



THE  
**FRITILLARIA**  
GROUP



The Fritillaria Group of the Alpine Garden Society  
Journal No 22 Spring 2008



**Editor:** Pat Huff

**Botanical advisor:** Martyn Rix

The Fritillaria Group welcomes articles, short notes and photographs – especially of plants in the wild—line drawings, and other material concerning Fritillaria.

**Copy dates:** 1 May and 1 October

**Articles** are quicker and easier to handle if they are produced electronically, but typed and manuscript copy is also very welcome.

**Photographs** should be in the form of 35mm transparencies, or on photo CD. If possible, please send transparencies ahead of the copy to allow for scanning. Electronically produced images will only be accepted at a resolution of 300dpi.

**The photograph of *Fritillaria gibbosa*  
on the front cover is by**

**John Ingham**

**and**

**the photograph of *Fritillaria poluninii*  
on the back cover is by**

**Bob Charman**

# MEETINGS 2008

**SUNDAY 16<sup>TH</sup> MARCH**

**Hillside Events Centre, RHS Garden, Wisley**

- 0930** Coffee, Staging of Show Plants
- 1100** Iran in the footsteps of Paul Furse by Bob and Rannweig Wallis
- 1230** Show open to the Public, Lunch
- 1400** Growing Fritillarias by Fred Hunt
- 1530** Raffle
- 1600** Close of Meeting and Show

**SATURDAY 4<sup>TH</sup> OCTOBER**

**Loughborough Alpine Garden Society Show**

Fritillarias and other Plants of Iran  
By Ian Green of Greentours

**SUNDAY 19<sup>TH</sup> OCTOBER**

**Hillside Events Centre, RHS Garden, Wisley**

Annual General Meeting

Mainly Fritillarias of North America in their habitats by Phil and Gwen Phillips

Growing Fritillarias in Holland by W.H. de Goede

## SECRETARY'S NOTES

As another year closes and the new year arrives once again I hope that the Fritillarias I grow (or attempt to) give a better performance than they did last year (I'm blaming this on the wet, mild winter followed by a very warm April).

This year's speakers at our Spring meeting need little introduction. Bob and Rannveig Wallis not only grow and show Fritillarias of a consistently high quality (somehow last year's weather didn't affect their plants like mine), but have also visited Iran on numerous occasions to see Fritillarias growing in the wild and shed some light on their nomenclature.

We are also lucky to have Fred Hunt coming down from Scotland. For those of you who haven't seen the quality of the show plants Fred grows, his talk will no doubt be an eye-opener and an education.

As the Spring meeting is also the Group Show, members who have any plants in flower are asked to bring them along. This is not a competitive show and even the more easily grown Fritillarias are gratefully received. The show is open to the general public and serves to help attract interest in Fritillarias and possibly new members to the group.

Anyone wishing to attend this meeting is encouraged to book tickets early. I have already been contacted by a lady from Australia who has reserved her place!

Finally I regret that I had to announce at last year's AGM that due to personal commitments which include setting up a nursery that I have to step down as Secretary at this year's AGM. Anyone who is interested in taking over this post is asked to contact me. Please note that my new e-mail address is

**[chris.birchall@talevalleynursery.co.uk](mailto:chris.birchall@talevalleynursery.co.uk)**

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## FROM THE EDITOR

The theme that has emerged from this issue is comparison via physical differences. Professor Lovis' article on Christabel Beck prompted me to reprint one of her AGS Bulletin pieces on distinguishing two very similar fritillaries, *F. crassifolia* and *F. olivieri*. Laurence Hill's Fritillaria Icones project is intended to establish an on-line herbarium where the slightest variations between species can be examined. Bob Charman's piece and its accompanying photographs show how much colour variation can exist within a single species. And finally, I have reprinted a seminal article by Dr Martyn Rix from the 1975 RHS Lily Group Yearbook. Some of the botany may have moved on – mostly driven by Dr Rix himself – but the piece is still fascinating. It is also depressing: thirty years ago an amateur group could mount an exhibition of fritillaries that a national botanic garden would be hard pressed to reproduce today. The growers are still there – you can see that in any Frit Group or AGS Show. What happened?

## How many species did Christabel Beck recognise? *By Professor John Lovis, Christchurch, New Zealand*

Gerry Webster produced a fascinating biographical note on Christabel Beck in Journal 10. In it he states that in her book (1953) she ‘recognises 90 species’. I’m not convinced that is true. Taxonomists use ‘recognise’ in the sense of accepting as a ‘good’ species. Christabel’s list (pp. 47-48) includes 88 species names (and, curiously, one variety), but 16 are given in italics, being ‘Those of doubtful specific rank, and synonyms...’ The main text bears this out, with six of the italicised names being straight synonyms, and another six are interpreted variously as local variants, or aberrant forms, of some other species. She was clearly unsure of the true status of the remaining four. Exactly just how many species she did accept is a moot point. She does confuse the issue somewhat by including a second list (pp. 75-76), consisting solely of American species, which does include some names italicised in the main list, although she states that ‘The doubtfuls’ are not included in the above [American] list’.

But the real point of this note is not just pedantic number-fixing. The most interesting outcome is the effect on the proportion of species recognised which were actually cultivated by Beck. The figures change from 90:66 (=73.3%) to 72:62 (=86%). Actually, the figures look even more impressive if you turn them around to percentage **not** grown: 26.7% reduces to 14%.

Of all the European & Asiatic species she accepted, 57, she had grown 51, a truly remarkable achievement. In spite of all the advantages we have today, compared with the mid-20<sup>th</sup> century (and disregarding the recent developments in China), how many of us today can claim to have grown 90% of Eurasian fritillaries!?

The six she had not grown herself were *armena*, *davisii*, *ehrhartii*, *fusca*, *persica* and *roylei*.

Of these *davisii*, now one of the most successful species in cultivation, was first discovered by Peter Davis in February 1940. Beck states (p.49) that the original 'living material was lost in transit [there was a war on!] and the species is not in cultivation'.

Beck's book, like that of Pratt and Jefferson-Brown, was written as a gardener's introduction or guide. The Tibetan species *fusca* was probably included out of consideration and respect for her mentor and dedicatee, W. B. Turrill, Keeper of the Kew Herbarium, who described and named it. It was not then in cultivation, and is still one of the very rarest species in cultivation -- just one positive response in the UKFG survey.

The inclusion of *persica* in this list may well surprise at first sight, but things are not as they might seem. It needs to be remembered that 50 years ago *libanotica* was regarded as a distinct species, not just a synonym of *persica*.

Another Himalayan species, *roylei*, although not as rare as *fusca*, is still not common in cultivation today, ranking in the survey with the likes of *gibbosa*, *pinetorum* and *striata*. Which leaves just *armena* and *ehrhartii*.

Christabel Beck deserves our admiration for appreciation of the scale of her achievement even more than perhaps we had realised.

## **Two Fritillaries, by Christabel Beck**

One of the most puzzling group of the genus *Fritillaria* is that which – covering a wide area of Asia and the Middle East – includes *F. crassifolia* and *F. olivieri*. Bornmüller wrote à propos of *F. olivieri* that no less than nine species of *Fritillaria* grew within an area about the size of Yorkshire. A further complication is suggested by Dr Parsa in an article on “Fritillaries in parts of Iran” in the 1958 Lily Year Book of the Royal Horticultural Society, where he tells us that “because of human activities of Horticulture some Fritillaries...have become

naturalised and entered into the composition of the native vegetation. For example *F. karadaghensis* which is more or less cultivated in Tabriz.”

The two species under discussion have, however, a wide distribution beyond the confines of Iraq. *F. crassifolia* ranges from the Lebanon to the Caspian Sea, growing at an altitude from 4,000 ft to 7,000 ft. It appears to vary considerably in height in the wild according to E. K Balls, who found it in the Cilician Taurus growing in coarse limestone and scant turf at 5,000 ft, where it was rarely 6 in tall, whilst in shelter of dark limestone cliffs at about 4,000 ft it attained a height of 15 in, with two bells on a stem.

In cultivation growth seldom exceeds 9 in, the somewhat solid bells measuring 1½ in long by 1 in wide. The colouring of the flowers is striking, the outer segments being a yellowish green whereas the inner ones each have a broad stripe of rich mahogany. The flower is well supported by rather glossy green leaves, spatulate at the base narrowing to lanceolate at the summit.

This fritillary is well suited to pot culture, and, unlike many members of the genus, it flowers with unflinching regularity. Propagation is by seed, or by growing on the small bulbils which may be found clustering round the parent bulb.

*F. olivieri*, so often confused with *F. karadaghensis*, comes from Iraq, the mountains of ancient Media and from Syria. In its native habitat it appears to grow close to the water's edge, and is happy near the spray of falling water, flourishing in red turfy and very sandy soil up to 10,000 ft.

At first sight this species might easily be confused with *F. crassifolia* but the shape of the bell and the far less striking colour of the stripe alone is enough to distinguish the one from the other. A close study of the accompanying photographs will tell more than I can write about their individuality.



Miss Beck's article was illustrated with black and white photographs taken at Hegg Hill, Maidie Rathbone's garden in Kent.

They did not reproduce satisfactorily, so they have been replaced by these Photographs taken by Bob Charman.



## THE 2007 AGM AND LECTURES

*By Pat Huff*

The Fritillaria Group's 2007 AGM was held at the Hillside Centre, Wisley, on 14 October. The meeting itself was conducted with exemplary dispatch by Chairman Anne Silver. After the minutes had been accepted, the accounts approved and the officers re-elected, the near-capacity crowd settled down to listen to the two speakers. Secretary Chris Birchall, who had, sadly, announced that he was stepping down when a replacement could be found, had been faced with a daunting situation only a few weeks before. Both scheduled and announced speakers had been obliged to cancel at quite short notice, but two members stepped into the breach and delivered fascinating lectures with wonderful images to accompany them.

Laurence Hill spoke on "The Trials and Tribulations of the Frit Photographer", and no one knows about them better than he. His original intention when embarking on this project had been to photograph an entire genus. He chose *Fritillaria* not only because the plants were beautiful, but because there weren't too many of them. As he delved further into the subject, however, the number increased remorselessly, and he is now looking at a total of 178 different species.

Laurence's photographs have appeared before in the Journal, and there is one of them on the inside back cover of this edition. His approach is to photograph the entire plant in flower. He raises the plants himself since, as he says, no one else would let him take a rare fritillary from its pot when it's in flower, wash all the soil off the roots and lay it down on bench to be photographed. The roots, necessarily invisible under normal circumstances, hold a fascination for him. 30% of a fritillary's genome is concerned with root development, and there are three different sorts: straight, branched and end-branched. The various types have strong geographical associations; show Laurence the roots of a

fritillary bulb and he can tell you what part of the world it hails from.

Two-thirds of the most widespread plants in Britain reproduce clonally, and fritillaries reflect that pattern, i.e. their sex lives are pretty much non-existent. Laurence said that in a study of *Fritillaria camschatcensis* done in the wild, an eight-square metre sample of the population showed that only 1% of the plants had flowered, and there was no germination at all in the area surveyed. Asexual reproduction is quite normal for fritillaries. The bulblets often form around the base of the stem at the bulb end. Because North American fritillaries are multi-scaled, their bulblets form on top of the scales. When you are reduced to baffled chagrin by your frits' refusal to flower, remember that they're not bothered. They will almost always use asexual techniques first before going to the trouble of flowering and setting seed.

Laurence's interest in what goes on under the ground led him to examine stolons as well. They come in two varieties, seasonal and persistent. Seasonal stolons are quite common, as in *Fritillaria conica*. Stolons that elongate laterally, e.g. those of *F. montana*, push the baby bulbs much further away from the parent plant. Elongate vertical stolons, e.g. those of *F. pinardii*, appear mostly in species found in Asia Minor. Laurence commented that it was a strange thing to do, since it makes the baby bulbs very vulnerable to rodents. Persistent stolons are found only on *F. camschatcensis*, and perhaps reflect that species' closeness to the Liliaceae.

Still staying below ground, Laurence observed that late bulb renewal takes place in only 20% of species. The rest have renewed their bulbs so that they are completely formed at the point the pollen breaks.

Laurence Hill's intention to record a "small" genus has morphed into a large-scale phenotypic study. He wants to make the fruits of this study available to students of botany all over the world. He

concluded by saying that there are problems with viewing holotypes online. Eighty percent of Kew's herbarium specimens of fritillaries, for example, are in spirit. The Museum National d'Histoire naturelle, on the other hand, has a good website for its herbarium specimens. He has switched to digital, since film was proving far too expensive, and uses PDF to preserve the images. His plans for making these "Icones" widely available can be found in an article on p. 13.



*Laurence Hill explains one of the features of the fritillary on the screen to his right*

After Laurence had answered questions, we broke for lunch. Most of us first crowded round the beautiful trug-full of autumn

crocuses kindly brought in by David Stevens. If anything could banish the blues of the shortening days, this was it.



*A selection of autumn crocuses*

If Laurence Hill's talk tended to concentrate on what goes on underneath a fritillary, Bob Charman dazzled us with image after image of what happens on top. In mid-April 2007 he and a number of Frit Group stalwarts visited Iran. They travelled 3000 miles in three weeks, and "The Frit Group in Iran" was a record of the plants they saw. Although fritillaries were naturally the most sought-after quarry, other plants also got a look-in. Trying to write in the dark, while not missing a single thing on the screen, I scrawled a number of names with lots of exclamation points after them, e.g. "*Gladiolus atrovioleaceus* !!" and *Rosa persica* – yellow w/ black centre !!!" The fritillaries were numerous, and in such gorgeous and abundant flower that it was hard to credit Laurence's assertion that the genus on the whole

can take it or leave it. The showstopper was, of course, the unidentified species:



*New species photographed in Iran by Bob Charman*

Or is it? Bob examines this question further later in this issue (see p. 14).

The AGM in October had everything: a brief meeting, two first-rate lectures and a basketful of beautiful autumn crocuses. The next meeting is on 16<sup>th</sup> March, at Wisley once again, and will feature Bob and Rannweig Wallis talking about Iran in the footsteps of Paul Furse, and Fred Hunt on growing fritillaries. There will also be an opportunity to show your own fritillaries in flower, and admire those brought in by other members. It is a wonderful day, and one well worth supporting.

## ***FRITILLARIA ICONES***

*By Laurence Hill*

*Fritillaria Icones* is an on-line reference to assist with the identification, research and conservation of *Fritillaria*. The site is hosted by the **Fritillaria Group of the Alpine Garden Society** and is available for non-profit use only. All images remain the copyright of the author and he should be acknowledged at all times.

The original aim of the author was to create a complete set of photographic portraits of the genus *Fritillaria*. This has now been extended to include other detailed images and data which have been combined and made available in an easy to use format.

A series of photographs and notes are provided in Portable Document Format (PDF) for each *Fritillaria*. This provides different options including: the zoom function, printing or saving for viewing off-line. All the photographs show the date they were taken, an accession number and scale bar. For comparative analysis the main portraits are always photographed just after dehiscence of the anthers therefore establishing a common point in the annual cycle. All the fritillaries are grown and photographed by the author in south-east England.

*Fritillaria Icones* is an on going project and new images will be added as they become available. Anyone wishing to support the project, or who requires further information, please email the Fritillaria Group Webmaster Lee Pater on

[webmaster@fritillaria.org.uk](mailto:webmaster@fritillaria.org.uk)

## IRAN FRITS

*By Bob Charman*

In the Autumn Journal, No 21, I wrote a short article about my travels in Iran, in particular I mentioned the diversity that existed within groups of plants of the same species. From the following photographs you can see the wide range of colour forms that we found in *Fritillaria persica*, which were all growing on one small hillside.

I also mentioned the discovery of Frit sp., a pretty little plant that was probably new. I have since discussed the possible new Frit with Janis Ruksans, and he was sure that there are plants in distribution in Europe identical to this that are being named as *Fritillaria poluninii*. Both Janis and myself have grave doubts about the name that this Frit is being given. There is a photograph of this plant on p 12 of this Journal, and another view at Item 5 below. On the back cover of the Journal you will find *Fritillaria poluninii*; I will leave you make up your own mind.





**FRITILLARY CO-OPERATIVE EXHIBIT:  
MARCH 25<sup>th</sup> 1975**

*By Dr Martyn Rix*

A. Comparison between *Fritillaria*, *Lilium* and *Tulipa*

The genus *Fritillaria* is found all across the northern hemisphere, with the exception of eastern N. America. *Lilium* has a somewhat similar distribution, but it does not extend so far south in the arid parts of Asia and it is found in eastern N. America. *Tulipa* is found only as far east as Kashmir and in California it is “replaced” by *Calochortus*.

In many of its characters, *Fritillaria* forms a link between *Lilium* and *Tulipa*. The style is usually shorter in *Fritillaria* than in *Lilium*, but not yet reduced to a knob on the top of the ovary as in *Tulipa*. In *Lilium* and *Fritillaria* the style falls off and the capsules are flat-topped: in *Tulipa* the style persists and the capsule is pointed. The bulbs of *Fritillaria* are usually few and very thick-scaled, but not as smooth and round in cross-section as *Tulipa* bulbs; most *Fritillaria* bulbs have no tunic, but some species of subgenus *Rhinopetalum* have a thin but very woolly tunic.

Two genera are particularly interesting as forming links between *Fritillaria* and the others. *Korolkowia* from central Asia (sometimes called *Fritillaria sewerzowii*) forms a link between *Lilium* and *Fritillaria*; in bulb and in leaf it is like a fritillary but the stamens and the structure of the petals, especially the nectary, are more like those of a Lily. *Amana edulis*, on the other hand, a Japanese plant sometimes included in *Tulipa*, often has a nodding flower and a short style almost like that of a fritillary.

The confusion which has arisen between fritillaries and lilies has involved species with external similarities rather than truly intermediate morphology. In the Himalayas there are many *Lilium* species which have brownish nodding flowers like a

Fritillary although their bulbs are typically Lily-like. Notable are *Lilium nanum*, which was in the exhibit as a painting by Admiral Furse, and *L. souliei*. An account of the distribution and variation in these species is given in "Lilies and Other Liliaceae", 1974. Even more suprising as a *Lilium*, and also shown as a painting, is *L. sherriffiae*, with its purplish-brown campanulate flowers clearly tessellated inside: these tessellations are known otherwise only in fritillaries and one or two species of *Colchicum*.

In California there are striking parallels between *Fritillaria* and *Lilium*. *F. recurva* and *Lilium parvum* both have small nodding tubular scarlet flowers which have probably evolved as a response to pollination by humming-birds. *Fritillaria brandegei* has narrow reflexed petals, looking like a miniature Turk's cap lily. Some of the genus *Calochortus* also have nodding fritillary-like flowers, and even the Mexican *Tigridia meleagris* (Iridaceae) mimics a fritillary.

#### B. Subdivisions of *Fritillaria*

The genus *Fritillaria* itself is very diverse in form, and can be divided usefully into subgenera as follows:

PETILIUM (*F. imperialis*, *raddeana*)

RHINOPETALUM (*F. gibbosa*, *bucharica*, etc.)

THERESIA (*F. persica*)

LILIARHIZA (*F. camschatcensis*, and American species)

FRITILLARIA (*F. meleagris*, *graeca*, *caucasica*, etc.)

The first three of these subgenera are morphologically homogenous and distinct. *Liliarhiza* is very diverse, and what appear to be close parallels have evolved amongst American and West Asian species: e.g. *F. pudica* c.f. *F. forbesii*, and *F. glauca* c.f. *F. crassifolia*.

There has been no satisfactory division of the subgenus *Fritillaria*. Much the same range of flower types is found in the

eastern Mediterranean, in the Himalayas and in eastern Asia, and this would appear to be a suitable basis for subdivision.

E. Mediterranean	Himalaya	E. Asia
<i>meleagris</i>	<i>delavayi</i>	<i>maximowiczii</i>
<i>graeca</i>	<i>przewalskii</i>	<i>dagana</i>
<i>caucasica</i>	<i>bhutanica</i>	<i>amabilis</i>

These different flower types are probably visited by different types of insects. A few observations have been made in Europe and Western Asia. The *meleagris* types are generally visited by Bumble bees, the *graeca* type by wasps (usually the queens), and the *caucasica* type by small flies.

Although species of different types often grow together, especially in Turkey, I have seen only one plant which is probably a hybrid between different groups (*F. aurea* x *F. caucasica*) and all attempts to create such hybrids artificially have failed. Even between very closely related species, attempts to produce crosses usually fail, although one or two have been successful.

### C. Cultivation

Fritillaries grow in a number of different habitats and climates, and an understanding of the ecology of a particular species is a valuable guide to its cultivation. Even so the majority of species grow well in a sunny frame, kept dry in summer, and many grow well in the open. A soil of J.I. potting compost with extra peat and grit added is suitable. A layer of peat below the compost is useful to prevent premature drying out which causes the plants to go dormant. The bulbs seem to grow more healthily when enclosed in a layer of coarse silver sand. A surface layer of about 1 inch of limestone pigeon grit is beneficial, as is watering during the spring with a high PK fertiliser such as "Tomorite"; this encourages good flowering without causing unnaturally robust growth. The following species grow successfully in the open if protected from slugs: *FF. pontica*, *graeca* ssp. *thessala*,

*pyrenaica*, *acmopetala*, *meleagris*, etc., (and many others may be seen outside at Hegg Hill) [Maidie Rathbone's garden in Kent, *Ed.*].

#### D. The Exhibit

This was the fourth co-operative exhibit put up by the Lily group, and the earliest in date. The date was advanced because of the exceptionally warm weather in January, but March reverted to more usual temperatures, and while many of the early species were already over, the later ones had to be forced with extra light and heat. It would seem that because of the organisation of the Shows, it is not possible to have the exhibit at the ideal time for Fritillaries, i.e., the second week in April.

The display itself was backed by a large map of the northern hemisphere on which were marked the distributions of some of the more important species. This showed clearly the centres of diversity of the genus with three concentrations of species; in Greece, Turkey and Iran, in the mountains of Asia to the north and south of the deserts of Tibet and Sinkiang, and in California. Paintings by Admiral Furse embellished the blank spaces on the map and showed some of the very rare species which were not present as growing plants, e.g., *F. camschatcensis*, which is found from Japan to California along the Northern Pacific coasts, *F. davidii* discovered by the French missionary Pere David in Western China and not seen since, and *F. crassifolia* subsp. *poluninii*, a small grey-flowered species from Iraq, described recently in honour of its discoverer. Two rarities from America were included, *F. brandegei* mentioned above, and *F. glauca*, a plant of mobile screes, remarkably similar to *F. crassifolia* from similar habitats in Turkey.

On the other side were a group of paintings executed by Felicity Baxter in the field, showing the small differences between *F. graeca* subsp. *thessala* from Corfu (syn. *F. ionica*) and from the mainland nearby.

The staging was directed by Mr Brian Halliwell of the Royal Botanic Gardens, Kew, aided by Mr Ken Aslet from Wisley and Mr R. W. Boardman of the John Innes Institute, Norwich.

The plants came from many gardens, notably Mrs K Dryden's, Miss J Robinson's, Dr J Elliott's, Mr Vic Horton's and Admiral Furse's, and from Kew, Cambridge and Wisley. The John Innes Institute sent a particularly beautiful collection of forms of scarlet and orange *Fritillaria recurva* and stems of *F. phaeanthera*, *F. agrestis* and other were flown in by Wayne Roderick in California, and from Van Tubergen in Holland.

The species were arranged, as far as possible, according to place of origin and there were specimens present from most areas. In Western Europe the genus was represented by *F. lusitanica* recently collected by Vic Horton in Portugal and several forms of *F. pyrenaica* including one which is reported to be an intermittent double. The Alpine species usually flower later in April, but there was one specimen of the yellow-flowered *F. moggridgei*, similar to *F. meleagris*, from the Alpes Maritimes and *F. meleagris* itself was there in the white and purple forms. *F. tenella* is found in southern France, Italy and Yugoslavia, but is always rare, and it has recently been discovered in a few places in Greece. Its relative, *F. ruthenica*, was also present in the exhibit and the two could be compared; in *F. ruthenica* the uppermost leaves form tendrils and are often on an extension of the stem above the flowers, and in *F. tenella* the upper leaves are usually in a whorl of three below the flower, and do not form tendrils.

Several species have been described from North Africa but they are very rare in cultivation and most seem to be indistinguishable from *F. messanensis* from Sicily and Greece. The alpine form from the High Atlas in Morocco, originally introduced by E K Balls and still in cultivation, is somewhat distinct, and one plant was exhibited at the Show.

Most of the species native to Greece were present in the display, for example several forms of *F. davisii*, *F. rhodocanakis* from

Hydra, and *F. gussichiae* with untessellated flowers and widely spaced alternate leaves from Macedonia. There was also *F. graeca* and its northern subspecies *thessala* (syn. *F. pontica* var. *ionica*); other Greek species were *F. drenovskii*, a relative of *F. armena*, from the border area with Bulgaria, and *F. tuntasia* and *F. obliqua*, a pair of very closely related species from Kithnos and Attica.

Turkey has the largest number of species of any country and fifteen of these were represented. In the *meleagris* group there was the dwarf *F. aurea*, common in the limestone highlands of Central Turkey. In the *F. caucasica* group there were *F. carica* and *F. forbesii*, two closely related yellow-flowered species from the south-west, and a pair of green-flowered species, *F. bithynica* (syn. *F. schliemannii*) from the Aegean coast of Turkey, and *F. glaucoviridis* from the Amanus Mountains. Also in this group was *F. carduchorum*, a common species from snow-patch hollows in the mountains south of Lake Van, described as recently as 1970. *F. armena* from north-east Turkey with small bells blackish-purple inside and out, and *F. pinardii* with purplish bells, yellow inside, from southern Turkey, could be compared directly.

The *graeca* group was represented by *F. pontica* from the Black Sea area and Bithynian Olympus; this is the only species which is found in both Europe and Asia. There was also *F. whittallii* from the western Taurus and *F. hermonis* subsp. *amana* from the Amanus mountains in Turkey, Syria and Lebanon. This subspecies is glaucous all over in Lebanon and Syria, but green in Turkey, where it is much rarer. The northernmost collection is the particularly fine "S.E. Turkey form" (A.M. 1968 under the name *F. crassifolia*) discovered by E K Balls in 1934, and still in cultivation. The representative of this group in eastern Turkey is the true *F. crassifolia* and three subspecies of it were present in the exhibit – subsp. *kurdica* (syn. *Karadaghensis*), subsp. *hakkarensis*, a dwarf alpine form from S.E. Turkey and N.E. Iraq, and subsp. *crassifolia* itself, which is characteristic of limestone

screens, especially on Kop Dagh near Erzurum, one of the most beautiful, with striking flowers of purple and yellow.

In Iran and neighbouring Afghanistan and Turkmenistan are found members of the rarer subgenera, and the following could be seen in the display: *F. imperialis* and *F. raddeana* in subgenus Petilium, *F. bucharica* and *F. gibbosa* in subgenus Rhinopetalum and *F. persica* in subgenus Theresia. There were also good specimens of *Korolkowia serewzowii*, the link between *Fritillaria* and *Lilium*. Two special Iranian species were *F. reuteri*, a graceful yellow and purple-flowered one recently introduced from near Ispahan, and *F. zagrica*, a small, dark, *armena*-like member of the *caucasica* group, with a yellow point to each petal. A plant which has become common in cultivation since being introduced from Iran by Admiral Furse is *F. uva-vulpis*, usually but wrongly called *F. assyriaca*. The bells are small, very rounded, yellow inside and purplish outside, with a grey grape-like bloom – hence the Kurdish name “Fox’s grapes”. The plant is robust with shining green leaves and increases well in cultivation.

The Himalayan and Chinese species were represented only by one magnificent group of *F. verticillata* which was dug up from E B Anderson’s garden and preserved at Wisley. Central Asia also yielded only one species, but that one of the most satisfactory in gardens, *F. pallidiflora*. It has large green *meleagris*-like bells and broad glaucous leaves. It is also one of the quickest species to flower from seed, often taking only three or four years compared with six or seven for most species.

The American species show a great diversity of colour and form, and have more and smaller flowers than the Old-World ones. There were the sombre black and green *F. lanceolata* var. *tristulis*, the scarlet *F. recurva*, and the pale greenish-white *F. liliacea*. We also had a chance to see *F. agrestis* and *F. phaeanthera*, both rare in cultivation in this country, sent over from California by Wayne Roderick.



£3.50

