions of low plant competition. David Bellamy proposed a sub-plot that this rock can occasionally have some heavy metals, as does serpentine rock, being toxic to plants and so it may mimic the sparse vegetation of the latter.

Above: Sugar limestone (Photo: naturelogblog.wordpress.com)



Foggy progress on sugar limestone



Rock, *Viola*, and *Anthyllis* in centre

Years before, I had seen the sugar limestone outcrops at the rather bashed-up Cairnwell, near the pass over to Deeside. However, I was privileged to work on an area of this rock further south in the Blair Atholl/Beinn-a-Ghlo area with the then Nature Conservancy Council (now *NatureScot*). The sugar limestone here forms pale flat flying-saucer shaped domes emerging from, and strongly contrasting with, the dark dominating cover of peat and heather. I found a curious ring of the montane rush *Luzula spicata* around the edge of these domes – like a monk's tonsure around the rocky pate – and then the pretty golden-flowered *Potentilla crantzii* on the tops, but not much else. In wet areas, I remember abundant frog orchids and, along one bit of the ridge limestone that perhaps was not so crumbly, *Dryas octopetala* (mountain avens) heath. Perhaps others with more time and knowledge have found more there?

Walking with my tremulous offspring and in mid-July on a mountain in north-eastern Greece, we had reached the top at just under 2000 metres. We found yellow-flowered *Doronicum columnae* (leopardsbane), *Rosa pendulina* (thornless pink alpine rose) and, strangely, the hedge-row classic – hogweed, on low north-facing crags. Below, on the wet northern slopes, were big tufts of *Saxifraga granulata* (meadow saxifrage) and a grassy meadow with *Pedicularis foliosa* (lousewort), and *Botrychium matricifolium* (moonwort). I had been looking at these shady crags on the off-chance of finding the choice forget-me-not relative *Omphalodes luciliae* but was not lucky, as it only seems to occur on inaccessible plunging north-facing cliffs nearby where I dared not chance the kids. The top itself was picnic-perfect flat and had a couple of depressions (karstic dolines) with lush grass in the bottoms and purple *Anthyllis montana* and *Sempervivum marmoreum* on dry pavement

around the edges. It was getting late and we decided to get back to the car and home. The kids were getting impatient so we took a short cut across some rather uninteresting grassland with slabs of limestone, the only highlights being *Stipa* species with characteristic long awns, the *Sideritis scardica* (Greek mountain tea), patchy *Aubretia* and *Cotoneaster nebrodensis*.

On this long and difficult trudge across the rocks the kids were getting tired and fed-up of being spiked by the cushions of white-flowered *Astragalus angustifolius*. Suddenly and unexpectedly, as we came down gentle south-eastern facing slopes, the grass sward opened into pockets of white sand. And rock outcropped in rounded powdery mounds. I immediately realised we were surrounded by a vegetation that was dominated by small bushes of *Viola delphinantha* in flower. Everywhere across the pale sand were massed its beautiful deep mauve blossoms, in that tint and silky texture that is shared by exotic New Guinea *Impatiens*. This viola is a rare and protected species considered to be an ancient relict of much earlier climatic periods with relatives in Spain and France. Slightly lower down were spreading cushions of the bright golden *Anthyllis aurea* (kidney vetch), flowing downwards and imitating a spring-line. Despite my protestations, my kids had had enough and I had to leave this precious natural rockery. We descended some low cliffs below, above the huge drop to the lowlands, looking beneath us to scattered beech trees clothing the craggy slopes. Rounding a cliff above as a fog descended, and luckily finding a trail – there being no map for these places – I looked up as we respectfully negotiated above the yawning chasm. I could see the same rock, in bands in between the hard outcrops of marble. With binoculars I could see a crazed and contorted surface where huge tufts of soft sugar limestone had collapsed, the remnants dotting the slope around us.

The Greek sugar limestone is soft and crumbly in the hand, but extreme cooking in the afternoon heat - enough to fry an egg on - flakes parts off and violent thunderstorms wash off many of the sugary bits, making sand in surface patches and underneath any stones that are left. It is inter-bedded with somewhat harder limestones that dominate higher. On the mountain in question there are also outcrops of very hard snow-white marble with extremely sharp edges where plants have a struggle to root. Some of the sugar limestone had been infiltrated by lodes of metalliferous ores and elsewhere there are the typical heavy-metal indicator plants growing on green copper ores, pyritic iron ores, with evidence of mining test-holes.

On our return in mid-August, the kids were more patient when bribed with a visit to a Greek fast-food chain on the way home. The site was hot and parched, the *Viola* and *Anthyllis* having gone over. Examining the habitat of the violet rooted into the rocks at the edge of the white gleaming sand, all the capsules had dehisced but no seed could be seen. I suspected



Viola delphinantha on sugar limestone

that it had all been greedily eaten by large white snails that are a local speciality. Walking further, I found an unfamiliar plantain-leaved herb that I later identified as *Scorzonera austriaca* ssp. *crispa*, with fibrous old leaf bases and compound inflorescences gone over, but hardly any had flowered. This may be quite a rarity in Greece, more typical of the main mass of the Balkans further north; it is known on Mount Olympus. Further delights were the blue *Edrianthus graminifolius*, *Anthyllis montana* and *Sedum sediforme*. An umbellifer, most probably an alpine lovage (*Ligusticum*) with highly-cut glaucous foliage, was only just coming into flower; its contrasting inflorescence was like pretty pink foam and unusually for an umbellifer it could be considered rock-garden worthy, if it were possible to grow it. This or a closely related species is also on Olympus at high altitude. There were many other species including a fine *Euphrasia*, and pale-yellow flowered mats of *Teucrium montanum*. There was a late flowering diminutive bulb, *Allium moschatum*, and plants of an extremely delicate *Hypericum* (St John's wort) that had nearly gone over but added a rich crimson

Rock terrace with *Scorzonera austriaca* ssp. *crispa*





Sedum sediforme

tinge to the remaining yellow petals and dark spotted sepals. I later keyed it out as near to *Hypericum fragile*, but several species seem to overlap in their diagnostic characters in geographical area.

My conclusion from what I had seen and from descriptions by others of what they had found was that these plants were not at all typical of the crags of this particular mountain. The region is mainly known for a diverse cliff vegetation with three *Porophyllum* saxifrage species including *juniperifolia*, an African violet relative – *Haberlea rhodopensis* and also an endemic *Centaurea*. Sugar limestone had played its magic trick in having

its own special flora. Its unique properties seem to allow a surprising suite of sometimes rare species to co-exist in conditions of low competition and perfect drainage. It must be said that the rock and plant habitat is extremely cryptic and tucked away in the landscape. Unless you are standing on it, it is very hard to spot from a distance, especially in the vast areas of species-poor grassland that contained it.



Ligusticum



A tiny *Allium moschatum* in a rock crevice

If one wanted to recreate a rockery of this in the garden – I assume in a sunny position – the nearest approach to its properties is possibly provided by tufa and its artificial substitutes, although tufa may hold more moisture. For planting, one could dig pockets in the tufa and fill with a fine crushed limestone or calcareous sharp sand, because many of the typical plants have deep woody or tap roots. Drainage is crucial.

For botanists and rock gardeners who venture to mountains that have marble, many of which fringe the Mediterranean, remember the possible presence of this rock, and do not dismiss zones of monotonous

grassland below marble crags out of hand, particularly if time is available to scan for areas of bare rocky ground through binoculars. Unless complete surveys and mapping of the mountain vegetation have been conducted, such as was done in Scotland, it may be still out there unnoticed and awaiting discovery, with new botanical finds a distinct possibility.



Violas cling onto a terrace

The Evolution of a Historic Garden: The Reader Rock Garden, Calgary

Daniel M Walker

Section "G" (Continued)

Primula denticulata
Campanula abietina
Vaccinium vitis-idaea
Vaccinium vitis-idaea
Covslips, mixed
Artemisia nuttillina
Cheiranthus allionii
Alchemilla alpina
Dieltannus fraxinella
Campanula thyrgoides
Campanula barbata
Cyclamen europaeum
Campanula stansfieldii
Phyteuma comosum
Campanula gerganica
Campanula gerganica fenestri
Campanula glomerata aquilii
Lilium wallacei
Draba alpina
Ulmus parvifolia
Campanula spicata
Campanula glomerata alba
Campanula caespitosa
Campanula caespitosa
Campanula speculum
Campanula pushtilla
Campanula pushtilla
Iris barbatipollis
Anemone sylvestris-foetida
Iris barbata Barius
Campanula lingulata
Campanula phytidocalyx
Campanula siberica
Campanula persicifolia
Adenophora polymorpha
Lythrum virgatum
Campanula phytidocalyx
Lonicera henryi
Adenophora botanica
Sedum oppositifolium
Sedum reflexum cristatum
Sedum album tenuifolium
Sedum anopetalum
Sedum stoloniferum
Cassiope mertensiana
Sedum muralis
Sedum moranense?
Sedum stenopetalum
Sedum balticum

The life of a garden is always evolving and changing in so many ways that may be positive or may have drawbacks. That small tree you planted in your yard has now matured into a beautiful shade-giving canopy that has your sun-loving plants sulking with the lack of sunshine. Weather patterns change, winterkill happens and those cute little bunnies snack on new supple woody plant material during the cold long winters.

The major rehabilitation in the history of the *Reader Rock Garden* began in 2004 and was completed in 2006 with the grand reopening on May 29. The work began with the help of the Infrastructure Canada Alberta Program, which included funds from municipal, provincial and federal government levels. The main champion to spearhead the project was Anne Charlton, a project manager with the City Planning Department. Together with a team of experts that included landscape architects, heritage restoration architects, horticulturalists, geologists, arborists, irrigation specialists, alpine plant specialists and many others we were able to uncover the hidden beauty of the garden. Decisions were made with the guidance with the new Standards and Guidelines for the Conservation of Historic Places, and a management committee was created to develop a set of Parks Department rules for this unique asset.

One of the main rules is to follow William Reader's plant lists and locations,

A fragment of William Reader's specifying plant lists - how many remain?

because documents exist stating where plants were originally placed. It took dozens of volunteers and city staff to remove the vegetative material and uncover the pathways and rocks that make up the garden. In the end only 32 species of herbaceous material were found to remain there, a small number considering that over 4000 plants were trialled during Reader's time. Many plants had gone missing during the decline – to avid gardeners and homeowners who were “saving” these plants from dying out. The city put out an amnesty call for anyone who may have taken plants from the garden to please return them to the Parks Department to get a baseline inventory of the garden. Dozens of species were happily returned when news spread that the gardens were being worked on.

Now the rest of the meticulous cultivation by members of the Calgary Rock and Alpine Garden Society could begin and plant orders were compiled and delivered. The City learned quickly that the garden's light levels had changed because of the mature trees and shrubs that now blocked the majority of the sunlight. It was a challenge to successfully grow the sun-loving plants in what had become a shady environment. For quite a few years this was an issue, as staff followed the rules of putting plants in the beds that were documented rather than where they would thrive. After many failures by placing sun-loving plants in shade it was decided to save the money of continuous failures and to allow planting in more appropriate places. Plants were put in beds that best fitted their cultural needs while attempting to keep them in or as close as possible to their original beds.

A decade later the garden was looking overgrown and a touch messier than an arts and crafts style garden should look. Beds were beginning to look overgrown, and the tenacious and evil creeping bellflower (*Campanula rapunculoides*) was starting to take hold once again because of the decline in the number of maintenance staff. 2016

The evil beauty, *Campanula rapunculoides* (Matt Lavin, license CC BY-SA 2.0)



saw the beginning of the battle of the creeping bellflower and the campaign to bring the garden once again to its former glory. Beds were carefully selected by the amount of bellflower in them, visual impact within the garden and overall bed “fatigue”. Once the beds had been prioritized, large monocultures of one species were selected for downsizing, and the weed-free parts of plants were placed in our holding beds to be saved for other areas. The remainder were dug up and moved to other city parks, helping us reduce the amount of plant material being composted in the end. Clumps infected with weed or bellflower were discarded to help stop the spread.

We used cultural and chemical methods to further eradicate the perennial weeds, with two treatments in four weeks followed by the fallowing of entire beds for one year from mid-August. During the fallowing, early in the spring, rocks were cautiously exposed after years of soil erosion coverage and were carefully lifted vertically to further expose them. It was amazing how some beds showed no signs of rocks until these investigations began. It was an extremely tedious process as mechanical help was out of the question owing to the sensitive nature of the garden space. All the rocks were lifted slightly using wood dunnage and metal pry bars and were adjusted to look as natural as possible. Many countless hours go into this work, but the view of all the exposed rocks after the fact is worth it. A low salt compost is used to amend the soil – originally one inch was placed every three to four years, a practice which may have contributed to the rocks’ disappearance. Nowadays, half an inch or so (one to two cm) is spread to allow nutrients back into the soil while not adding copious volume to the beds. After a month with the compost in place (usually beginning in mid-June) all weed regrowth is sprayed once more with chemical. Regrettably, this routine does not



Cypripedium acaule

get rid of all the bellflower but it sets it back immensely and gives the garden a fighting chance.

Then the best of the job begins, the re-planting! I have taken it upon myself to really dive deep into the “bible” that is William Reader’s plant list, and it almost becomes an obsession to want to have them all! The renovations have provided an opportunity to diversify the garden and continue the quest to get as many of the beautiful unique plants back as possible. The winter months is my research time when I hunt through the internet trying to find local nurseries who can supply me with the plants I need. The unfortunate



part is that many of the cultivars are very rare if not extinct, so there are many dead ends.

I’ve been able to find some wonderful supplies here in Canada; *Cypripedium* like *C. passerinum*, *C. acaule* and soon-to-be *C. montanum* have all been re-introduced. *Dactylorhiza maculata* with its beautiful mottled leaves recently made it through its first winter and bloomed beautifully. I was over-

Cypripedium montanum



Meconopsis betonicifolia

the-moon excited to get the adorable *Juniperus communis* 'Compressa' back into the High Rockery. Through some private growers, heirloom *Hemerocallis* (*H. lilioasphodelus*, *H. dumortieri* and *H. middendorffii*) came from down east in Ontario. *Cypripedium speciosum*, native plants (*Castilleja miniata* and my favourite *Pulsatilla patens*), and rare speciality plants like china rose vine (*Calystegia hederacea*) have been reintroduced to the garden.

We grow stunning *Eremurus* pot-in-pot here so that I can overwinter them in our seasonal cold room. The *E. stenophyllus* was a show-stopper this season with its foxtail yellow towers. It only took two overwintering years to get three to bloom but our patience was well worth it. We were also able to acquire *E. robustus* and *E. himalaicus*. We can't forget all the societies that have wonderful seed exchange programs, this being one of the easiest ways to get hands on rare plants. Seeds are inexpensive and more easily transported across borders. We have profited from some seed exchange programs with wonderful new additions such as cup plant (*Silphium perfoliatum*), a *Telekia* relative (*Inula helenium*). The architecture that this plant gives is a wonderful contribution to the garden structure.

Pincushion cactus (*Escobaria vivipara*) and devil's tongue cactus (*Opuntia humifusa*) grew nicely in our greenhouses for the 2020 planting – a test of patience but well worth it in the end. Blue Himalayan poppies (*Meconopsis betonicifolia*) are now a speciality, with a couple of hundred plants germinating each season from the garden population's own seed and with volunteers tending to their care.

Facing: *Eremurus stenophyllus*

(Wikimedia Commons: Agnieszka Kwiecień, license: CC-BY 3.0) 🍁





Silphium perfoliatum

(Wikimedia Commons: Dominicus Johannes Bergsma license CC BY-SA 4.0)

The addition of some woody material has brought some sensory joy: winter daphne (*Daphne mezereum*) with its deciduous habit here and its spicy fragrant purple to pink flower in the spring; Bayberry's (*Myrica pennsylvanica*) wintergreen scented leaves when brushed along a pathway; and many roses (*Rosa moyesii* 'Geranium' and *Rosa gallica* var. *officinalis*)



that sweeten the air with their perfume. The succession planting of our tree canopy has allowed us to track down and reintroduce the butter nut (*Juglans cinerea*) and we hoped to get in an Amur cork tree (*Phellodendron amurense*) and sugar maple (*Acer saccharum*) here in 2020 or 2021. The extensive *Iris germanica* collection is growing closer to its 150 types with the reintroduction of 43 cultivars, thanks to the Historic Iris Preservation Society's rhizome sale. We are extremely excited about this and it will bring the total list to almost half complete. The inventory continues to grow but it seems that approximately 40-45% of the list is already currently growing here.

We aim to renovate three to four beds – depending on their size – each season and we try to do one in each of the three areas to help minimize the impact of the renovations. Signs explaining garden improvements help notify visitors that change is coming and to stay tuned. So far, people are thoroughly enjoying the “new” introductions to the garden and look forward to what the years to come will look like.

I hope one day you can come and visit the Reader Garden, the peak bloom time is mid-May to the end of June, but really there is always something to see here!

Orchis maculata





The Genus *Primula* At Rotterdam Zoological Gardens ... a plant collection at an unexpected place

Louwerens-Jan Nederlof*

If we plan a visit to the Zoo, it is normal to expect to see the lions, giraffes, elephants, apes, and monkeys. The vegetation around is just a scenic backdrop for a nice and joyful day. However, in silent spots and away from the crowded paths, the most remarkable plants appear, and a closer look reveals unique and rare species with many different cultivars. The collection of registered trees and other plants at Rotterdam Zoo comprises around 6000 accessions in total. Most species are part of the urban city greening but dozens of specimens are part of the official botanical collection (BGCI accredited Botanic Garden 2019, Arbnet Level II accredited 2020), an arboretum officially recognized by the Dutch Dendrological Society in 2021.

* Curator of Plants, Botanical Gardens, Rotterdam Zoo P.O. Box 532, 3000 AM, Rotterdam l.nederlof@rotterdamzoo.nl

To exemplify the BGCI Collection Assessment for 2021, we focus here on the genus *Primula*. The collection was founded in 2005 as part of the National Plant Collection in co-operation with the Dutch Association of Botanic Gardens. So by 2021 it has already been a major part of our registration for sixteen years. The nearly one hundred species need further study and evaluation to define our status relative to other botanic collections in the Netherlands, Europe, and worldwide. The most important aspect of the collection is the opportunity that it gives us to contribute to research, conservation and education; these are the solid and formative main factors that influence our 2030 masterplan, with the same for the zoological collection in the next following year. Sadly, the COVID pandemic now throws shadows over the planned schedule ...

We present and house the living collection of Rotterdam Zoo in a unique way, in which we give our visitors the feeling of travelling through the continents. The animals are housed in naturally built exhibits and displays together with conspicuous and typical plant species from their natural habitat, or they may be combined by 'look alike' simulative presentations, strengthening the idea and impression of natural habitats. For example, the exhibit of the Lesser Red Panda (*Ailurus fulgens*) is planted with different bamboos and large oak trees so as to express the natural climbing and foraging behaviour to a maximum. Around the exterior of the housing are planted other typical species of Western Himalaya origin like *Primula*, *Magnolia* and *Rhododendron*. This combination offers several opportunities to educate the public about the animals, their natural habitat, and *in-situ* conservation projects aiming to reforest the original Nepalese ecosystems for these iconic mammals. The role of a 'modern zoo' as an institute for promoting *ex-situ* nature conservation and public awareness is more important than ever before; a living *in-situ* collection plays an essential role in this strategy. Which brings me to *Primula* ...

Primroses

Primulas or primroses are famous among keepers of rock garden plants and people with a range of different gardens on moist and shadowy soils. Many species are good partners and will flower for many years or even decades in the same place in the border. They are renowned because of their early flowering, attracting several insects as pollinators as they awaken from their winter rest. The genus *Primula* has a worldwide distribution with about four to five hundred botanical species. Most occur in the northern hemisphere and China is considered as the *Primula Hotspot* with more than half of the known species. The Himalayas are also species rich; more than a hundred occur on steep rocky slopes, or are scattered over wet and dry mountain meadows. In Europe, fifteen species occur mainly in the Alps of central and southern Europe. Only three are native to the flora of the Netherlands.

Primula (Dodecatheon) hendersonii



Despite the enormous amount and numbers of the so-called auricula hybrids, none of these cultivated plants forms part of the primrose collection at Rotterdam. References applying to primula taxonomy and classification (*Primula*, John Richards, 2003) were followed in the early years of the collection, including Reveal & Mast's *Britonia* 2007 article on *Transfer of Dodecatheon to Primula*. Mitchell & Lawson's *The Plant lovers's guide to Primulas* (2016) underpins the perspectives on hybrids, varieties, and horticultural aspects and methods. Since 2019, every accession for the National Collection has been checked against Plants of the World online (<http://www.plantsoftheworldonline.org>). We check and determine flowering plants by comparison but preferably – whenever possible – according to breeders and taxonomic specialists. The division of the genus *Primula* into subgenera will be avoided because this covers a lot of taxonomic unclearnesses. However, we have used an unofficial botanic subdivision for general purposes:

Division of the genus *Primula* in 'botanical groups' with examples of the species in the collection, December 2020:

Auricula	<i>P. auricula</i> , <i>P. clusiana</i> , <i>P. glutinosa</i> , <i>P. palinuri</i> , <i>P. venusta</i> , <i>P. villosa</i> and <i>P. wulfeniana</i>
Bullatae	<i>P. bullata</i> , <i>P. forrestii</i>
Candelabra	<i>P. beesiana</i> , <i>P. bulleyana</i> , <i>P. chungensis</i> , <i>P. cockburniana</i> , <i>P. japonica</i> , <i>P. polifera</i> , <i>P. pulverulenta</i> , <i>P. wilsonii</i>
Capitatae	<i>P. capitata</i> ssp. <i>mooreana</i>
Cortusoides	<i>P. cortusoides</i> , <i>P. sieboldii</i>
Denticulata	<i>P. denticulata</i>
Farinosae	<i>P. farinosa</i> , <i>P. frondosa</i> , <i>P. involucrata</i>
Muscarioides	<i>P. vialii</i>
Nivales	<i>P. nivalis</i> var. <i>farinosa</i>
Sikkimensis	<i>P. alpicola</i> , <i>P. florindae</i> , <i>P. secundiflora</i> , <i>P. sikkimensis</i> , <i>P. waltonii</i>
Vernales	<i>P. elatior</i> , <i>P. veris</i> , <i>P. vulgaris</i>

Primulas all around

Because the zoo is divided into the so-called continents, and animals and plants are placed in the context of an ecosystem, it is not strange that the majority of the primulas are to be found in the Asian parts and the European rock garden. On the shores of the pelican pound many specimens of *Primula bulleyana* and *P. viallii* flower near the public



Primula capitata

paths. In the Chinese garden there is ample room for a display of *P. capitata*, *P. forestii*, *P. denticulata*, *P. prolifera*, *P. pulverulenta*, *P. rosea* and *P. sieboldii* in small groups or natural-looking flowerbeds. The African continent, however poor in *Primula* species, is the location where we can display *Primula simensis* as potted plants, stored in the winter period in a cold greenhouse behind the scenes, together with all other delicate specimens of primula.

The relatively small European rock garden is a difficult place, at least in the climate of the Netherlands with its relatively wet summers and moist mild winters. Nonetheless, several small patches of *Primula auricula*, *P. wulfeniana*, *P. clusiana* and *P. daonensis* may be seen by the visitors. The rare and endemic *P. palinuri* is kept behind the scenes together with a small assurance culture – or back-up – of the other European alpine species. The plants that are part of the National Collection (NC) are kept behind the scenes year-round as at least three

Primula wulfeniana



specimens of each accession. An annual overview of the NC is published as the catalogue of the genus *Primula* and is shared with other collections and research groups.

During the summer months (April-October) our primulas are placed outside on tablets where they are shaded by fine netting to



Primula daonensis

provide shadow and avoid loss of the relatively moist atmosphere that we create by daily misting and watering. The section of dry and sun-exposed alpine species is situated on the outside edge of the summer display. From November until March all primulas are moved to the cold greenhouse (about 400 square metres) where temperatures between 4° and 10° C are maintained by ventilation and minimal heating. The most important reason to put the primulas in the greenhouse is to protect them against rotting if the outside soil is too wet and impermeable to drain the water efficiently. Surplus plants from the different accessions are planted out in the garden collections.

All primula plants are treated twice a year with a solution of Entomen, containing nematodes (*Steinernema feltiae*) as a biological pest control against the larvae of the vine weevil (*Otiorhynchus sulcatus*), of Koppert Biological Systems. The use of these natural enemies is quite successful but does not avoid the need to re-pot every plant once a year to reduce the numbers of vine weevils to a minimum.

Special Accessions

In the future, our ambition is to increase the number of species and the total items by at least 5% per year. We intend to use the network of

Facing: *Primula palinuri* 🍁



botanic gardens (BGCI), horticultural societies, breeders and project groups of universities to contact and strengthen cooperation. The risk of hybridizing between plants in the collection is a matter of concern, so we welcome regularly collected seeds or cuttings with well known genetic backgrounds from other institutions. For example, in 2021 we received the endemic *Primula scotica* from the Royal Botanic Garden Edinburgh and many new taxa from the *Index Semina* (Seed Exchange) of the Scottish Rock Garden Club and the Dutch Rockgarden Society.

Education

The National Collection houses the three primroses native to the Netherlands: *Primula elatior*, *P. veris* and *P. vulgaris*. In 2021 we started a pilot project with a collective of four Dutch universities from Nijmegen, Wageningen, Groningen, and Amsterdam to collect seeds for the National Seed Bank, providing material of genetically known populations of primulas for reintroduction to their natural habitats. The normal million and a half annual visitors to Rotterdam Zoo are given information in the garden and on several websites about endangered native flora and the many relevant conservation projects (www.hetlevendarchief.nl).

The three primulas native to the Netherlands:

Primula vulgaris



Primula Theatre

Because the botanical department's nursery is not open to the public, the flowering plants of this collection are exhibited in a *Primula Theatre*, inspired by ancient Chinese and Japanese traditions of showing the most beautiful flowers as individual highlights. Many switches are made during the year because the primulas are characterized by an extended flowering season over the range of species.

Our Collaborations

Some of our more than 80 images of primulas appear in the authoritative and well-known website www.primulaworld.com, which provides a wealth of information about the whole genus and its species, combined with taxonomic reviews and many images. We are going to maintain the bibliography and we plan cooperation in various research projects on flower anatomy (the famous heterostyly), spectrophotometry, thermal and optical aspects of pollinators, and flower attractiveness. We plan collaborative cross-breeding experiments for the native species to examine the impact of hybridization of wild populations and the survival rates of the different species sharing the same habitat. Watch this space!

Primula veris ssp. *macrocalyx*



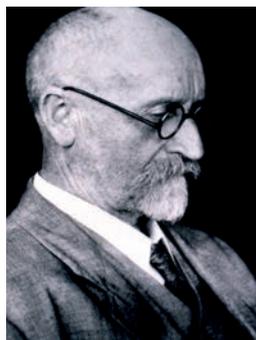
Primula elatior ssp. *pallasii*



Bulleyia yunnanensis*

Phillip Cribb and Mark Clements

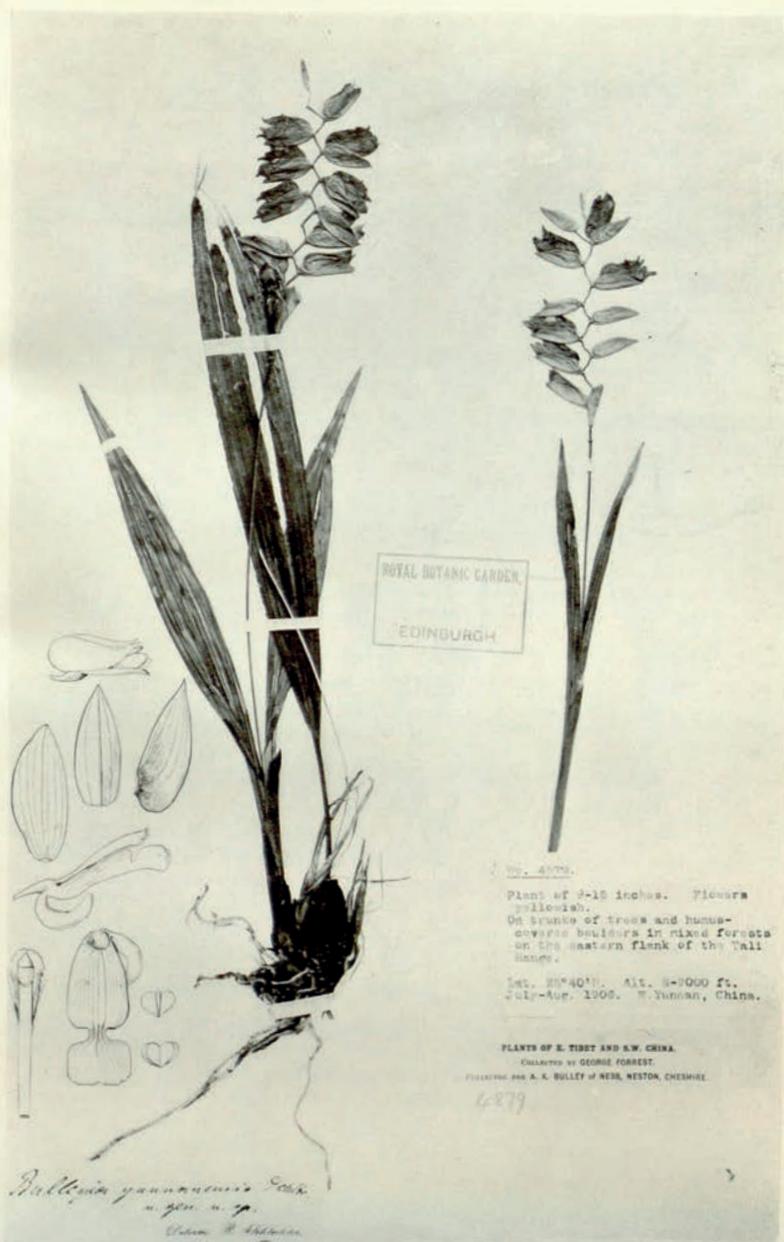
Arthur Bulley (1861–1942), owner of Bees Nursery at Ness in Cheshire and a great patron of horticulture, was born in New Brighton. He was one of fourteen children and joined his family's cotton-trading business when he left school, travelling extensively overseas, where he developed an interest in plants. In 1898, he purchased sixty acres of land near Ness, where he built a house and opened parts of the garden to villagers. He opened Bees Nursery (later Bees Ltd) in 1903, and sold plants grown from seed sent from Asia and Europe. The nursery became particularly famous for its broad range of rare Chinese plants, notably in genera such as *Primula*, *Rhododendron*, *Meconopsis* and *Lilium*.



Arthur Bulley
(Photo: Ness Gardens)

Bulley commissioned collectors to gather plants from countries around the world, but the main source of the rich flow of hardy Chinese novelties was George Forrest (1873–1932), a Scot who had trained at the Royal Botanic Garden Edinburgh. Forrest was born in Falkirk and, on leaving school, was apprenticed to a local chemist until 1891 when he inherited a small legacy that he used to travel to Australia, where he prospected for gold and worked on a sheep station. He returned to Scotland in 1902, where he met Isaac Bayley Balfour, Regius Keeper of the Royal Botanic Garden Edinburgh, who offered him a job in the Edinburgh Herbarium. The following year, Balfour recommended Forrest – now aged 30 – to Bulley, who was sponsoring an expedition to southwestern China in search of exotic plants, particularly species of rhododendron, of which Yunnan has many. The first expedition in 1904 was based in Yunnan, where he arrived in August. Forrest set up a base of operations in Talifu (now Dali) and learnt the local language. By the summer of 1905, he had trained a team of seventeen local collectors and was ready to mount his first expedition in northwest Yunnan near the border with Tibet. He stayed briefly at the French Catholic mission of Tzekou, under Père Etienne-Jules Dubernard. Forrest and his team then collected numerous plants, herbarium specimens and seeds in the surrounding mountains. They were totally unaware of the massacre of the priests and local converts at the mission station by rampaging Tibetan monks, who then met them on their return. Forrest was pursued by the monks down the gorge of the Lancang Jiang (upper Mekong) and only escaped by jumping over the edge of the steep wooded slope that fell to the raging river below, where he lay hidden until the hue and cry had abated. He escaped shoeless and with injuries to his feet, as

*This version of an earlier article is published with the permission of the Orchid Society of Great Britain. Schlechter's plate opposite was published by the RBGE in 1912



Bulleyia yunnanensis, Schltr.



Bulleyia yunnanensis (Photo: Mark Clements)

well as losing all his collections. It did not, however, discourage him from returning to Yunnan. Altogether, Forrest made seven trips to western China, mainly based on the rugged Jade Dragon Snow Mountain (Yulong Xueshan, 5596 m) near Lijiang, a botanical paradise. There, he collected herbarium specimens and seeds for the subscribers who paid for new species to add to their gardens. His collections numbered some thirty-one thousand plant specimens and he discovered numerous species new to Science, including *Gentiana sino-ornata* and species in thirty genera that are named in his honour, including *Pleione forrestii*, *Rhododendron forrestii*, *Pieris formosa* var. *forrestii*, *Primula forrestii*, *Iris forrestii* and *Hypericum forrestii*.

A New Genus

Forrest collected a wide range of plants and seed for Bulley and did not neglect orchids. One of the most striking of these was a relative of *Coelogyne* and *Pholidota* that proved to be new to Science. The herbarium material was examined by Rudolf Schlechter, who described the genus *Bulleyia* in honour of Arthur Bulley. The excellent type specimen and a detailed drawing of the dissected flower both accompany the description. He distinguished it from *Pholidota*, to which he thought it most closely related, by its elongate spurred lip, hidden within the swollen bases of the lateral sepals. *Bulleyia* has been subsumed within a broadly defined *Coelogyne* by Mark Chase et al. in *Phytotaxa* 510 (2021). The expanded genus also includes the large genera *Pholidota* and *Dendrochilum*.

Distribution

Forrest collected *Bulleyia* several times, growing on rocks, cliff ledges and on trees at 550 and 800 m in western and north-western Yunnan. It has been reported with a wider range; a collection at Kew (Kew Spirit Collection 25871) extends its range to Assam, without exact provenance, while *Orchids of Bhutan* also records it from Bhutan.

Description

Bulleyia yunnanensis Schlechter plants are up to 45 cm tall, with narrowly ovoid, two-leaved pseudobulbs 5 to 7 cm long, clustered on a short, stout rhizome. Inflorescences are up to 72 cm long, with 9 to 15 creamy-white flowers with a pale brown lip. The sepals and petals are about 18 mm long.

Cultivation

One of us (MC) grows it in an intermediate greenhouse in low light, in pots in a 50/50 mixture of medium pine bark and coconut fibre pieces. Plants are watered regularly under an automatic watering regime throughout the year, with an enforced drier period during the winter months (May to August in Canberra). Once established, plants produce one new growth each season, the leaves appearing first, followed by the emergence of the inflorescence and gradual development of a ribbed pseudobulb like that seen in many related *Coelogyne* species. The thin, wiry, slightly flattened inflorescence emerges from the centre of the new shoot and continues growing over several months, becoming pendulous with the weight of the flowers. The creamy-white flowers develop and open fully in clusters lasting for one to two weeks. There is no obvious scent from the flowers.

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Acantholimon at Utrecht Botanic Garden

Connor Smith



When turning over a pot to uncover small white roots brings a moment of joy like no other – it brings a happiness welcomed in the cold depths of winter when many of us are secluded in our glasshouses. Although this feeling is often sought, some species are not so eager to please us. As we tip the pot, we find rot, callusing but no rooting, or sometimes remnants of a cutting that once was there. This often results in new methods, at new times, sometimes with new species, sometimes faring better, sometimes not so much.

Acantholimon is one such. It is predominantly an evergreen shrub – although I have seen some with interesting bronze colour normally followed by loud cursing – that grows in harsh conditions in the arid and high elevation areas from Eastern Europe to Central Asia. It grows from densely packed cushions which are tightly formed into laxer mat-forming carpets that creep over the ground or cling to rock faces. Despite a remarkably large range of species, with the AGS stating approximately 120 while Kew states 312, it is clear the true names and species are not agreed upon and are far from accurately described. Despite their range they remain relatively unexplored, with only a small array of species available in commerce, seen in people's gardens or in botanic gardens.

Many of the *Acantholimon* have been placed in the garden within their preferred area of colonisation. The larger species are allowed to grow rampantly and the smaller denser ones are given protection in the alpine house away from the rain. These are mostly the easier species like *A. acerosum*, which have established well and flower regularly.

We have grown some of the following: *Acantholimon acerosum*, *A. alatavicum*, *A. glumaceum*, *A. pamiricum*, *A. knorringianum*, *A. kotschyi*, *A. caesareum*, *A. venustum*, *A. armenum*, *A. sarytavicum*, *A. saxifragiforme*, *A. hedinii*, *A. caryophyllaceum*, *A. capitatum*, *A. litvinovii*, *A. calvertii*, *A. ulicinum* and *A. echinus*. For propagation, we made a range of cuttings to test which was the best for us and for this tricky plant. We took short cuttings approximately 8 cm long with a single tuft and also some with multiple tufts. We took longer cuttings approximately 15 cm long to see if length might be an important factor.

The final technique was inspired by a conversation with Gerard van Buiten (Head Gardener at Utrecht BG) who told me that when redesigning a bed a number of years ago he had removed a large species of *Acantholimon*. He covered it with some soil and left it unprotected outside. He was concerned that it might have rotted after a rainy cold

Above: Our *Acantholimon glumaceum* accession from 1964. It formed a carpet of spiky foliage with graceful flowers (Photo: Gerard van Buiten)

spell but, much to his surprise, he found many small roots that had formed all over the plant. This is what gave me the idea to do *mounded* cuttings. Long sections of the plant were taken as cuttings and placed in a large deep pot. Two to four of them were then spaced into the pot and backfilled with soil. The mix was then filled to the neck of the cuttings. All were placed in a glasshouse, with no bottom heat, only a heater fan to prevent the conditions from dropping below freezing. The cuttings were taken in November, but I believe they may be taken from October to February depending on your climate and conditions.

What were the results? Despite many of the cuttings, short or long, looking healthy there was no root development. A few had rotted at the base and were beginning to turn brown. This is a common case when I have spoken with people about trying to root *Acantholimon*. Talking with other plant people has revealed some species that are easier than others (*A. acerosum*, *A. ulicinum* and *A. trojanum*) but are still neither reliable nor consistent in their results.

When the pot with the mounded cuttings was turned over it had a different story to tell. All of these cuttings had rooted at the bottom. This is quite similar to *Erigonum* species and other desert-adapted genera that have these forms of adaptations. To explain, plants in desert environments have adapted to the scarcity of water. Therefore, root formation – especially the fine roots that *Acantholimon* produce – need to be kept moist in order to establish. It makes sense as to why the cuttings rooted lower down where there is more water, a cooler root zone temperature and better anchorage against wind. It also makes sense when you think about how the plant forms in its native habitat: as soil builds up around the necks of the plants they will form new roots in it.

There is a similar adaptation in forest plants like *Viola* which are mounded by fresh leaf litter on the forest floor. This then covers the plant, allowing the roots to form in the new conditions. A similar technique has been developed to propagate the equally challenging species of *Cassiope*. Soil is mounded onto the main stem covering part of the lower limbs to allow new roots to form – quite similar to a form of layering but instead of bringing the branch of the plant down to the soil you are bringing the soil to the plant.

One cutting which had the best roots had started rooting further up the stem. It is easy to jump to logical conclusions: as the cutting forms roots and is better established, it now can form additional roots further up the stem if a satisfactory volume of soil and water is present.

The biggest problem for this technique is finding the material, otherwise seed should be the primary method to grow a few plants. Then sacrifice one plant to get enough material for multiple cuttings. These are essentially fully grown plants because of the size of the cuttings required and therefore they can be planted out into the garden much faster. May you enjoy the best of luck!

Cyclamen, A Concise Guide Martyn Denney

The Cyclamen Society £5-00
140 pages, 366 colour and 3 black
and white illustrations
ISBN: 9780953752652

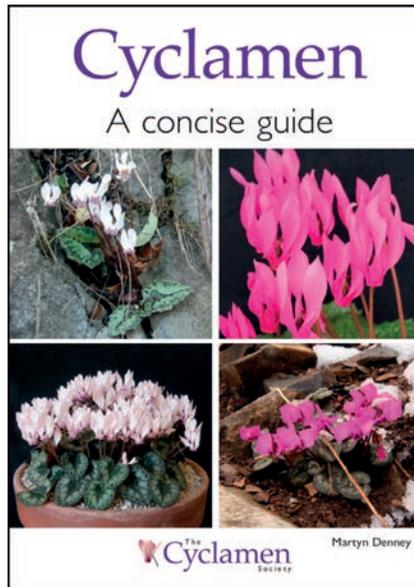
The Cyclamen Society has just published a new 104-page soft-covered book compiled and written by Martyn Denney. The reader is first given a brief botanical guide, naming the above- and below-ground parts of the cyclamen plant, and there is a map of the natural distribution. The next chapter covers florists' cyclamen, which through many years have

become widely-grown popular house plants. Many cultivars are mass produced and, being widely available, are often people's first introduction to growing cyclamen. After this introduction, the guide takes you on to the next step of growing in conservatories or greenhouses, whereby following the provided guidance should deliver success. The next chapter describes species that are expected to do well in some – if not all – gardens of the United Kingdom; the same list would apply to any who share a similar climate. The many good illustrations show a selection of hardy cyclamen species in a range of garden habitats.

The chapter on pests and diseases may seem daunting but although it is useful to see detailed pictures of the range of plant infestations, you are reassured by "*Don't panic*": you may only encounter a few of these pests and diseases – if any; if you happen to be unlucky then prevention and control options are included.

My favourite method of getting plants, including bulbs, is to grow them from seed, and that is the topic of the next chapter. I have read many descriptions of growing cyclamen from seed, some overly complicated, but the method described here is simple and following it will deliver a good germination rate that leads to mature plants. The Cyclamen Society holds shows: should you want to become an exhibitor there is a short chapter taking you through the methods and preparation required to present your plants successfully.

The main part of this book is a guide to the species and here I find the author has successfully distilled the many pages that could have or have been written on each species down to the essential information on



the plant, its habitat, and how to cultivate the forms and cultivars available to gardeners. I also commend the mixture of excellent pictures that show each species in the wild as well as in cultivation.

The Cyclamen Society has been involved in many valuable field studies and research reports, all of which have greatly extended our understanding of these plants. This knowledge may help the conservation of the species in the wild, which is the theme of another chapter. Over the years numerous books have been written on cyclamen, and some are usefully listed at the end of the book.

I will certainly be referring to this guide which, true to the description “*Concise*”, will be a valuable resource to beginner and expert alike by providing all the information needed to grow cyclamen. At just £5.00 it should not just be on *your* bookshelf but it would be an excellent present, costing little more than the cost of sending a birthday card, for any friend. It is available from the publication pages of the Cyclamen Society (<https://www.cyclamen.org/publications/>).

Ian Young

Bulbous Plants of Turkey and Iran **Peter Sheasby & Christopher Grey-Wilson**

The Alpine Garden Society £44-00
448 pages, ISBN: 8010000021938

This is a new and fully revised version of a book first published in 2007; it contains new text with 150 added species and 350 extra images. First impressions are of a weighty hard-covered book abundantly packed with pictures often four or more per page, so there are many delightful visual references. With the pictures is a brief text giving plant name, authority, and the botanical descriptions; used with the image this helps guide the reader to identify the many different bulbs that are found in this botanically rich region. The bulbs are listed botanically under plant families but as I read through I found some larger genera are further divided into sections by key botanical characteristics.

This book reminds us how important the bulbs native to Turkey and Iran have become to our gardens. Here are many familiar plants, but it

Bulbous plants of Turkey and Iran



Alpine
Garden Society

A photographic field guide by Peter Sheasby
Text by Christopher Grey-Wilson

has illustrated to me how many more species there are. For instance, it takes sixteen well-illustrated pages to cover the different species of *Gagea*, similarly with *Ornithogalum* and of course, the more familiar *Crocus*, *Colchicum*, *Fritillaria* and all others. The print quality and photographs are good but do not expect full page images – this is impossible in such an extensive guide where multiple images per page are necessary.

Although most pictures seem to have been taken in the field for completeness, some – as indicated – are of cultivated plants. Readers may note one trivial mix-up on page 295 where a picture of the North American *Erythronium revolutum* appears instead of *Erythronium dens-canis*. As a writer I know all too well how easily such things can happen.

The weight and hard cover might deter me from carrying this book in my backpack but it would be handy to have it in your vehicle or accommodation for daily reference or to compare against your own photographs on returning home.

If you intend travelling there is some brief guidance in the introduction of where and when to go, along with very inviting landscape pictures. If you have not been before I endorse the recommendation that going on a guided tour is the probably the best option. Even for gardeners who do not travel, this book will prove an extremely useful visual reference to the bulbs of Turkey and Iran, many of which are available and can be grown in our gardens.

Ian Young

A Field Guide to the Plants of Armenia

Tamar Galstyan

Filbert Press, about £25

592 pages, many pictures

ISBN: 9781999734589

This book is the first English language guide to Armenian plants. It has the feel of a weighty tome, coming in at 782 gm. Flicking through the many pages I realise that it might have been much heavier. The paper is thin enough to keep weight (and price) down but not at the sacrifice of print quality, which I find good throughout. I also like the design of this book – physically, the soft cover and rounded corners make it a comfortable fit to be carried in a backpack or even a large pocket.

The plants are listed in two sections: one for monocotyledons and the other much larger for the dicotyledons. I very much like the addition of six identification pages. Each contains 12 images to help identify the main plant families. This in turn helps to navigate the rest of the book where the plants are listed alphabetically under their plant families. The consistent layout uses two columns per page where the upper two thirds contain the pictures and the bottom third gives descriptions; this is very

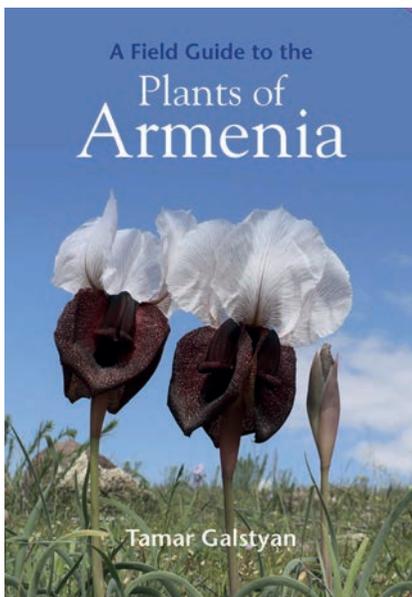
logical and easy to search; furthermore, a small map at the bottom indicates the distribution of each plant in Armenia. Sometimes there is a single image of the plant in the upper part, sometimes two if appropriate to aid identification. Some of the plants, especially those with smaller flowers, are challenging to photograph but the images are of a good quality and serve well to help identify the subjects.

When reading the author's introduction, I was struck that her love and enthusiasm for the plants of her homeland have driven her to seek and then share this knowledge, originally through her *Plants of Armenia* Facebook page which, with the help of her collaborators – including Christopher Gardner and the publisher – resulted in this book. With pictures and descriptions of a thousand plants including bulbs, herbaceous plants, woody plants, grasses and ferns this is an impressive list but in the words of the author '*I only regret the limited number of species included here, but to have included more would have made the book too large and unwieldy. A good reason to plan a second book!*' There are many plants here that I have simply not seen before and I for one look forward to the sequel to this one..

I conclude and concur with the publicly expressed opinion of Panayoti Kelaidis (Senior Curator at Denver Botanic Gardens): '*Wow! This is a remarkable and significant contribution to the literature of the region. The photography is exceptional and despite my vast botanical library I've not seen at least 50% of the plants in any other book of this nature.*'

Ian Young

Tamar's pictures grace the cover pages of this issue. She graduated from the University of Art and Theatre in Yerevan. She studied ecology and worked with children as an ecology teacher. Tamar began to travel regularly in Armenia, taking numerous pictures of plants and identifying them. She created a website to help students learn about the Armenian flora and this led to her popular Facebook page *Plants of Armenia*. In 2012, she was invited to guide a botany trip. Gradually, the geographical range of her trips expanded, and some are managed through her own travel company, *SkyGreen*. Travels in Georgia, Iran and Central Asia have deepened Tamar's love of Nature as well as her plant knowledge. Now see the next page ...





An Armenian beauty:
Iris pseudocaucasica
(Tamar Galstyan)



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