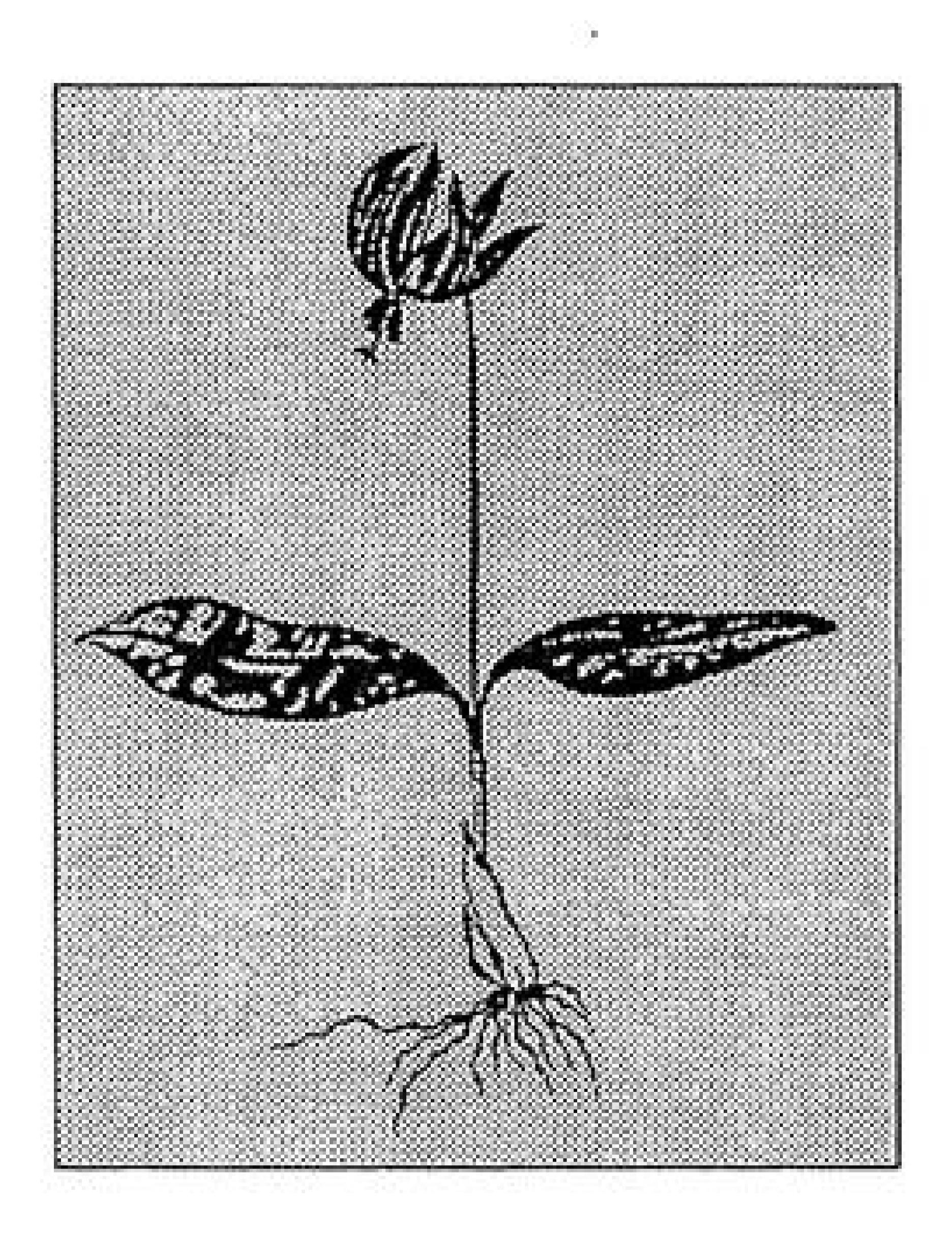
THE BULB NEWSLETTER



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The Bulb Newsletter No. 25

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Troubled by Warts?

The recently-published *Wart-cure Survey* for the Folklore Society by Gabrielle Hatfield (1998)* mentions many treatments, varying widely from rubbing with the underbelly of a slug (ugh!) to allowing the warts to be bitten off by crickets. There is something even more intriguing involving electric sparks and a piece of steak but I don't think we should even begin to delve into that one! Many plant cures are mentioned but only two monocots, onions and garlic, which are rubbed on to the warts. I think I would rather keep the warts. *Publisher: Folklore Society, University College London, Gower Street, London WC1E 6BT.

*****The International Bulb Society*****

From time to time in the *Bulb Newsletter* we give reports on some of the interesting papers published in *Herbertia*, the journal of the IBS. In the last few years they have expanded their activities considerably and in response to a request from the Society we are happy to provide the following updated information about the IBS.

The International Bulb Society, established in 1933, is positioning itself for the 21st century. A new Board of directors under the guidance of Robert M. Turley, president elect, will assume responsibility for the IBS in January 1999. The IBS will replace its newsletter with a new publication, *Bulbs*, while retaining *Herbertia*, its scientific geophytic* journal. *Bulbs* will be presented in three issues, bringing the total to four quarterly issues per year.

American and international chapters will be developed with the international chapters each having a representative on the IBS Board. A 'Bulb Exchange' has been added to IBS' customary Seed Exchange list. Annual membership meetings and bulb shows are

Galanthus gala

Snowdrop festivals are now becoming regular events in the gardening calendar and the genus is going from strength to strength in popularity with bulbs of unusual varieties changing hands for a considerable amount.

This year there is a gala on Saturday February 19 at Worksop College, Notts, organised by Joe Sharman and Daphne Chappell. The day includes a series of talks, a plant sale, optional buffet lunch (book before 6 February) and a visit to nearby Hodsock Priory. This is a Domesday site where there are five acres of naturalised snowdrops and a collection of cultivars set among flowering trees and shrubs.

The day costs £11 (lunch extra, £7) and is bookable through Daphne Chappell, Cinderdine Cottage, Dymock, Glos. GL18 2DG (Tel: 01531-890265). Please send S.A.E. for return of tickets.

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proposed, as is the resumption of its scientific symposia.

Subscription details: Master Card and Visa will now be accepted for membership dues via their web page, fax and postal mail. For membership Information see the web site at: http://www.bulbsociety.com. Or contact Dave Lehmiller, Membership Director, 550 IH-10 South, Suite 201, Beaumont, TX 77707, USA. Or Email to IBSMEM@AOL.COM, or fax to (409) 842-8244.

Current dues are \$30.00 US per year.

* Geophyte is a word which is only catching on in 'bulb' circles, although it has been around for a very long time. In short, it includes all those plants that have their growing points below ground level - such as bulbs - but it embraces any other type of underground storage organ as well, monocotyledon or dicotyledon, so is quite a useful, if rather inelegant, word.

Would a book called The Smaller Geophytes have much pulling-power in the bookshop window, I ask myself!

Two new species of Ledebouria

The genus Ledebouria, for those unfamiliar with this name, contains many species of Hyacinthaceae/Liliaceae formerly included in Scilla. Many gardeners will have grown some of those with ornamental leaves, such as L. (Scilla) violacea (often regarded as a variant of L. socialis) and L. adlamii, which make quite good house plants. Not all the African scillas disappeared into Ledebouria when John Jessop did his revision of the group in 1970; a few species, such as S. natalensis, remain in the predominantly Northern hemisphere genus Scilla.

Studies for a revision of the genus Ledebouria by S. Venter (an M.Sc. at Natal University) has revealed two undescribed species from the northerly regions of South Africa. These are described in a paper by S. Venter & T.J. Edwards, with drawings, in Bothalia 28,1: 15-17 (1998).

The first, L. atrobrunnea, is from the foothills of the Magaliesberg near Rustenburg where it grows in reddish stony soil in sparse deciduous woodland consisting of Protea and Lannea. It has an elongated bulb consisting of rather loose scales; growers in northern gardens can usefully compare it with the bulb of Scilla lilio-hyacinthus, but in the case of L. atrobrunnea the bulb is often purple-spotted, the live scales white and the dead outer ones purple brown (the Pyrenean S. lilio-hyacinthus has yellowish bulbs). From the drawing accompanying the description it appears that the apex of the bulb is situated more or less at ground level, with the body of the bulb just below ground. The leaves of L. atrobrunnea are said to be glaucous, 4-6 in number, twisted lengthways and erect (unusual in Ledebouria where they are so often spreading out flat) and undulate at the edges, at least in the lower part. As with many ledebourias, there can be more than one inflorescence per bulb and this a short raceme of small starry flowers, the perianth segments reflexing when they are fully open. The flower colour is

not described, but it would be surprising if it is very bright - most species seem to be in green-and-purple mixtures. It flowers in September-December which would translate to spring to early summer in the Northern Hemisphere.

The other new species is *L. dolomiticola* (=dolomite-loving) which grows in the Strydpoort Mountains near Pietersburg in dolomitic rock crevices and stony places, flowering between January and April (= mid-late summer in the Northern Hemisphere). This also has an elongated bulb, in this case with the scales tightly wrapped together and white, and the bulb is borne above ground - apparently in clumps formed by offsets. There are 3-5 lanceolate, glaucous leaves which lack threads when broken, and these are also more or less erect. The short raceme has small flowers which are described as pink or purple with a green central stripe along the centre of each perianth segment on the outside. Both of these are placed by the author in a small group of three with *L. viscosa* which occurs in much the same region of South Africa, the North-West province. The features they have in common are the near-cylindrical bulbs, erect leaves and conspicuous 'shoulders' at the apex of the ovary. All three are considered to be exceedingly rare and particularly vulnerable to extinction.

And a new South African Ornithogalum

In the same issue of Bothalia 28,1: 62-65 (1998), G.Williamson has named a new Ornithogalum collected in September 1995 in the Richtersfeld National Park, Northern Cape. This is O. decus-montium, a dwarf species only 4-10 cm in height with two narrow grey-green leaves only 1.5-3 mm wide which are present at flowering time (some species are hysteranthous - i.e. leaves appearing later, after flowering). The short, compact raceme has up to 8 white flowers facing upwards, each about 1.5-2 cm across; these appear to have a dark eye in the centre, formed by the ovary which has a blackish-green apex. This feature is noted as being unique (Northern Hemisphere bulb enthusiasts will probably immediately think of O. arabicum which has a blackish ovary and a similar upward-facing inflorescence, but this is, of course, an enormous plant by comparison with the new species). The meaning of the name may not be immediately obvious so is usefully explained: it refers to the 'decorative carpets of flowering plants which cover the lower mountain slopes.' Ornithogalum decus-montium flowers 'in abundance in September' on arid slopes in soil of decomposing orange-brown rocks, in full sun at 200m.

An Inconstricted grape hyacinth, and a look-alike

Derek Viney, author of An Illustrated Flora of Northern Cyprus (1994), has raised a question about a dark, blackish-blue Muscari seen there recently. At present I am not able to provide a definitive answer, but it has led to a part-investigation into Muscari inconstrictum and its authenticity as a species.

This species was described in 1951 by K.H.Rechinger from a specimen gathered in February 1937 at Petra in Jordan (*Dinsmore* 10371). It was

distinguished from the Greek M.commutatum by the corolla not being

constricted at the mouth - that is to say rather more bell-shaped than urn-shaped. In colour the two are very similar, a deep blackish-blue throughout. without the paler blue or whitish lobes, or 'teeth', so noticeable in the common neglectum. These two species have been dealt with in various wavs the Floras of the region. The Flora of Turkey (1984) maintains them as distinct, largely on basis whether flowers mouth constricted not: in reading through the two descriptions one extract can



few more alleged distinctions: in *M.commutatum* the racemes are more densely-flowered, the bulb tunics darker brown, the leaves wider, the flowers with bumps or 'shoulders' around the constricted mouth, the lobes (teeth) of the perianth only 0.5-1 mm long and recurved (straight and 1-1.25 mm long in *M. inconstrictum*) and a longer, oblong or ellipsoid capsule (about as long as wide in *M. inconstrictum*). There is also a geographical element involved: *M. commutatum* occurs in Sicily and mainland Italy, eastwards to Crete and the Aegean Islands of Lesvos and Samos; *M.inconstrictum* is recorded for Cyprus, Jordan, Syria, Lebanon, Israel, Iraq and Iran; in Turkey it is known to occur only in the extreme central-south in Hatay province, near the Syrian border. The two distributions do not appear to overlap anywhere, or even meet.

Desmond Meikle, in his Flora of Cyprus (1985), maintains M.inconstrictum as a distinct species and Flora Iranica (Liliaceae II), published in 1990 also retains it rather than sinking it into M.commutatum. On the other hand Mouterde, although he used the name M.inconstrictum in Nouvelle Flore du Liban et de la Syrie (1966) commented: "Mais s'agit-il bien d'une espèce distincte et non simplement d'une forme extrême de commutatum."

Feinbrun, in *Flora Palaestina* (1986), went one stage further and sank *M.inconstrictum* into *M.commutatum* with the note: "We join Mouterde in doubting the......diagnostic significance of the degree of constriction at the throat of [the] perianth in plants from the *commutatum* group."

So where does this get us? A check on dried specimens (photocopies of three of which are shown above) appear to support the separation of these two very dark grape hyacinths. Most of the features given to distinguish between them do seem to be valid: the colour of the bulb tunics, the width of the leaves, the denseness of the inflorescence, the shape of the perianth (bell-shaped v urn-shaped) and attitude of the lobes, and the shape of the capsule coupled with discrete distribution patterns. The specimens also indicate that the plants of *M.inconstrictum* from Cyprus appear to have shorter perianth than those from mainland Asia.

On the basis of the facts available it seems that these are distinct species and that the plants on Cyprus may be worthy of recognition as a subspecies of *M.inconstrictum*. However, as can be seen from the accompanying photocopies, dried specimens are not ideal for observing the subtle characteristics of the perianth shape and are no substitute for observations based on living plants. At present we do not have plants of all three [i.e. Greek/Italian (*M.commutatum*), Asian (*M.inconstrictum*) and Cypriot] plants growing together in cultivation, but it will make an interesting project for the future.

And while on the subject: McBeath's Grape Hyacinth

We don't associate our good friend Ron McBeath with western Asiatic bulbous plants - more of a Himalayan/Chinese dicot expert - but he does now have a *Muscari* named after him, so this requires an explanation. We are grateful to Jim Archibald for pointing out the omission of this interesting little plant from the pages of BN, so we hope you have a good stock of seeds, Jim & Jenny! (see Catalogues, BN 24:17, 1998).

Muscari mcbeathianum was described in Herbertia 44(1): 25-26 (1988) by Kit Tan of the Royal Botanic Garden, Edinburgh, and named after Ron for a reason which may be unique. To quote from Herbertia: "During a particularly mild and early spring and throughout March and April, Ronald McBeath, an assistant curator at the RBG [Edinburgh], had been assiduously bringing me Muscaris in pots and polythene bags, hoping for quick and accurate identifications.... Archibald 6155, in cultivation for nearly three years,was brought in as part of the identification routine. Having recently completed a

large batch of boring 'armeniacum' cultivars and 'neglectums', neither plant nor bringer received an enthusiastic gaze. It was with some delight that I found myself unable to match the plant with any known species." She continues, "It gives me great pleasure to name this sand-inhabiting little *Muscari* after Ron McBeath. His devoted concern, almost bordering on anxiety lest I miss out on my *Muscari* identifications, is here rewarded....."

The Herbertia Editor of the day (Mitch Beauchamp) is to be congratulated for his taste in covers, for we are treated to a most useful colour photograph of Muscari mcbeathianum, and the article is also well illustrated by a line drawing with floral dissections. This is an attractive little plant, belonging to the Pseudomuscari group - that is, those which have bell-shaped flowers without a constricted mouth, as in the commonly cultivated M. azureum. This one most closely resembles M. coeleste in being a small plant with very pale blue flowers but is immediately recognisable as different since it has 8-9 very slender (1-2 mm wide) leaves; M. coeleste has only 2-3 rather broader (3-12 mm) ones. The rest of the vital statistics are: Plant 5-12 cm tall when in flower, the raceme equalling or overtopping the leaves and carrying 10-20 flowers. The pale sky-blue flowers are bell-shaped and 5-6.5 mm long with short, recurved lobes which lack any darker blue stripe along their centres (most of the species of this group, such as M. azureum, M. coeleste and M. pseudomuscari (chalusicum) do have such a stripe).

The original collection of *Muscari mcbeathianum*, *Archibald* 6155, was from Adana vilayet (province) of southern Turkey, between Yesilkent and Tufanbeyli at 1200 m where it was growing in fine moist sand.

The one-leafed Romulea

Apologies from the BN office to whoever it was who asked us to give some details of *Romulea unifolia* - the letter <u>must</u> be somewhere in this heap! There are quite a lot of bulbous plants that produce just one leaf per bulb (even at maturity when flowering); I can think of *Ornithogalum unifolium* [and another 'thog I've seen in Turkey with one hairy leaf, possibly an un-described species], *Tulipa regelii* (see BN 17:11) and *Scilla monophyllos*; also *Crocus candidus*, *Muscari mirum*, *Muscari latifolium*, *Allium akaka* and *A. nevskianum* often do it as well. It has a certain sort of attractive simplicity, and very economical of effort!

So, it was intriguing to find that there was a Romulea as well.

Romulea unifolia was described by the South African Romulea specialist Miriam de Vos in 1987, in the Journal of South African Botany 53(3): 247 (1987). It is said to be most closely related to R. sabulosa, but the flowers are rather more of an orange shade compared with the bright scarlet red of R. sabulosa, and of course there is only one leaf per bulb. The one slender leaf can be up to 32 cm long and the pedicels (flower stalks) up to 12 cm, each with a solitary flower. The flower can be as much as 5 cm long (claimed to be even larger in cultivation), which must open out to form a flower at least 8 cm

across; it is cup-shaped at the base with spreading segments, which are shiny orange-red and the flower is marked with a conspicuous blotch in the centre, the upper part of the blotch blackish-brown and lower part yellow. The outer segments have a darker, feathered pattern of veins on the outside. *Romulea unifolia* was discovered on the Great Roggeveld Plateau between Sutherland and Calvinia. In the wild it flowers between August and September, so in cultivation in Northern Hemisphere collections we can expect it to start to grow in autumn and come into flower in January or February.

RHS Awards to Bulbs in 1998

The Royal Horticultural Society's system of awards is a useful exercise for various reasons, but particularly as a means of encouraging people to bring good plants to the notice of the gardening public. The hardy or near-hardy bulbs are assessed by the Joint Rock Garden Plant Committee, which has with representatives from the the RHS, Alpine Garden Society and Scottish Rock Garden Club. Each year, in the December Bulletin, the AGS provides written accounts of all those plants that have received awards [FCC (First Class Cert.), AM (Award of Merit), PC (Preliminary Commendation) or BC (Botanical Cert.)] during the year, often accompanied by colour photographs; this is a very valuable set of records dating back for many years.

The full write-ups of all of the 'rock plants' receiving awards during 1998 are to be found in Vol. 66, no. 4 of the *Bulletin*. The 'bulbous' plants (excluding orchids) honoured during the year were:

Androcymbium europaeum - BC [Kew] A little Colchicum relative with a rosette of leaves and funnel-shaped stemless white or pale pink flowers in winter. Spain, N.Africa. [See BN 6:3, 1994 and 10:17, 1995]

Biarum ditschianum - BC [Kew] One of the most bizarre 'bulbs' I know. Late summer/early autumn-flowering, before the leaves emerge. About the only thing visible above ground is the thick yellow spadix c. 5 cm high, the spathe being reduced to a green rim at ground level. Tony Hall, author of this account, describes the smell as a cross between Billingsgate fish market and a knacker's yard on a hot August day - nice one, Tony (& he has got a poor sense of smell! -ed). [See BN 7:20, 1994]

Corydalis x allenii - PC [Mr & Mrs H.Taylor] An old hybrid, possibly between C.bracteata and C.solida, very vigorous increaser with curiously coloured flowers, a mix of pinkish-purple on the 'lips' and creamy yellow, fading to white on the spur. Garden Origin.

Corydalis schanginii subsp. schanginii - PC [Drs I. & C.Bainbridge] A distinctive Corydalis with long (4cm) flowers, half of which is a slender, tapering spur; pale pink with a darker stain on the inner petals. C.Asia, Tien Shan & Altai Mts.

Crocus imperati subsp. suaveolens - AM [A.Edwards] Spring-flowering. Similar to subsp. imperati in colour, violet with a yellow throat inside, buff with violet veining on the outside; yellow anthers, yellow/orange style. Italy.

Crocus kotschyanus subsp. kotschyanus - AM [J.McGregor] Very easy early autumnal species, leafless at flowering time; flowers pale lilac with a ring of yellow blotches in the centre, white anthers, small pale yellow style. Turkey.

Crocus longiflorus 'Primrose Warburg' - PC [A.Edwards] An albino of this fragrant autumn crocus, white with violet veins, yellow anthers and deep orange style branches. Coll. by Primrose on Malta. [See BN 24:10, 1998].

Fritillaria affinis var. tristulis - AM [Mr & Mrs J.Young] One of the better variants of *F. affinis* (*lanceolata*); 20-25 cm with whorled leaves and 1-several large, dusky purple, yellow-edged bells. California. [See BN 21:8, 1998].

Fritillaria davisii - AM [R.Lilley] Shiny green leaves and purple-brown flowers, strongly checked; up to 20 cm tall. S.Greece.

Galanthus 'Diggory' - PC [R.Hobbs & Mrs R.Steele] A distinct snowdrop (!) with a unique shape, the outer segments curving inwards towards the centre of the flower. A G.plicatus selection or hybrid. Garden Origin.

Galanthus 'Fieldgate Superb' - PC [C.Mason] A hybrid snowdrop with G. plicatus in its parentage. Flowers up to 4 cm long, rather globular outer segments; inner segments with an X-shaped green mark. Garden Origin.

Galanthus 'Spindlestone Surprise' - AM [R.McBeath] One of the 'yellow snowdrops' - the yellowish-green part being the ovary and the markings on the inner segments. This is c. 20 cm tall with slightly pleated leaves; could be a *G. plicatus-G. nivalis* 'Sandersii' ('Lutescens') cross. Garden Origin.

Gemmaria chaplinii (Strumaria c., Hessea c.) - PC [Kew] Early-autumn fl., before the narrow, strap-like hairy, prostrate leaves appear; loose umbels 12-14 cm across of white starry flowers 1.5 cm diam. S.W.Cape, S.Africa.

Ipheion 'Rolf Fiedler' - FCC [Kew] Similar in overall aspect to *I. uniflorum* but a lovely clear pale blue; less frost-resistant and does not survive outside here in Surrey. (?=*I.peregrinans*). Uruguay. [see BN 21:4, 1998].

Iris leptorrhiza - PC [Kew] A small Juno Iris with green flowers, lined and spotted purple, with a white crest and yellow signal patch on the falls. The roots are thin (most junos have swollen roots). C.Asia, Pamir Mts.

Iris stenophylla subsp. allisonii - PC [Kew] A Juno Iris, one of the *I. persica* group. Very short leaves at flowering time; several pale blue-violet flowers, very prominently dark-spotted on the falls and with a yellow crest. S.Turkey Muscari armeniacum 'Valerie Finnis' - PC [Valerie Finnis] A good, vigorous pale lavender blue grape hyacinth from the garden of Sir David Scott and Lady Scott (Valerie Finnis). Garden origin. [see BN22:15, 1998]

Narcissus nobilis subsp. primigenius - PC [E.Webster] A delightful small trumpet daffodil, bicoloured with deep yellow tube and trumpet with paler creamy perianth segments; much narrower leaves and more graceful flowers than the usual, rather 'top-heavy' *N. nobilis* we see in cultivation. N.W.Spain.

Narcissus viridiflorus - BC [Kew] If you manage to flower this autumnal Narcissus you will be surprised by the weird shade of green of the flowers. Kew's Tony Hall has the trick, apparently; a long pot containing many bulbs in a 'pot-bound' state seems to be part of the answer. Spain, N.Africa.

x Rhodoxis hybrida 'Hebron Farm Red Eye' - PC [Wisley] A name at last for these useful hybrids between Rhodohypoxis and Hypoxis (x Rhodoxis); all crosses between R. baurii and H. parvula will be x Rhodoxis hybrida plus a cultivar name for any clonal selections. This cv. has white flowers with a red stain in the centre. Drakensberg Mts.

Roscoea humeana 'Inkling' - PC [Mrs C.Coller] A very dark form of this normally pinkish-purple (it can be white or yellow as well) hardy ginger. This

one is intensely dark purple. China, but this form of garden origin.

Scilla verna 'Audrey Burge' - PC [R.Burge] This was grown from seed collected from a vigorous plant of *S.verna* found by the exhibitor in Cornwall. It is up to 15 cm in height with a wide raceme of starry, pale violet-blue flowers. It has since been shown (by Prof. John Parker of Cambridge Botanic Garden) to be a triploid variant. Widespread in (mostly maritime) W.Europe.

Trillidium govanianum (Trillium govanianum) - BC [Kew] Not the showiest of trilliums, but interestingly curious. It has the usual whorl of three leaves (plain green) and a short-stalked green-and-purple flower with narrow segments. Himalaya.

Tulipa edulis (Amana edulis) - PC [Kew] A little eastern Asiatic 'tulip', perhaps a link with *Erythonium* or even *Gagea* Several small, white, yellow-centred flowers marked pale brown on the outside. Japan, Korea, China.

The Scillas (and Chionodoxas) of Crete [See also BN 24:15, 1998]

Franz Speta, in the Linzer Biologische Beiträge 29: 641-681 (1997), describes a new Scilla from Crete, S.cydonia, which is akin to the very familiar S.bifolia.

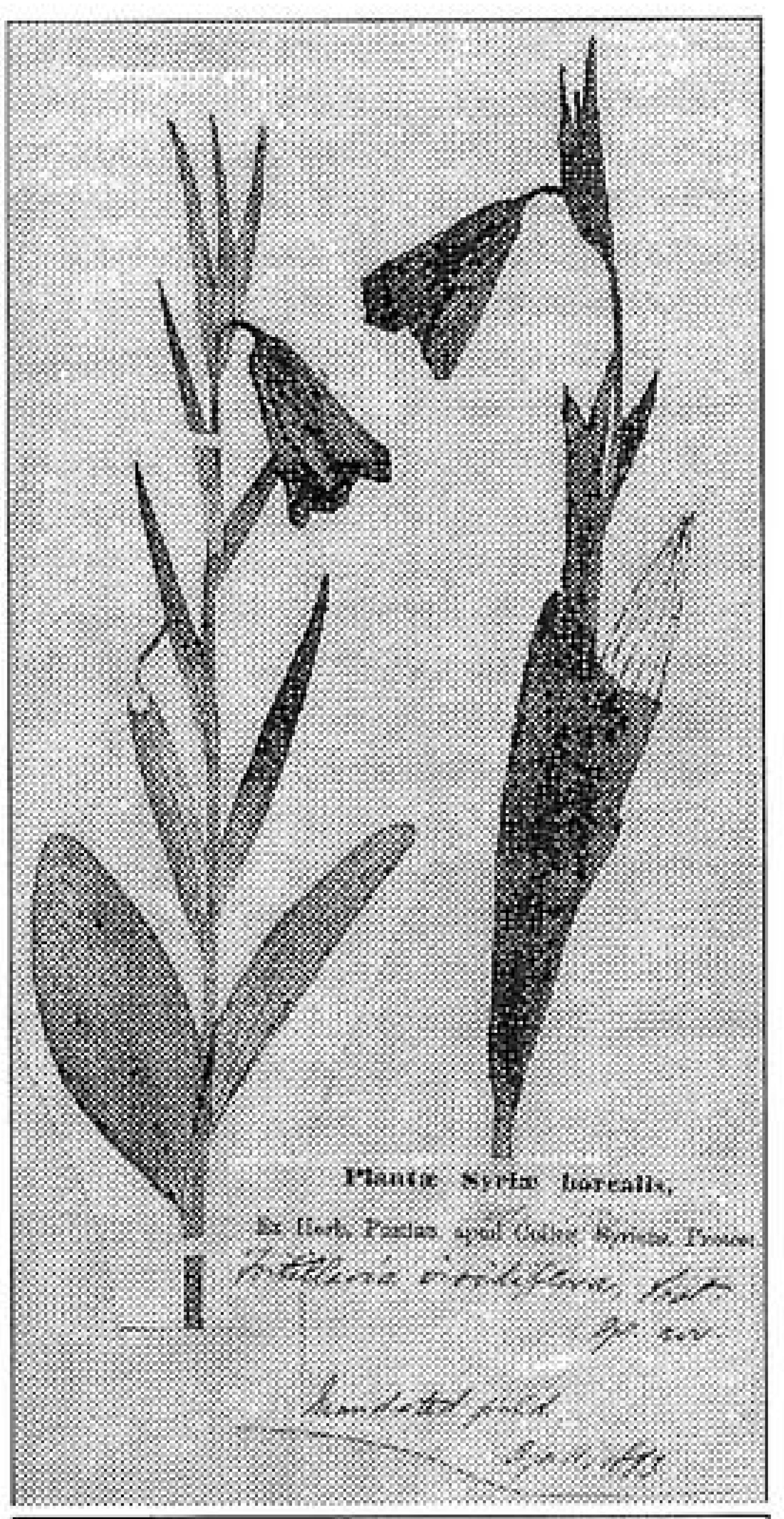
In the author's view the genus *Chionodoxa* should be sunk into *Scilla*. Doubtless molecular studies will add more to this debate in due course; it seems that the most likely outcome of this will be that the many species at present regarded as scillas will be divided amongst several genera, but that *Scilla bifolia* and *Chionodoxa* will be combined (and for nomenclatural reasons probably under the name *Scilla*). However, there is something to be said for retaining names for the practical purposes of communication, and it is very convenient to talk about 'Chionodoxas' since this gives an immediate image of the flower with perianth segments joined into a tube and stamens with wide filaments forming a cone (free segments and slender filaments in *Scilla*).

Scilla cydonia has 2-4 leaves 2-7 mm wide and a raceme of up to 4 small starry flowers which are 'deep greyish lavender' with a green central stripe on the outside of the segments. It is recorded in western Crete, between Nea Roumata and Papadiana, Nea Roumata to Langos and near Limni (300 m); also on Karpathos Is., at Kali Limni, 1200m. It flowers in March and April.

In this paper, Franz Speta also reduces Scilla (i.e. Chinodoxa) albescens to a subpecies of S. (Chionodoxa) nana; thus, he now considers there to be just one species of Chionodoxa on Crete, C. nana, but split into two subspecies - subsp. nana (syn. C. cretica) [from Levka Ori] and subsp. albescens [from Oros Kedros, Idi and Dikti]

What is Fritillaria viridiflora?

Some time ago (all right, I confess - it was years ago!) Erna Frank asked me about Fritillaria viridiflora and matter. I still have not seen plants from the type locality alive, but I can provide as much background information as possible. Since this is marginally a Turkish species, it was included by Martyn Rix in the Flora of Turkey Vol. 8 (1984), with the following entry: "close to F. bithynica, but larger in all its parts, and well separated geographically. Known only from the two collections cited." The two collections referred to are the original (type) specimen, Post 410, and Haradjian no. 1132 - both collected on Kurd Dag which is a mountain on the borders of southern Turkey and Syria. The original description was in the Bulletin de l'Herbier Boissier 3:164 (1895), but the information was repeated and slightly added to in the next year in Post's Flora of Syria, Palestine and Sinai (1896). It was described as follows: Stem 1-2flowered, leafy from the middle [upwards]. Leaves opposite or scattered, oblong-lanceolate to linear-lanceolate, the upper shorter and narrower than the lower, all rather obtuse [at apex], the upper usually forming an involucre [a



F. alfrdae ssp. glaucoviridis (left). Collected by E.K.Balls in southern Turkey, Osmaniye-Fevzipasa. Type specimen of F. viridiflora (right). Collected by Post on Kurd Dag, north-west Syria.

whorl overtopping the flowers]. Flower obconical-cylindrical, rounded at base; flower stalk nodding, 1/2 to 1/3 as long as the flower; perianth segments oblong, green; stamens 1/2 as long as the perianth, filaments papillose. Style undivided, 3-grooved, the stigma shortly 3-lobed. Martyn Rix saw the two specimens mentioned above and improved on some of the details: the stem is 12-25 cm in height; the leaves are 7-9 in number and 7-9 cm long by 1.2-1.5 cm wide, the three narrow upper ones in a whorl and 3-4 cm long. The flowers are 2.9-3.5 cm long, the outer segments oblong, obtuse and 0.6-1 cm wide, the inner oblanceolate, with a short point and 1.2 cm wide. The style is smooth and slender in comparison with some of the other green-flowered species [for example *F. alfredae* subsp. *glaucoviridis*, in which the style is

rather thick and papillose]. The overall impression of the species, from the type specimen at Kew, is of a fairly stout, leafy plant. Post described the habitat of F. viridiflora as stony, inundated fields in the Kurd Dag, where it was in flower in April. Although in Flora of Turkey this locality is given as falling within Turkey (Gaziantep province), it is likely that the plant may have been collected in present day Syria. The mountain range Kurd Dag (Kurt Dag) is shown in the Turkish Büyük Atlas as being in north-western Syria, to the north-west of Aleppo. The mountain range to the west of Gaziantep could be seen to be the northern extension of the Kurd Dag, but is marked in another

atlas I have as being the Kartal Dag. Mouterde, in his extremely useful gazetteer of place names in Nouvelle Flore du Liban et de la Syrie, also gives the Kurd Dag as being in Syria, to the east of the Amanus range, between Qâtma and the frontier town called Meiden Ekbes (Meydaniekbez) on the Turkish-Syrian border. However, whichever side of the border the original specimen was collected on, in view of the fact that the mountains appear to run right across the border into Turkey one would expect it to be found on both the Turkish and Syrian sides unless of course it is a very restricted plant.

In fact there is a similar specimen of a 'glaucous green' fritillary in the Kew Herbarium which was collected in Turkey by Peter Davis (27036) at Soguk Oluk in the Amanus (or Nurdag); this range is not far to the west of the Kurd Dag, although separated from it by a substantial valley. The plant was growing on Karlik Tepe at 900m in Quercus coccifera maquis and was seen in flower on 23 April 1957. It is identified and filed away as F.alfredae subsp. glaucoviridis, but bears an inscription (by W.B.Turrill or J.R.Sealy) "style more slender and less puberulous than Surrey CR6 9JA, England."

FRITILLARIA GROUP We reported on this group of 'Frit' enthusiasts, a group within the Alpine Garden Society, in BN 19:8 (1997). Their latest newsletter, number three for Autumn 1998, contains short profiles of several species, with colour photographs, an article on a serious problem in their cultivation (?caused by fungal) attacks), some advice for beginners, an impressive list of the species exhibited at the Group's show at Wisley on 15 | March 1998 (not including | F. viridiflora, I note), and, very importantly, the seed list. This contains 80 items including rarities like F.reuteri, F.carica subsp. serpenticola, F.euboeica, F.japonica and F. olgae.

The Fritillaria Group Secretary

Mrs Erna Frank, "Cadenza", Butterfly Walk, Warlingham,

usual". These characteristics of the style would make this individual more akin to F. viridiflora. The distribution of F. alfredae ssp. glaucoviridis does, on the whole, appear to be farther to the north, in the mountains to the west of Gaziantep.

The photocopy on the previous page shows the type specimen of F. viridiflora (right) and a specimen of F. alfredae ssp. glaucoviridis (left) from this more northern area, showing how very similar they are in outward characteristics. This raises a question, are there two distinct species with slightly different distributions or are they just variants of one, with a style

which can vary from smooth to papillose, slender to thick. Clearly only further field work can elucidate this, since there are other features of *F. viridiflora* which have not yet been observed - such as the shape of the nectary and the shape of the capsule.

If anyone has observations on the green fritillaries in this region of north-west Syria and the adjacent Amanus we would be grateful for any information, either for the *Bulb Newsletter* or for the *Fritillaria Group Newsletter*. Although the plant occurs in a border area, it is fairly safe to assume that someone has had a look for it, and someone, somewhere, may even have a flourishing pot full.

Letters

We do not particularly wish to encourage too many to send in bulbs and photos to the BN office for identification, but some of them do turn out to be interesting, and provide sustenance for the Newsletter, so please keep them coming.

Chris Jones (our invaluable BN Index-compiler) has sent in two items other than stamps, so the BN 'trivia' collection is expanding its horizons.

Firstly, wine bottle labels from South Africa. The one sent in by Chris (already imbibed, incidentally) shows Geissorhiza monanthos, a

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showy purple-flowered Cape Iridaceae. It is labelled No. 38 in the series, so there are presumably at least 37 other variants out them somewhere, not necessarily showing monocots. Mmmm.....further research is required, I think.

The next item from Chris is a curious piece of porcelain seen in the National Maritime Museum in Greenwich, in the collection dedicated to Nelson and the Battle of Trafalgar. The item is described as: "Porcelain Crocus Pot, about 1798, commemorates Nelson's 'gloryous' victory at the Nile." It is a roughly oblong, deep-ish very decorative pot with scenes of battle on the sides and a (Chris thinks) separate lid in which there are five thimble-shaped tubes protruding out of the top of the lid. Chris suggests that it might have been for displaying cut blooms of crocuses and asks, have you ever come across one of these before? Well, the short answer is no, but we have heard of 'Crocus pots' and suspect that they might have been putting corms into, with water in the lower portion for forcing indoors. Mind you, this one looks to be a very expensive piece of porcelain for messing around with water and crocus corms!

Peter Erskine contacted us with a leaf and photo of an Oxalis from Joe and Ann Cartman in New Zealand where this plant is cultivated under the names O. fabacea, O. citrina, O.fabefolia and O. luteola. It looked as if it might be one of the South African species, and our starting point for these is T.M.Salter's The Genus Oxalis in South Africa, published as the Journal of South African Botany Supplementary Volume No. 1 (1944).

Although there have been many collections and additions since that time it is still a fine piece of work and invaluable for providing a pointer in the right direction. In this case it seems fairly clear that this plant is one of the variants

of O.fabaefolia Jacquin which Salter picked out as 'form B'. This is an extremely variable species (as are many of the others) in flower colour and leaflet shape; the one sent to us has three long narrow leaflets and yellow flowers but it can have short, rounded leaflets and the flowers can be in a range of different colours - pink, yellow, purple, etc.

Oxalis is not an easy genus to classify. Salter waded through 208 species by which time he had clearly had enough. The final species in his account, number 208, was described by R.Knuth in 1927, based on (Salter's words) "A single fragmentary specimen without bulb or

STAMPS

We all know that Japanese gardeners are besotted by irises, so it is not so very surprising that two stamps received recently depict water irises. One of them (420y) definitely appears to represent *Iris laevigata*, the other (50y) is not so clear, but probably a deep blue *I.ensata*.

flowers." Salter did not attempt to comment upon the plant but merely stated "My patience is exhausted"!

Pet Hates by Brian Halliwell

Beauty is in the of the beholder, as the old saying goes. Earlier on in this part of BN we reported on the fact that a fine pot of *Narcissus viridiflorus* had received an award from the RHS Rock Plant Committee. Re-reading an article that Brian Halliwell has sent in to BN, we find that this falls into his 'pet hates' class in the 'bulb' world [for those who disagree, please don't moan at us - ed!] Brian Halliwell writes: Many years ago I wrote an article for the Alpine Garden Society with the above title. It was returned to me by the then Editor, Roy Elliott, with the cryptic comment 'We aim to be constructive, not destructive'.

Gardeners are allowed to enthuse over any plant verbally or in print, but there is universal dismay if dislike is expressed. If Reginald Farrer, the arch priest of alpine gardeners, disliked a plant he never hestitated to say so; why should he be the exception? Ever a horticultural rebel, I have never been afraid in voicing my dislikes even if not in the same poetic mould as Farrer. Here I confine myself to the relatively few bulbous plants which I dislike for one reason or another.

In general I dislike double flowers, but one which I find particularly offensive

is the double-flowered tiger lily, now *Lilium lancifolium*. Not only are the flowers grotesque but the plant carries a symptomless virus; whilst this is harmless to this host, it is readily spread to other species of *Lilium* which can be decimated by it.

I am fond of the British wood anemone, Anemone nemorosa and its variants, including most of the doubles. Exceptions are those in which the inflorescences are green, and especially obnoxious are the so-called doubles which look like leafy galls.

Regretfully in a lot of modern plant breeding large has come to be equated with beauty. Nowhere could this be farther from the truth than in the modern cultivars of *Narcissus*. Not only has this gigantism in daffodils produced coarseness but these monsters are intolerant of adverse weather conditions and they can be flattened by wind, rain or frost. In the genus *Narcissus* I have many favourite species but there is one exception, *N. viridiflorus*. Autumnflowering narcissi are not easy to get to flower in Britain so when I first attempted this species, I was pleased when it produced flower buds. In spite of waiting expectantly I almost missed the open flowers; perhaps it would have been better if I had! The flowers are ugly, distorted and an unpleasant shade of green.

Bluebells, *Hyacinthoides non-scripta*, which carpet deciduous English woodlands are delightful and much-admired, even by me. Here they should stay and must not be allowed into small gardens. Once introduced they quickly establish and their leaves can swamp less vigorous neighbours. I moved into a house where they were thick in the garden. Annually for 20 years I dug over the soil removing as many bulbs as I could find; all to no avail! A friend with a large garden who actually wanted to grow bluebells was bemoaning his bad luck, for a disease had infected his plants. Perhaps here was a biological control! I obtained infected bulbs and planted them in the garden, but the end result was even worse. In no way was vigour decreased, none died and I now had an even more ugly-looking nuisance. The Spanish bluebell, *H. hispanica*, is just as bad. [Er......we believe that bluebells are now protected in England, Brian!].

The genus Allium is not a favourite with many gardeners. Its main disadvantages are: the leaves dying away as flowers develop, and an unacceptable smell. By careful planting the unsatisfactory foliage can be hidden from view and the onion smell is only apparent if the leaves are damaged. Neither of these conditions worry me unduly and I may be unusual in enjoying the genus - in general. My hate here is directed at A.paradoxum. The inflorescences are disappointing, for many flowers are replaced by bulbils. Gardeners interested in propagation avidly gather these but the resulting progeny may have even more bulbils in the inflorescences than their parents. If you consider introducing this species into your garden the form normale is the one to have since this produces flowers instead of bulbils. Allium paradoxum and another species, A. roseum, which behaves similarly, can become weeds in the garden, but it is a close relative, Nothoscordum

gracile (fragrans, 'inodorum') which I consider to qualify for 'my most hated bulb'. It has strap-like leaves and an onion-like inflorescence of dirty white flowers; below ground are clusters of naked bulbs which need careful lifting to avoid breaking up the cluster. They should be burnt or incarcerated in a plastic bag; do not transfer them to a compost heap. On light soil there is difficulty in ridding oneself of this pest, for any granule missed will soon result in re-colonization. If you garden on clay and have this pest, elimination will be impossible.

Footnote. Noel Lothian wrote to us from Crafers, South Australia, to say "why do growers of bulbs in the Northern Hemisphere grow *Nothoscordum gracile*?* It is a most troublesome and pernicious weed. Fortunately we have learned to identify seedling leaves and carefully remove the small bulbs and burn them. Unfortunately Mt Lofty Botanic Garden (which I founded 40 years ago) is becoming infested with this pest." [Noel actually puts this down to cuts in government funding to the Botanic Garden Department, but I had better not mention it in case it causes offence in official circles).

* We suspect that they are mostly not growing it by choice; it sets lots of seeds and seems to get into seed lists in mixed collections, and because of mis-identification; along with *Anomatheca* (*Freesia*) laxa and *Habranthus* tubispathus (andersonii) which can be a bit of a pest of bulb frames here.

Those Lycoris again

Lycoris are very much in mind again at present. Last year I made a bed for them in the hottest part of the garden in the hopes of getting some flowers; it is too early to say if this will succeed, but the leaves look well enough. I have also just written up *L.sanguinea* for *Curtis's Botanical Magazine*, to accompany a gorgeous watercolour by Hidenari Kobayashi, President of the Japanese Society of Botanical Art; this will be published in May of this year. In the cultivation notes I was recommending a warm spot, but one which does not dry out in summer since they seem to flower best in regions of the world where the average summer temperatures are high (c. 30-35°C) and with high humidity and significant rainfall. These comments concur with those made in a note from Ian Black of Lower Froyle, Hampshire, who is trying out some members of this tantalizing genus. Ian writes:

"Close to the top of the desirability list must be *Lycoris aurea* - looking remarkably like a vigorous form of *Nerine sarniensis* but with bright yellow flowers. Alas, this species is very reluctant to flower anywhere in Europe, except when grown in a greenhouse bed. Perhaps a clue to its successful culture is the fact that it seems to prosper in the humid southern states of the USA.......Recently a number of bulbs of *L.chinensis* [another yellow-flowered species] have been available..... in North America and word from there is most encouraging. Reports of its free-flowering and hardy constitution come from as far afield as Kansas and California. The first suggests that it should be fully

hardy to winter temperatures way below those seen anywhere in the UK, whilst the latter suggests that the plant should be able to shrug off wet winters. It will be interesting to see if the few bulbs I have just acquired from the same original importation fulfil this promise. There is little guidance yet as to what the bulb's preferred growing conditions might be. The current monograph Synopsis of the Genus Lycoris [See BN 12: 6-9, 1995] suggests that the bulbs are found on moist slopes in mountainous areas and flower in July and August. Certainly the bulbs in captivity seem to repeat this flowering pattern, suggesting that they might be happier in a routine flower-bed with some summer moisture, rather than anything like a bulb frame. Has anyone tried this? It would be interesting to know."

Well, this summer will reveal how successful our own experiment has been; certainly there has been no lack of water recently - there are drowned worms on the lawn, but it is summer moisture we need for the *Lycoris*, so whoever is . in control, could we please have a shower over that bed but avoiding the Mediterranean bulb frame.

ttttttttt Spanish Madonnas tttttttt

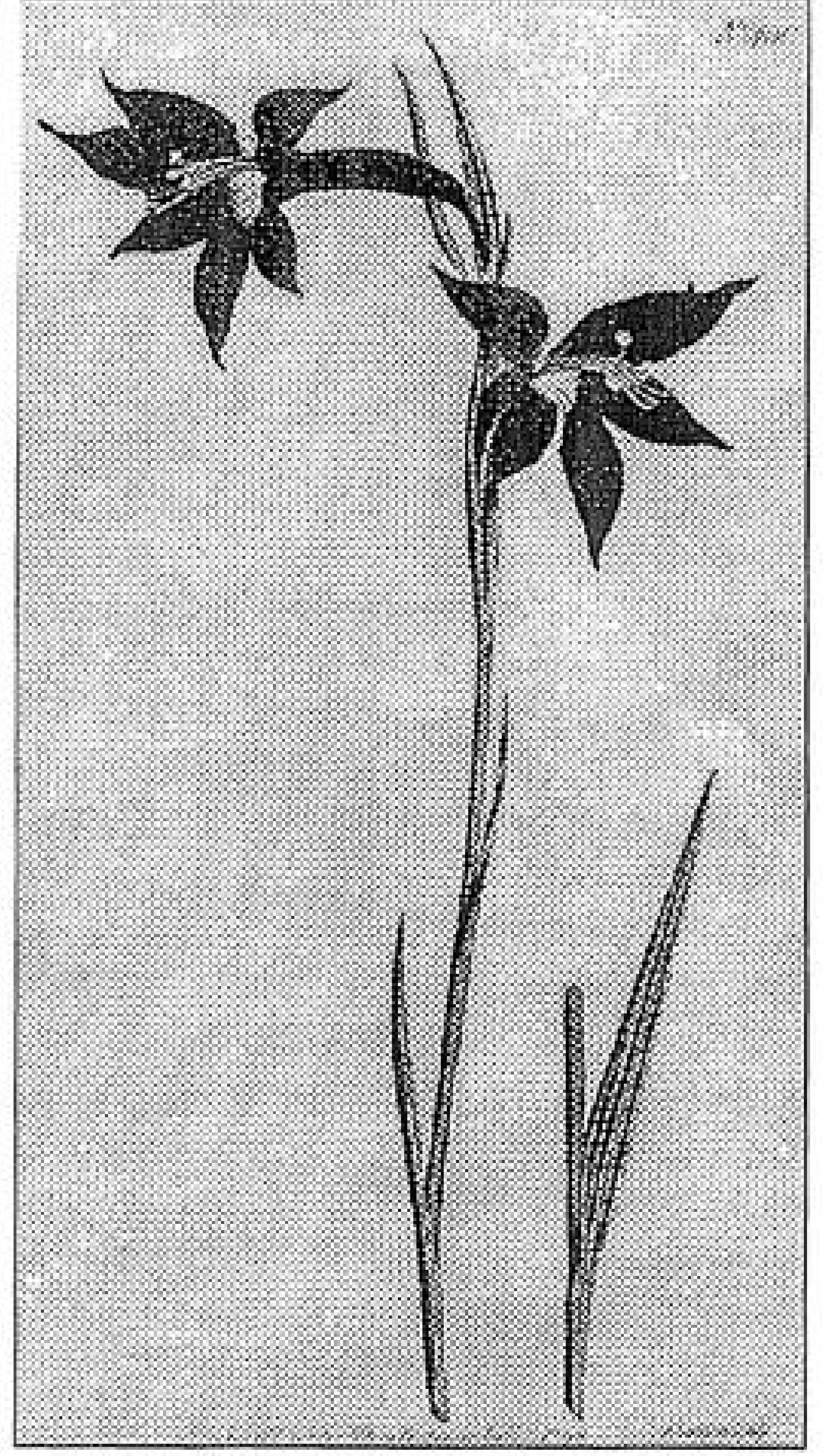
Manfred Koenen has written from his Spanish abode in Valencia province to say that Lilium candidum is fairly common in his area, never really wild and always near buildings on the fincas, but once planted spreading on by itself. He continues: "I have found it in quite a few old fincas which were obviously abandoned one or two hundred years ago, or more!! In my opinion this form of L.candidum has two secrets of its power. One is easy to see: it can survive even in the dryest and hottest habitats; the other is that mice & co. do not find it tasty. The bulbs I sent you [thank you, Manfred] I found beside a mouse colony which has formed in the centre of my L.candidum clump on my finca."

Manfred ends his letter by asking if there is any history of this lily in Spain, so if any of our subscribers have any information on this we would be pleased to hear.

Request: James Kee from New Castle is seeking two species of *Iris* which although not commonly cultivated, are certainly around in collections and someone may be able to help. They are *I.scariosa*, a small purple bearded iris from Russia and the Central Asian Republics, one of the most easterly occurring of the group, and *I. clarkei*, a 'Sibiricae' from the Himalaya. If anyone can help, it would be best to contact James directly. James C. Kee, 662 Country Path Drive, New Castle, DE 19720, USA.

Ideas, please: Bruce Muir (Victoria, Australia) was delighted with the various suggestions about curing liverworts that we published in BN - spectacular results, he says, with the vinegar. However, he now has another query which rings a bell - how <u>can</u> I squeeze more hours out of the week? In this case, answers direct to the Editor, please!

*****100 years ago in Curtis's Botanical Magazine****



In 1799, the *Botanical Magazine* featured a beautiful illustration by Sydenham Edwards of the bright red Watson's corn flag, *Gladiolus watsonius* (Plate 450).

On the copy in the Kew Library there are various pencilled notes (that's the trouble when there are botanists about!) as to the identity: Homoglossum praecox Salisb., says one, Gladiolus watsonius Curtis, not of Jacq. says another, then a curt: "No!, Dr. Brown has changed his views - H.watsonium (Thunb.) N.E.Brown".

In the text, Curtis himself also had a bit to say about botanists changing their minds: "At first sight, one would be led to regard this plant as an Antholyza rather than a Gladiolus, its flowers bearing a great affinity to those of the Antholyza meriana. Prof. Thunberg, having thought fit to make a Gladiolus of that plant, he could no less than regard this as a Gladiolus also; we regret that the infinite variety to which all the productions of nature are subject should give occasion to

versatile minds perpetually to alter genera, often without due consideration." So, not much has changed, then.

Where does this get us - is it an Antholyza, Gladiolus, Homoglossum......?
On matters of African Iridaceae we turn to Dr Peter Goldblatt, and to his splendid new tome (with John Manning), Gladiolus in Southern Africa (Fernwood Press, 1998). The plant in Plate 450, shown here, is now regarded as a Gladiolus - as is the whole genus Homoglossum. This means that it is Gladiolus watsonius, a representative of Gladiolus section Homoglossum, a large group of 51 species from (mainly) the winter-rainfall region of S.Africa.

Suggestion about Bowlby's Disappearing Bulbs [See BN 24:13,1998]

Darren Sleep of Barrow-in-Furness has a rather cunning plan. "How about incorporating (for instance) Ammonium chloride which has been enriched in the stable isotope of Nitrogen into the fertiliser programme during the growing season. This would persist in the plant (or bulb) tissues until at least

one more growing season had passed and would be detectable after only one feed. If a large number of bulbs were suddenly offered shortly after a theft then analysis of a small (5-10 mg) amount of material by mass spectometry should detect such labelling. The labelled compounds should be available to professionals via Sigma/Aldrich - the same company that many growers buy GA-3 from. The material is expensive but only a small amount would be needed, enough to label one feed early in a growing season. Plants could bear the sign 'protected by isotopic labelling' to deter theft."

If anyone is intrigued by this, Darren does offer further advice if required.

Clue to secret of how to grow Erythronium grandiflorum?

Part of the glacier lily's claim to fame as far as growers are concerned lies not in its undeniable beauty but in its reluctance to thrive and seed around. Thanks to Vic Aspland, who spotted the following item in *Ecology* 79: 2219-2228 (1998), help may be at hand, although somewhat hazardous.

Sandra E.Tardiff & Jack A.Stanford have made a study of areas in the Glacier National Park, Montana where grizzly bears cause great disturbance by digging for *Erythronium* bulbs. This is a substantial piece of work, so only the gist of it will be reported here. In short, the authors hypothesized that the digging influenced the availability of mineral nitrogen, and this in turn had an effect on the plants. They found that in the disturbed areas there was significantly more ammonium-N and nitrate-N than in the undisturbed meadows, and the *Erythronium* bulbs in the former areas also contained more N in their tissues. The bear-cultivated areas also gave rise to a greater quantity of seeds (double), suggesting that the mature bulbs that survived through being situated deep in the soil were benefiting from this activity and showing increased reproductive vigour; seedlings were found to establish more successfully on the bare (excuse the pun!) areas where the grizzlies had been digging. Experiments with artificially dug plots (to eliminate certain factors such as bear droppings) showed similar results.

Now, I am not suggesting for a moment that anyone should go to the local hire-a-grizzly, but there may be something useful for growers here. For some time I have found that spring bulbs benefit from a nitrogenous feed as soon as they show signs of pushing through in spring; mine, including erythroniums, get a sprinkling of sulphate of ammonia, a very rapidly assimilated source of N for plants, which is then watered in. This does seem to give them a kick start - maybe akin to snow melt water.

The Macedonian Colchicum

Richard Hancock was intrigued by the description of *Colchicum macedonicum* in the catalogue of V.Pilous (Czech Republic), said to be July-flowering, dwarf and rare - could we add any information? The best we have is from *Flora Europaea* 5 (1980), where Chris Brickell gives the following facts: Described in 1911 from calcareous pastures over 2000m in N.W.Macedonia (Jakupica), flowering June; previous season's leaves sometimes still present at flowering.

Catalogues

The spring catalogue from Broadleigh Gardens reminds us that although the spring planting season may seem a long way off it is not too soon to be placing the orders and planning where the summer bulbs such as lilies and dieramas are going. In the case of dieramas, there are two unusual ones offered for the first time: D. floriferum and D. sertum; the first is a short one with lilac flowers, the latter creamy yellow. It is good to see Farrer's marble martagon lily, Lilium duchartrei, listed, there are too few lily species in catalogues these days; also here is the lovely L. canadense flavum, a splendid one for a cool, moist position. Liriope is a genus of modest plants, but quite popular just now; the purple-flowered L. muscari is one of those almost indispensable autumn perennials for ground cover, but the also listed whiteflowered 'Monroe White' is seldom seen, and the same applies to the albino Nerine bowdenii 'Alba' which is really quite scarce. It is good to see that excellent little plant Hypoxis parvula 'Hebron Farm Biscuit' appearing under its correct name. It has been around for some time as a Rhodohypoxis baurii-Hypoxis parvula hybrid (see x Rhodoxis, page 9, this issue) but this cultivar is a straight H. parvula. It flowers all summer, from May to September, producing many flat white flowers with protruding yellow stamens. Broadleigh Gardens, Bishop's Hull, Taunton, Somerset TA4 1AE.

We have obtained a sneak preview of Janis Ruksans' list which will come later on in the year, and we can foresee many a smacked lip. How about nearly 70 Corydalis for a start - many are selections of familiar ones such as C.solida, but there are also rarely seen species: C.subremota, C.seisumsiana, C.ornata, C.gracilis, C.ruksansii, etc. There is a good list of Crocus species and cultivars including the seldom-offered Crimean version of C.biflorus which Janis recognises as C.tauricus - available in three colour forms. This Latvian nursery is always a good source of Asiatic bulbs of the former USSR-Erythronium sibiricum variants, Fritillaria caucasica, collina, eduardii, meleagroides, stenanthera and verticillata, Iris (Juno) maracandica, I.parvula, I.tadshikorum, I.tubergeniana, I.zenaidae and I.hyrcana (I hesitate to mention I.winkleri in case they all sell out before I get the order in!), Scilla rosenii and S.vvedenskyi and many tulips. The full descriptive catalogue will be available later on. Janis Ruksans, Bulb Nursery, LV-4150 Rozula, cesu apr., Latvija.

The Snowdrop Company is offering 38 species and cultivars including, for the first time, 'Florence Baker', a very robust wide-leafed 'plicate' one which recently received an award at an RHS Show in London. Among the species listed is *G. gracilis* ("graecus") which, with its elegantly twisted slender grey leaves, is still among my favourites in spite of all the competition from the numerous 'improved' cultivars. The bulbs are posted 'in the green' in March. List from: The Snowdrop Company, Barn Cottage, Shilton, Oxforshire, OX18 4AB. (Tel: 01993-842177).

Guy Wrinkle of Exotic Plants has some interesting bulbs which are not normally available without some difficulty. Most of them are from southern Africa, and here are just a few names to give an idea of the range: Apodolirion macowanii, Brunsvigia namaquana, Boophane ernesti rushii, Eriospermum (several spp.), Gethyllis villosus, Haemanthus crispus, H. amarylloides toximontanus, H. deformis, H. unifoliatus, Ledebouria dolomitica (See this issue, p. XX), Lachenalia trichophylla, Rhadamanthus namibensis, etc. Quite an extraordinary collection. Guy Wrinkle, Exotic Plants, 11610 Addison St, North Hollywood, CA 91601, USA. Tel:310-67-8637, Fax: 670-1427.

Bookends

Gladiolus in Southern Africa by Peter Goldblatt & John Manning. This is a splendid piece of work, providing a taxonomic account of the genus in southern Africa comprising 163 species including plants formerly known as Homoglossum, Anomalesia, Acidanthera and Oenostachys. The work is illustrated with 144 beautiful colour plates, reproduced from watercolours by Fay Anderson and Auriol Batten. The text contains all the information expected in a comprehensive monograph - keys, descriptions, distributions, history, etc. etc., as well as a lot of line drawings illustrating various details of the plants. Fernwood Press (Pty) Ltd, P.O.Box 15344, 8018 Vlaeberg, South Africa. US\$87.50, incl. p.&p. Tel: +27-21-683-3784, Fax: +27-21-61-8574.

Agapanthus - A Review by Wim Snoeijer. This is a 250-page book reviewing the genus Agapanthus, containing descriptions of all the known species and cultivars (a lot!), cultivation notes, identification keys, a list of useful addresses (National Collections, nurseries, etc.), references, awards, etc. There are nearly 30 pages of colour photographs. This is published privately and is obtainable from Wim Snoeijer, Ijssellaan 139, 2806 TG Gouda, The Netherlands. 54.50 Dutch Guilders or 25 Euro. Fax: +31-71-527-4511.

Tulips by Anna Pavord. Just published, this book is a delight to own and read. It is not a definitive taxonomic account - that has not yet been written! This is a tome of 439 pages tracing the fascinating history of tulips through a host of well-told stories, paintings, woodcuts, tiles and tapestries. For those requiring information on the species (on a status quo basis), and on a selection of cultivars, that is here too. Extremely good value at £30. Bloomsbury Publishing, London. ISBN 0-7475-4296-1.

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