DYKES ON IRISES

A Reprint of the contributions of the late W. R. Dykes, L-es-L., to various journals and periodicals during the last 20 years of his life

FOREWORD TO THIS PART EDITION

In the 1920s George Dillistone diligently compiled articles written by William Rickatson Dykes during the last 20 years of his life and this was published by the then *Iris Society*, later to become the British Iris Society.

These articles are now out of copyright and are reprinted here for all to freely enjoy. Some of the names and thoughts are now dated, but surprisingly much of the detail still makes very interesting reading and the enthusiasm has not diminished despite the gulf of a large number of years.

I personally have found it very rewarding to have read the articles whilst transferring them to a modern medium. My only regret is that there was not sufficient time to complete the task this year. Accordingly, the complete series should be ready in 2011, but here is about half to keep those with a keen and enquiring mind semi-happy.

Alun Whitehead

Contents

		Page
1	Foreword to this part edition	
2	Contents	
3	Irises	
4	Irises for Amateurs	
5	Some Early-Flowering Bulbous Irises	22
6	Early Flowering Bulbous Irises	24
7	Some Early Flowering Irises	29
8	Early Bearded Irises	33
9	August Irises	38
10	Autumn-Flowering Irises	40
	Irises from October to August	
	An Iris Garden in Winter	
13	Some Garden Irises	48
14	Garden Irises	58
15	A Dalmatian Iris Hunt	66
16	An Iris Excursion	75
17	The Origin of Some Garden Irises	79
	Hybridisation in the Iris	
19	Curious Results of Hybridisation	90
	Self-Fertilisation in Irises	
21	Irises from Seed	92
22	On Raising Irises from Seed	94
23	Notes on Various Species and Hybrids	
	1. Iris acutikor	98
	2. Iris albopurpurea	100
	3. Iris albo-purpurea Colchesterensis	
	4 Iris Aphrodite	
	5. Longipetala Group	
	6 Iris Boissieri x tingitana	
	7 Californian Irises	
	8. Some Californian Irises	114
	9 Iris Carthusian	118
	10. Iris Lop-tec	119
	11. Chinese Iris (Three New)	
	12. Mr. Farrer's Chinese Irises	
	13. Iris chrysographes	129
	14. Some Hybrids of Iris chrysographes	
	15. Iris Clarkei	
	16. Iris cristata	134
	17. Iris Douglasiana	135
	18. Iris Filifolia	
	20. Iris flavescens	139
	21 Iris x fulvala	
	22. Iris Grant-Duffii and its allies	
	23. An Autumn-flowering Iris	
	24. Iris Himalaica	

25 .	Iris Hoogiana (sp Nova)	147
26 .	Iris Hoogiana	150
27.	Two New Irises	153
28	The Juno Irises	155
29.	The Juno Section	159
30.	The Japanese Iris	162
31.	Iris laevigata and Iris Kaempferi	163
32.	Iris laevigata, Fischer	165
33.	Iris laevigata, Regel	167
34.	Iris lacustris	168
35 .	Iris Lisbonensis	170
36.	Iris Lop-tec	172
37.	Iris masia	173
38.	Iris melaina	174
39	Iris mellita	175
40	Iris mellita var rubro-marginata	176
41	Iris minuta, Iris kumaoensis	177
42	Iris nepalensis and its neighbours	179
43 .	Iris ochroleuca	183
44.	Oncocyclus Irises from seed	185
45 .	Iris pumila	
46 .	Iris pumila	190
4 7.	Iris palida dalmatica	191
48.	Iris paradoxa var Choschab	
49 .	The Reticulata Group	

IRISES

(" The Times "-July 6th, 1907.)

Everyone knows the tall purple flag or Iris germanica, but it is hardly yet a matter of common knowledge that it is possible, at least in the south of England, to have irises of one sort or another in flower during ten months of the year. Moreover, even in the two remaining months of August and September, it is by no means unusual to find a few stray flowers among a number of plants. And yet, when we realise that there are between 150 and 200 known species of iris, coming from all parts of the northern temperate zone, from Siberia and Labrador to Arabia and even as far south as Hong-Kong, it should not surprise us to find that irises can be had in flower during so many months of the year.

The flowering season begins in October with alata Vartani. The former has a comparatively large flower some 4in. in diameter, and it varies in colour from dark blue to a pure white. Vartani is smaller, usually a slaty blue, and its chief merit is that it possesses a strong scent of almonds. Another point of fact that is the it comes from neighbourhood of Nazareth. While these two plants are still in bloom, a few hours of sunshine will bring into flower the lovely Algerian Iris, stylosa or unguicularis, which in a warm corner facing south, in soil that is neither too rich nor deficient in lime, will send up its flowers at intervals all through the winter months and on into April. The buds should be picked just before they burst and brought indoors to open, for rough weather soon spoils the blooms. In the opening days of January we may look for the first of the numerous of the well-known violet-coloured relatives reticulata. The procession is headed by histrio, the gaudily painted actor, closely followed by the tiny Iris Bakeriana with its pale bluish-white flowers with deep velvety violet tips. Then, in the bleak days of February, when to garden at all is an act of faith, we are cheered by the sight of the fat buds of histrioides and reticulata Krelagei pushing up between each pair of characteristic quadrangular leaves and by the quaintness and neatness of the tiny deep yellow Iris Danfordiae, which stands only two, or at most three, inches high and can only boast of one single leaf. Iris reticulata itself, deep violet with a golden streak, does not usually open until

the end of the month or the beginning of March, but it atones for its delay by its brilliant colour and its sweet scent of violets. The home of the family is in Asia Minor, and its members do not take kindly to every new abode. They seem to prefer a soil, which, while fairly rich in humus is yet well drained and, therefore, comparatively warm in winter. They are best left undisturbed, but if they must be moved, they should be left in the ground until the leaves have entirely withered away. They are then best stored in dry sand and planted again early in the autumn, in September or October.

All the irises which we have noticed so far, with the exception of alata and stylosa, produce small bulbs with netted coats, from which the type, reticulata, takes its name. But the class to which alata belongs-namely, the Juno Irises—have numerous roots, like small radishes attached to the bulb. These curious appurtenances contain stores of food, which the plants consume when they flower, and their last task in preparation for their summer sleep is to store up food for the next year's flowers by throwing out new roots from the base of the bulb. Iris alata is a native of the shores of the Western Mediterranean, and is especially plentiful in Sicily where it forms wonderful patches of colour along the banks of the streams on Mount Etna. In the East its nearest relative is Iris palaestina, which opens curious bluish-green flowers in February and March. Together with this iris come the various varieties of Iris persica, which has been grown in England for several centuries, but which is by no means as common or as well known as it deserves to be. Its large, brightlycoloured flowers are thrown up soon after the leaves begin to push their way through the surface of the ground. The colours are chiefly shades of white, seagreen, blue and steely-grey, and the flowers stand only a few inches high. Taller than persica, and far more gaudy, is the rarer Rosenbachiana, standing eight more inches high, with brilliant flowers of various combinations of white, gold and crimson.

To this same family of Juno Irises belong several species as yet by no means common in gardens. They are all of them hardy in the sense that the bulbs and leaves are neither killed nor cut down by frost, but flowering as they do in February, March and April, the blooms are all the more perfect if given the protection of hand-

lights or a cold frame. The home of all the species is in Central Asia and the bulbs need a thorough ripening in summer to enable them to flower well the following year. In a warm, sandy soil these irises will live for years and flower fairly well when left entirely alone, and even when overgrown in summer by herbaceous plants. But in less favoured situations it is advisable either to lift the bulbs and store them in dry sand in a greenhouse or frame or dry shed until early autumn, or else to cover the plants with glass during the summer months. If these irises must be taken important, and at the same time somewhat difficult, to preserve the curious fleshy roots, which are loosely attached to the bulb. When they are planted, a warm sheltered spot should be chosen, and they are all the better if a layer of old, decayed cow manure be placed well below the bulbs, so that the long roots can find their way down to it. A heavy soil is sometimes advised for them, but they certainly do well in light porous sand. All these irises have deeply channelled, bright green leaves with a shiny surface and in some cases a narrow white margin. The flowers issue from the axils of the leaves, which are arranged alternately on opposite sides of the stem.

The first to flower of these taller Juno Irises is usually sindjarensis, towards the end of February or later. The colour varies from a good deep blue through slaty-blue to pure white. It grows 18in. high and produces as many as seven flowers on a stem. Next come and its varieties alba, coerulea sulphurea. The type has small flowers of a good deep yellow, while its varieties, as described by their names, are far more charming. In nearly every case four delicate parallel lines of olive green run along the shaft of the fall and there is usually a signal patch, distinct in colour from that of the rest of the blade of the fall. This signal patch, which is perhaps nowhere more distinct than in the Oncocyclus Irises, is usually a brightlycoloured spot in the centre of the blade of the fall, by which the insects are attracted to the entrance of the passage or tunnel at the far end of which lies the nectar which they seek. The pollen-bearing anther lies along the roof of the tunnel, and covers the back of the intruding insect with pollen, which is scraped off by the lip of the stigma in the next flower it visits, for the stigmatic lip projects downwards at the entrance of the tunnel. But to return to the Juno Irises.

orchioides is still in flower at the latter half of March, the rare Wilmottiana, with its delicate lavender flowers, blotched with white, and bucharica, with large white flowers having the blades of the falls coloured a brilliant yellow, come into bloom. These are followed by warleyensis, which has violet-purple flowers with orange crests. Iris assyriaca is a plant closely allied to sindjarensis, and has large white flowers; while caucasica, fumosa, and Tubergeniana have curious semitransparent yellowish flowers of varying shades.

The Juno Irises remain in flower until the end of April, and in the same month the earliest of the dwarf bloom. Leaving begin to the consideration with the rest of the Pogoniris section, we will pass on to the Oncocyclus and Regelia families. These will never, it is to be feared, flower freely enough in our trying climate to form great patches of colour, but they are at once the pride and despair of the true iris lover, who sees in a few flowers of Lortetii or Gatesii ample reward for all the trouble that he has taken in their cultivation, and their cultivation is a real difficulty in this country. Even the late Sir Michael Foster, who devoted so much attention to this group of irises, owned that after 25 years he was still uncertain as to the manner in which they should be grown. All his care and science could not prevent their dying suddenly when apparently in the bloom of health, and the truth probably is that, even in their native homes, individual plants are short-lived. In attempting cultivate them in England we must aim at reproducing, in some degree, the conditions under which they grow in their homes in Syria and Central Asia, where they are baked by the sun in summer and kept dry in winter beneath frozen snow. As we might suppose, dry cold seems powerless to harm the rhizomes, but damp mild weather in autumn and winter is fatal to them, for they begin to shoot up, and the young shoots are soon cut down by frost, while the rhizomes get sodden and rot. In summer they need a thorough ripening, which may be obtained either by covering the beds with lights or by taking up the rhizomes when the foliage withers in July and storing them in sand in a dry. warm and preferably sunny place, until the second week in October. planted earlier they are apt to start into growth too soon and suffer in the winter and, if later, the roots will not seize hold of the ground. Roots that are firm should not be trimmed from the rhizomes, for they soon throw

out fresh fibres when they are replanted. The beds should be made convex, and so arranged as to throw off moisture rapidly, and the protection of lights in wet weather is beneficial. Sharp drainage is essential.

On the question of soil for these irises there has been much discussion. Their native soil is rich in lime, and they have certainly succeeded best in chalky soils in England, and a considerable admixture of chalk or lime would therefore seem advisable. Lime in the form of bone meal is, however, to be avoided for it is apt to make the soil sour. Manure as a top dressing is harmful, for it tends to rot the growths, but old cow manure placed about a foot below the surface provides the nourishment needed by plants which make their growth and flower rapidly.

If the cultivation of these plants is difficult the reward of success is great, for these flowers are some of the most wonderful that we can grow in our gardens. The colours, it is true, are not clear in most cases, but are almost all the products of lines and spots of one colour upon a groundwork of another and lighter colour. Thus, Gatesii, the largest-flowered species of all, has the purple lines and points so completely covering the creamy-white ground that the effect produced at a short distance is that of a soft grey. Lortetii has immense standards of creamy-white, faintly lined with reddishpurple, so that their whole effect is pinkish, while the falls, which seem almost to hug the stem with delight in the beauty of their standards, are more boldly dotted with crimson on a creamy ground, the signal patch being solid blotch of crimson-brown. Perhaps the best known and easiest to grow is susiana, the Mourning Iris, with its network of black lines and dots on a greyish ground. Iberica has an extraordinarily large flower for the size of the plant, the standards being white veined with purple, while the falls are dark brown. Paradoxa deserves its name for, whereas in most irises the standards are smaller than the falls, in this case the falls are merely narrow straps covered as it were with black velvet, while the standards are large and circular, veined with deep blue on a bluish-white ground. Of the other species the clear yellow urmiensis is most distinct, so that one wishes that it were not so rare.

The closely-allied Regelia species seem to be less

apt to disappear and die out, provided that the rhizomes are well ripened in summer. They are also more floriferous and have the additional merit of producing two flowers on a stem, while the Oncocyclus rarely produce more than one. The chief species of the family are Korolkowi with conspicuous veinings of purple or chocolate on a pale whitish ground, vaga and Leichtlini both of which bear flowers with wavy edges of an indescribable rosy-brown shot with blue. They are distinguished by their beards, that of vaga being bright yellow, while that of Leichtlini is blue.

We do not yet, unfortunately, understand the mysteries of hybridisation, but its results are in many cases startling. For instance, these Regelia flowers, when crossed with pollen of Oncocyclus species, give rise to plants which are of much easier cultivation than either of their parents. In most cases they retain the shape, and to a large extent, the colouring of the Oncocyclus flowers, while they take after the Regelias in being more floriferous and in producing two flowers on each stem. These Regelio-Cyclus hybrids are still rare and expensive as irises go, but we may hope that in a few years they will become as plentiful as they are beautiful.

Last week we spoke of those bulbous irises which flower in winter and spring and of the oncocyclus and regelia families which succeed them. But even before these latter are in flower we may expect some blooms of the earliest of the great class of Pogon or bearded irises, of which the common purple flag (Germanica typica) is the well-known type. The family is very widely distributed, examples of it being found in Spain, while in the East it extends as far as Nepal and possibly into the Shan States in Burma. All its members possess a root-stock or rhizome which lies on or near the surface and from which the real root fibres run down into the soil.

The earliest to flower is usually some form of pumila, which opens its first buds in early April. The colours are very various, ranging from yellow and white through pale blue, green, brown and claret to purple and violet. Almost all are extremely floriferous, and when the rhizomes have been thoroughly ripened in the previous summer they will produce as many as 30 blooms in a square foot. This is especially the case with

the charming pumila coerulea which might well be used more often than it is to form dwarf edgings. The growth is compact and practically evergreen, and the plants are not fastidious as to soil, provided that it is not too damp, nor the position too shady. Most of the forms to be found in catalogues are hybrids, either of natural or of garden origin, Or various dwarf species native to Southern Europe as far east as the Crimea. Iris pumila itself comes from Austria and from the mountainous regions lying to the south-east, and varies somewhat with the locality. The slightly larger pseudopumila is common in Sicily, while from Switzerland comes the greenish-yellow, sweetly-scented virescens. Italy sent us chamaeiris several centuries ago, for it found a place in Bacon's garden, while a handsome flower of a deep rich yellow shows its origin in its name bosniaca.

As the month of April advances, so do the irises grow in height. The early pumila are not more than 6in. tall, while virescens is as much as a foot. Taller than this again is the May-flowering Statellae. Once May is reached an iris garden should be one continuous blaze of colour, for the common purple flag is closely followed by the innumerable forms and hybrids which are loosely known as German irises. Closely related to the type, and probably only local varieties of it, are several forms of which Amas or macrantha is perhaps the best while other good forms are Purple King, Crimson King, Fontarabie and asiatica. With these true germanicas, there flowers also the white florentina, whose dried rhizomes provide the violet-scented orrisroot. Then, without any break, come the many-coloured hybrids of such wild species as variegata, pallida, neglecta, plicata, and sambucina—if, indeed, we may be sure that even some of these are not themselves hybrids. All these are natives of South-eastern Europe and Western Asia, and it is interesting to attempt to trace the parentage of their numerous progeny. For variegata gives us flowers with standards and usually dark falls, although even of this charming pure white variety, Innocenza; pallida, with its pale glaucous leaves and papery spathes tends to produce self-coloured flowers, such as the pink Queen of May, or the pale lilac variety from Dalmatia. Neglecta gives us flowers of which the standards range from lilac to purple, while the falls are usually darker, and even sometimes black, as in Black Prince, one of the best of all the German flags. Plicata has white flowers, of which the edges are veined with lilac-purple, and this colouring is characteristic of its offspring, of which Madame Chereau is a good example, while to sambucina we owe the scent of elder-flowers, from which it takes its name, and the gold dust which seems to cover the standards of such flowers as Jacquiniana, when seen in bright sunshine. These flags are best planted six weeks after flowering and should be given a sunny position.

The largest of all the Iris families is that of the Apogons, or beardless irises. The members of this family are very widely distributed, being found Europe, Asia, Africa and America. Our two native English irises, the yellow water-flag (pseudacorus), and the inconspicuous purple or yellow foetidissima, called from the smell of its bruised leaves, both belong to this section. The former, although at its best near water, will bloom well even in the driest of sandy soil, if helped with occasional soakings of water in summer, and with doses of liquid manure in winter, while the open capsules or seed vessels of the latter, filled with bright red seeds, are valuable as winter decorations. A large proportion of this Apogon family are water-loving plants, and all seem to prefer a soil rich in humus or vegetable refuse and deficient in lime. Those species whose leaves, when held up to the light, are seen to. closely filled with minute blackish dots should be planted in the dampest positions.

The earliest to flower of the Apogon is stylosa or unguicularis, which we have noticed already among the winter-flowering irises. Somewhat later is ruthenica, with grassy leaves and violet-coloured flowers veined with white. Graminea, with its plum-coloured and blue flowers, has a characteristic scent like that of a ripe greengage. From the neighbourhood of the Plains of Jericho comes Grant-Duffi, with flowers of a yellowish veined with lilac, while the closely Aschersoni has bright yellow flowers veined and dotted with green. The former of these is a capricious flowerer, for plants given to Sir Michael Foster by its discoverer grew at Shelford for 25 years without producing a flower while in the Cambridge Botanical Garden, about four miles away, it has flowered fairly often. Aschersoni is said to flower more freely, but it is a newcomer in England and we have yet to see whether this is true. Another capricious Apogon is ochroleuca, with tall

sword-shaped leaves which grow with a characteristic twist. The flower is large, white with a yellow blotch on the fall, and its home is in Asia Minor and Syria. In some seasons it flowers freely, and in others it will not produce a single spike. Possibly it often lacks in England that ripening in later summer which it must get in its native home. It certainly enjoys moisture when making its growth in spring. Aurea and Monnieri are two yellow species nearly related to ochroleuca; both are slow of growth, but well repay patience. Somewhat similar in habit are spuria and Güldenstadtiana, both producing in June and July spikes of flowers with narrow pointed segments, the type of the former being a bright lilac blue, while that of the latter is yellow. White forms of both are known, the signal streak in all cases being yellow.

One of the commonest and most free-flowering of the Apogons is Iris sibirica, with spikes of blue or white flowers standing well above the narrow leaves. The deep blue variety or species called Orientalis sanguinea, from its bright red spathes, and the large white Snow Queen are most distinct. They flower early in June and do best in a moist vegetable soil.

Everything Japanese seems to have a character of its own, and the typical Japanese Iris Kaempferi is no exception to this rule. All the garden forms appear to have been raised from the native laevigata, a flower which in habit somewhat resembles sibirica, except that it has broader leaves. The typical hybrids have flowers as much as eight or nine inches in diameter, with six large petals extended horizontally and producing an effect like that of a large clematis. The colours range from white through grey, pink, red, and purple to blue and violet. Yellow is only present in the signal markings.

In Japan the plants are grown in stiff clay, freely manured in winter and flooded with water during the growing season. Failing clay, they will grow in a rich vegetable soil, but lime appears to be fatal to them. They may be moved early in the autumn about the beginning of September, but after that are best left till spring, when the new roots are pushing out. They bloom from early July on into August.

Of the American members of the Apogon family it is difficult to speak with certainty. Seedlings vary so much

that in many cases it is hard to say which are species and which are only varieties. Some, however, are quite distinct. From the swamps in the Southern States comes fulva, of a shade of copper-red quite unusual among flowers. Near neighbours are hexagona and Lamancei, with widely-creeping rhizomes and deep blue flowers with greenish style branches. Earlier than these, which flower in July, are Douglasiana, with spreading flowers of shades from lavender to violet veined with white, and leaves that die off a brick-red colour, and tenax with bright reddish-purple, white-veined flowers, that does well in moist, peaty soil in half shade. Tolmeiana, or longipetala missouriensis. and are closely-allied species, flowering early in June, or even late in May, with flowers in which lavender and purple predominate. All are best moved at the beginning of March.

A small but distinct class of iris is named Evansia. of which the characteristic is the jagged crest which replaces the beard of the Pogoniris. To this family belongs japonica, or fimbriata, with innumerable pale mauve flowers with yellow crests. It will not flower out of doors, and indoors its roots should not be allowed too much room. Fortunately its relations are hardy, among the best being the blue tectorum, which is grown on thatched roofs in Japan, while its white seedling form, which appeared in Europe, is still more charming. Both varieties flower in May and June, and should be given a sheltered position and kept fairly dry in winter. With these flower also the little cristata from America with spreading lavender flowers and characteristic yellow crest, and the still smaller gracilipes flowers of a redder shade. Both thrive in full sun on the rockery in a vegetable soil, kept moist by a layer of small stones on the surface. The other member of this family in cultivation is Milesii, from the Himalayas. It has broad, bright green leaves two feet or more long, and tall branched flower spikes with rather small red lilac flowers, blotched with a deeper colour, the crest being yellow.

There remain the Xiphions, of which Iris xiphium, the Spanish Iris, and xiphioides, or anglica, are the best known. The latter owes its name to the fact that some centuries ago it arrived in Holland from the Pyrenees by way of England. The June-flowering Spanish Irises require a dry hot situation with a thorough ripening in summer, while the English Irises, which flower a

fortnight later, rejoice in partial shade and a moist rich soil. The colours of the former are white, yellow, brown and blue, while those of the latter range from white through lavender to deep mauve and violet. Other xiphions are juncea, the most richly-coloured of yellow irises, tingitana, a shy-flowering giant from Tangiers, which needs a hot position and to be lifted during July and August and then replanted over a layer of old cow manure, and Boissieri, one of the few bulbous irises that can boast of a beard.

Lastly we must mention the quaint tuberosa, which opens its green and black sweet-scented flowers in March. Some say it is not an iris, but it is very welcome at that windy time, and it grows readily in warm sandy soil.

IRISES FOR AMATEURS

AN INTERVIEW WITH MR. W. R. DYKES.

(" Garden Life "—April 2nd, 1910.)

For several years Mr. W. R. Dykes, of Charterhouse, Godalming, has devoted a great deal of his leisure time to the study and cultivation of the Iris. In fact, since the death of the late Sir Michael Foster, he has been one of the highest authorities among expert amateurs, not only because he has an extremely interesting collection of his own, but also because he is endeavouring to raise as many of the species as possible from seed, in order to determine the amount of variation within the limits of each species. He also aims at bringing into cultivation some of the numerous species still only known to us as herbarium specimens. When I asked him if he would see me for a chat about his favourite flower, and especially to discuss the question of Irises for Amateurs, he was kind enough to comply with the request, though he warned me that his garden does not lend itself to the picturesque, and is, in fact, rather a workshop than a garden. At the time of my visit, there was, of course, little to see, but Mr. Dykes has about an acre of garden, situated three hundred and fifty feet above sea level, and the irises, grown in clumps for decoration, must be charming in the prolonged flowering season. Owing to the limited space available, Mr. Dykes is obliged to refuse admittance to many plants that he would like to cultivate, and those that are admitted are mostly bulbs, which serve a useful purpose as a change of crop, in a soil so light and poor that it becomes quickly exhausted if plants are left undisturbed for more than two years.

" I do not intentionally," said Mr. Dykes, as we made a brief inspection of his garden, " imitate the nursery garden, but nursery beds, that make no pretence of being artistic, are practically a necessity to a specialist, whose chief occupation is, perhaps, the raising of seedlings."

GARDEN IRISES.

"But now," he continued, as we returned to the house, " you would like to know something about the irises which may be grown by amateurs, looking at the matter from the garden, as opposed to the botanical point of view. From November to August there is no difficulty in keeping up a constant supply of iris flowers, and even in the two intervening months, there are always some plants that seem to mistake autumn for spring, and come into bloom at an otherwise blank season. Last October, I had, I remember, as many as six species in flower at once. Unfortunately, the three species that can be relied upon to flower before Christmas, Vartani, an almond-scented reticulata from Nazareth, alata, from the Western Mediterranean, and palaestina, from the Eastern Mediterranean, want more warmth than we get in early spring to ripen

their bulbs for the next season; it is therefore difficult to grow them on from year to year, though freshly-imported bulbs rarely fail, if properly treated.

" With the opening of the new year, the earliest representatives of the reticulata group soon appear. They are so-called because the outer coats of their bulbs consist of a network of fibres. The well-known type from the Caucasus, with its violet and gold flowers, is one of the latest to flower, but it is a beautiful sight on a sunny day early in March. It is preceded by the plum-coloured Krelagei and the various forms under the names of histrio and histrioides, of which there are many local varieties, some of surpassing beauty. The diminutive golden-yellow Danfordiae is especially delightful and makes a brave show in January and February, even though it can only boast of mere bristles, in the place of the usually conspicuous standards. All the members of this group come from Asia Minor or Syria, but it is represented in Southern Europe by a somewhat mysterious relative, tuberosa, with similar quadrangular leaves and seeds of the characteristic reticulata shape. The honey-scented flowers have falls of black velvet, and it is by no means a difficult plant to grow."

HOW TO TREAT BULBOUS IRISES IN POTS.

- " But I suppose all these are apt to surfer in bad weather?"
- " Yes, the flowers are apt to be spoilt by rough winds, though the bulbs are absolutely hardy. A judicious use of hand-lights or spare frame lights often prolongs that beauty."
 - " Can they be grown in pots?"
- "Yes, all the reticulata group can be grown in pots. They should be treated just like narcissus bulbs, that is to say, potted in August or September, and plunged in ashes or cocoanut fibre for eight or ten weeks. When the roots are formed, by the end of this period, the plants come on rapidly, either in a greenhouse or even in a room, and may be had in flower by Christmas, with very little heat."
- $\mbox{\tt "}$ I should like to know of any other classes which will flower early? $\mbox{\tt "}$
- "The Juno group is one that deserves to be far better known than it is. The growth of these bulbous irises somewhat resembles that of a dwarf maize plant, especially in the stem-producing species. Of these, I have already mentioned alata and palaestina, of which the former grows in vast masses on the hills around Cordova and on the slopes of Etna, to mention only two localities. After Christmas, persica and its varieties Tauri and stenophylla, may be expected to bloom. For some reason, however, these beautiful little irises do not succeed very well with me. It may be, and probably is, that they require a heavier soil than mine."

VARIETIES WHICH VARY IN COLOUR

- " A hybrid of wonderful colour is a cross between sindjarensis and persica (sind-pers). It is of a blue that is almost turquoise. I incline to think that it varies slightly in colour in different soils, and even from year to year in the same position. Other irises undoubtedly vary a little in colour from year to year; for instance, the dwarf yellow forms of olbiensis, and also bosniaca and Talischii (a rarer species which comes from a province on the west side of the Caspian Sea). All these may be pure yellow one year, and in the next veined and clouded with purple. Last year my Talischii were stained with purple, but this year they were yellow. Of the many dwarf seedlings that I have raised, I have labelled the best of the yellows, when they flowered for the first time, only to find that in the next season the colour was spoilt by traces of purple.
- "One of the most beautiful of the early Juno Irises which blooms in February and March is Rosenbachiana. The flowers appear almost before the leaves, and are clothed in gorgeous apparel of crimson, gold and white."
 - " Is it an expensive species to grow?"
- " At present, yes, for it increases very slowly—there are very few offsets. However, it yields a quantity of seed, a pod sometimes containing as many as eighty or ninety grains. Of the taller Juno Irises, sindjarensis itself is a good variety, the flowers being a shade of pale blue, or even white. It has a stem, and produces three to six flowers, rising from the axils of the leaves. Somewhat resembling it in habit is orchioides, a rich orange-yellow, with four to six flowers on a spike, a very good doer. But the best of this group is bucharica, with half a dozen flowers on a stem."
 - " What is the colour?"
- "It is ivory white with broad lips of deep yellow. Bucharica increases rapidly. Two of my bulbs produced four flower spikes the first year after planting and the next seven. I then shifted the plants and had thirteen flower spikes in the following season. Orchioides alba and coerulea and the recent introductions from Bokhara, *viz.*, warleyensis and Wilmottiana are well worth growing."

PROTECTION FROM FROST.

- " Do you protect the tall Junos?"
- " I grow them in frames which are always open. This is not because the bulbs are not hardy, but to protect their flowers from the weather. I only use the frames so that the irises may have glass over their heads when they flower, because in this way the blooms last longer, and seeds set more freely. Now we might take some of the non-bulbous varieties."

A MINIATURE STYLOSA.

- " Have you any of these which flower regularly in the winter?"
- "Only one species. It is the iris generally known as stylosa; the name given fifteen years before was unguicularis, but it is a sad burden for so beautiful a plant. Besides the common lilac-coloured type there are several garden forms, including at least one white variety. I have also a very small form from the island of Cephalonia. It is not very free-flowering, but the petals seem to have rather more substance. It is, in fact, a miniature stylosa. The smaller forms are sometimes called cretensis, but can scarcely rank as more than sub-species of stylosa; they flower in March or April. Stylosa should be planted close up against a wall facing south in a sunny position, in soil that is not too rich. The numbers of the flowers that appear in succession from a well-established clump is really astonishing."
- "But before the bulbous irises are over, the dwarf-bearded varieties begin to bloom. The earliest of these is generally the true pumila, which is purple and comparatively rare in cultivation. It has only half an inch of stem, and no plant that is taller than this is a true pumila. The irises which are usually known as pumilas are not the true species, but garden hybrids of species found in Southern Europe, such as pumila, chamaeiris, and olbiensis. Of dwarfs there are several species not often grown, such as bosniaca, balkana, and Straussii, which are in some indefinable way more distinguished, shall we say, than the hybrids."
 - " What about the tall-growing bearded Iris?"
- "Germanica is the first to flower early in May. Besides the type, there are numbers of local forms, several having rather larger flowers than germanica itself. For instance, Amas or macrantha, but even finer is the hybrid called Oriflamme. G. Kharput is another good variety, which can be distinguished when not in flower by the distinct red edges of the leaves."

THE MOST BEAUTIFUL FLAGS.

- $\mbox{\tt "}$ Which do you consider the most beautiful white of the tall, bearded flags ? $\mbox{\tt "}$
- " A hybrid of Kashmiriana, raised by Sir Michael Foster, and named by him after Miss Willmott. Kashmiriana itself is very good, and I am glad to say that I have recently had a number of rhizomes sent to me from Kashmir, some of which flowered in their first season. Albicans, from the neighbourhood of Cadiz, is of a purer white, but perhaps less hardy than the well-known florentina, with its somewhat grey or blue-white flowers. The best pinks are Queen of May and Her Majesty, for pale mauve, pallida, and for choice, p. dalmatica. Then there is a species called variegata, which has

yellow standards and falls veined with reddish-brown. Gracchus is a free-flowering form, while Maori King is very richly coloured. Another group of tall, bearded irises, includes Black Prince, which flowers at the end of June and even into July. The falls are of the richest velvety black, and this variety should certainly be grown in all collections.

THE BEARDLESS VARIETIES.

"Of the large class of beardless or Apogon Irises, one, stylosa, has already been mentioned. Its last flowers usually open in April, and then there is a gap of a month or more before other members of this section come into flower. One of the earliest is missouriensis with delicate flowers of lavender and white, and it is usually soon followed by longipetala, another American from the Pacific Coast. Its Californian neighbours are, to my mind, among the most beautiful of all irises, but also, unfortunately, among the most difficult to establish, though once established they flower well. Douglasiana of many varying shades, is one of the easiest of the group, while bracteata, rich yellow, with crimson veins, is one of the least amenable. Tenax flowers freely with blooms that vary from a pearly grey, through mauve to a rich claret colour."

THE SPURIA GROUP.

- " What other groups do you recommend?"
- "There are some fine ornamental plants in the spuria group which may be recommended to those who rejoice in a heavy rich soil. The true spuria is a small plant, found in marshy places in the south of France, but its relatives extend all through Asia to Kashmir, which has a form of spuria, and also the golden aurea. Notha is a robust form of spuria with deep blue flowers. It is closely allied to ochroleuca, a tall, decorative plant, with white and yellow flowers. To this group also belongs Monnieri, with large, deep golden flowers, which is probably only a sport, and not a wild species. Amongst the series of hybrids raised by Sir Michael Foster is Monspur, a cross between Monnieri and spuria, with flowers of different shades of blue.

"The sibirica group, of which there is an eastern and a western form, each having a white variety, is noteworthy. The western form is that usually sold as sibirica, while orientalis, which has red spathe valves, comes from the Far East. A good form of this is known as Blue King, while a corresponding white form is called Snow Queen. All this group flower chiefly in June. Closely allied to sibirica is Clarkei, a plant from the Sikkim Himalayas, and nearly related to Clarkei is the Yunnan Iris, Delavayi. Mention might also be made of a number of beardless irises which do not come under any of these groups. There is, for instance, graminea, which hides its flowers in the grassy leaves, and has a scent which resembles that of a ripe greengage."

- " When does the Kaempferi group come in?"
- "In July. As garden plants they are largely the creations of the Japanese, and delight in rich soil and abundant moisture during the growing season. In such conditions they flower well, as, for instance, at the edge of ponds, and in the famous ditch in the R.H.S. gardens at Wisley."
- " Perhaps you would now tell me about some that are more difficult to cultivate?"

LOVELY ONCOCYCLUS FLOWERS.

"These certainly include the Oncocyclus, a group which, however, contains some of the most lovely flowers that we possess. For the last three years I have grown plants of this group by taking them up in July, drying them off in the shade for a few days, packing them up in dry material and storing them in a temperature of about thirty degrees F. I plant them in rich soil at the beginning of March and they then flower well in June. The grandest of this group, which Foster described ' as of surpassing grace and beauty ' is Gatesii, of a delicate silver-grey. A very lovely neighbour of Gatesii is Lortetii, veined and dotted with rose colour on a creamy ground, while the most commonly seen and cheapest to buy is susiana."

" You have not said anything about the Regelia group?"

A HINT ON REGELIA CULTIVATION.

"The Regelias are easier to grow than the Oncocyclus, and do not require cold storage, but the rhizomes should be lifted from July to October, unless they can be covered with glass in their beds. Of this group, only three or four are well-known, such as Korolkowi (white, with brown veinings), Leichtlini (bronzy-violet and yellow), vaga (very similar to, if not identical with, Leichtlini) and Suwarowi—all of these are worth growing. Iris lovers who cannot succeed with Oncocyclus may find some compensation in growing Regelio-cyclus hybrids, which need the same treatment as the Regelia group. They combine the size of the Oncocyclus flowers with the greater robustness of the Regelia seed parents."

XIPHIUMS AND XIPHIOIDES.

- " Then there is the Spanish Iris?"
- " Yes, and it is the very antithesis of the Oncocyclus species as regards ease of cultivation. Any light, rich warm soil suits it."

SOME EARLY-FLOWERING BULBS. BULBOUS IRISES.

(" The Garden "-January 5th, 1924.)

Some of the most beautiful and earliest to flower of all bulbous plants are the irises of the reticulata section. The almond-scented grey-blue I. Vartani from Palestine may be in flower at Christmas, and there is a white form of it spotted with blue which is extremely beautiful. It is closely followed by I. histrioides, from the mountains of northern Asia Minor, with its large flowers of a brilliant blue which appear before the leaves have had time to develop. This late growth of the foliage is an advantage to the plants, because it has a better chance of attaining its full development later than has, for instance, I. Vartani, of which the leaves are often so severely damaged by bad weather that no sound bulbs are formed for the succeeding year.

The same fate often overtakes I. histrio, which in some of its forms differs chiefly from I. histrioides in the earlier development of its foliage, and the yellow I. Danfordiae, from the mountains of Cilicia, which is distinguished by the fact that its standards are reduced to mere bristles, so small as almost to escape notice altogether. Even more brilliant than any of these is the rare I. Bakeriana, with its falls tipped with blue-black velvet and its slender eight-ribbed leaves. All these irises need a sheltered sunny corner in rather rich light soil made porous by the addition of a liberal supply of lime rubble. Several of them form, at the base of the flowering bulb, a number of minute bulblets, which, if left untended, rarely develop into full-grown bulbs and which need careful nursing for a year or two, either in pots or planted out in a cold frame. I. reticulata itself and its wild red-purple counterpart from the Caucasus, commonly known as Krelagei, come later in February and March and are better able to take care of themselves.

There is also a variety of garden origin with pale blue flowers which has been named Cantab, and which, like the deep blue typical form, seems to have something in its constitution which enables it to persist and increase in gardens and under conditions where the wild forms die out after a few years. There is a central line or ridge of deep yellow on the falls.

Of early-flowering Juno Irises the most wonderful is easily I. Rosenbachiana from Turkestan, with its brilliant flowers of all shades of colour from white to deep blue and red-purple, set off with a conspicuous golden crest. This and the many varieties of species akin to I. persica need sheltered positions and protection after flowering to enable them to mature their foliage, but the white and yellow I. bucharica, the golden I. orchioides and the purple I. warleyensis, which do not flower until April, should hold their own in well-drained soil in any sunny spot that is not too wind-swept.

EARLY-FLOWERING BULBOUS IRISES.

(" The Garden "-June 21st, 1919.)

Bulbous irises are among the most precious of the plants that can be relied upon to flower in our gardens in some of the darkest months in the year. Their flowering time alone would make them valuable even if they were not in themselves some of the most richly coloured of all hardy bulbous plants. Any garden which has a few warm sunny corners, providing a certain amount of shelter from the storms of winter, need hardly ever be without some irises in flower from Christmas onwards, and there are other species which will be more easily obtainable and which will usually give us flowers in the darkest days of November and December.

These early-flowering species of iris belong to one or other of the two groups of reticulata and Juno Irises. The former gets its name from a Latin word meaning a net, and has its bulbs covered with a network of fibres, while the name of Juno Irises seems to have been applied to the latter for some purely arbitrary reason.

Of the reticulata irises, the two best-known forms are the deep violet blue reticulata and the red purple Krelagei. The former is the better known, but there is a mystery surrounding its origin and introduction, for there seems to be no definite record of its ever having been introduced direct to our gardens from the home of its species in the Caucasus. All the wild plants that come direct from that neighbourhood are always redpurple forms, to which the name of Krelagei has been given, and what is still more curious is that seedlings obtained from the blue type always have red-purple flowers, although blue forms occur when a second generation is raised from these red-purple seedlings.

However this may be, both Krelagei and reticulata are most valuable irises. The former is in flower from January onwards, and the latter in February and March. Their one fault is that the bulbs are liable to fall victims to a deadly fungoid disease, which first marks the bulbs with inky black blotches, and then destroys them wholesale. The remedy against a bad

attack has yet to be discovered, but a frequent transplantation during the resting season and the avoidance of anything in the nature of half-decayed leaves or raw manure will go a long way towards keeping the bulbs in good health.

In Palestine there grows an allied species, Vartani, whose flowers may be either a dull slaty blue or white mottled with blue. This comes into flower in December and has a delightful scent of almonds, but, unfortunately, it can seldom be relied upon to form sound flowering bulbs for the next season.

Near Amasia in northern Asia Minor there grows the real I. histrioides, with large flowers veined and mottled with two shades of blue-purple on a white ground. Its flowers develop almost before the leaves have pierced the soil and it is a pity that it is one of those species of which a flowering bulb, instead of giving rise, as with reticulata and Krelagei, to one or two bulbs of flowering size and a few smaller bulblets, seems frequently only to leave behind it a host of bulblets no bigger than a grain of wheat, which take several years to grow into flowering size. I. histrio from Southern Asia Minor, has the same bad habit, and flowers of a very similar colour scheme. Its leaves are further developed at flowering time than are those of I. histrioides, and though they set off the flower to advantage, they often fall victims to late frosts, and are consequently unable to build up flowering bulbs for the following season.

There is one remarkable species with bright yellow flowers in which the standards are reduced to a fine, almost invisible point, namely, I. Danfordiae; it is found on the mountains of Cilicia, and, in this sandy soil at any rate, behaves like histrioides, so that a flowering bulb leaves us only a legacy of minute bulblets.

All the foregoing species have long, narrow leaves with four unequal sides, and a whitish horny tip. In northern Mesopotamia there grows a relative in which the leaves are tubular with eight horny ridges, the richly-coloured I. Bakeriana, the tips of whose falls are made, as it were, of deep blue-black velvet. It is a delicate little species, which can be crossed with reticulata to give a delightful series of brilliantly-

coloured forms of all shades of blue-purple and redpurple.

The Juno Irises are distinguished by their broad channelled foliage, by the horizontal or even dropping "standards," and by the fact that the bulb in its resting state has attached to its base a number of fleshy store-roots. These latter are brittle and are very easily detached from the base of the bulb. When this happens the bulbs are much weakened and seldom, if ever, really recover their vigour. Within the section there are several well-marked groups, though our knowledge of many of the species is so scanty that they cannot satisfactorily be assigned to any of the known groups.

The Mediterranean species, alata in Spain, North Africa, and Sicily, palaestina in Persia, and persica, with its numerous sub-species in Asia Minor Armenia, have all wide wings to their falls which arch over and enclose the style branches. I. sindiarensis is from the hills in northern Mesopotamia. This flowers of various shades of pale blue or white, while good forms of persica seem to combine pale blue, sea green and rich purple with a golden central streak on the falls. I. Tauri, with flowers of red-purple with golden stripes, and I. stenophylla with flowers of two shades of blue-purple, are both closely allied to persica, and seem to be easier to grow. Persica itself must have a heavy soil, from which it is extremely difficult to extract a bulb with its roots uninjured, and consequently it is seldom seen growing luxuriantly although it has been known in cultivation for at least 100 years. I. alata has very large flowers of some shade of blue-purple, while I. palestina is very variable and has colour forms that may either be blue, green or pale-yellow.

All these Juno species with the wide-winged falls have spherical seeds and are thus easily separated from the group of vigorous species from Turkestan, of which bucharica is probably the finest and best known. This has large flowers of white and deep yellow, falls without the conspicuous wings of I. alata, and cubical seeds of somewhat irregular outline. Its allies are the deep yellow orchioides and the rich purple warleyensis with both of which it will hybridise readily. From these crosses I have obtained a number of seedling forms, of

which the sturdiest is like bucharica, but has flowers that are wholly yellow, while some of the most beautiful are those in which the purple elements of warleyensis are reduced to a delicate shading of pale blue.

Of all these irises the growth and foliage is very characteristic. The habit is not unlike that of the maize or Indian corn, and as many as four or even seven flowers spring from the axils of the uppermost leaves, so that the display lasts a considerable time. Here, at any rate, in light sandy soil the bucharica group does extremely well, and seems as easy to satisfy as the Asia Minor plants are difficult. Large beds of seedling plants make a brave show throughout April, and these irises are certainly worth a more extensive trial than has hitherto been accorded to them.

Of the lesser-known species of the Juno group, some of the most striking are Willmottiana, deep green, glistening foliage and striking flowers of lavender-purple and white, Tubergeniana with deep yellow flowers and a straggling beard, and Rosenbachiana, which is certainly one of the most gorgeous of all hardy bulbous plants. Here in cold frames it is in flower for nearly three months in the earliest part of the year. It is almost stemless at flowering time, but it agrees with all the other species in sending up three or four flowers from the axils of its leaf. I. Rosenbachiana stands, however, well apart from all the other known species, both in the peculiar formation of its seeds and in the curious strap-like shape of its falls. It is a Turkestan plant and seems to thrive in warm, well-drained sand, well enriched with humus.

All the irises mentioned are hardy and will survive the hardest frosts in the open ground, though, naturally, the flowers will suffer. They are, however, well worth the protection of a cold frame to keep their flowers unspotted and to enable them to ripen their foliage and form satisfactory new bulbs. In the open their foliage is apt to be so much weakened by the buffetings of the storms of winter that the bulbs themselves are weakened and tend to dwindle away.

The soil should be well-drained and rich in well-decayed humus, and, when once a bed has been well

made-up, the plants may be left undisturbed for three and should increase annually vigour. in Eventually they will become too crowded, and then it is necessary to undertake the delicate operation of lifting the bulbs without breaking off the brittle store-roots. This is to my mind one of the most exasperating tasks that a bulb-grower can be called upon to undertake. I find it best to give the ground a good soaking of water a few hours before attempting to lift the bulbs, for there is then less danger of breaking all the roots than when the ground is so hard and dry that it only splits into huge lumps. Nothing is gained by keeping the bulbs long out of the ground, and they should be replanted in September or, at the latest, in early October.

SOME EARLY-FLOWERING IRISES.

(" The Gardeners' Chronicle "-January 11th, 1913.)

The experience of the summer of 1912 has shown that we have still much to learn as to the conditions which favour or prevent the production of flowers by those species of iris which bloom in winter. In August, when week after week brought little or no sunshine, but rather rain and low temperatures, it seemed as though such species as I. unguicularis and the smaller bulbous irises would be unable to ripen their growth, and the prospect of them producing their usual crop of flowers became more and more gloomy. If the time could have been found, I should certainly have lifted all my bulbs of the Reticulata group, and, by storing them in dry sand, have attempted to give them artificially that ripening which they seemed unable to obtain naturally. However, the time for this slipped by, and the bulbs remained in the ground to take their chance.

The first surprise came early in December, when I found that two or three clumps of a very narrow-leaved unguicularis full o f were Unfortunately, I have been unable to ascertain from what locality this form comes. I obtained it some years ago from a nurseryman, who aroused my curiosity by advertising an Iris agrostifolia, of which no botanical description appears to have been published. The name is suitable, even though it is a Graeco-Roman mongrel, and, presumably, means grassy-leaved. As a matter of fact, the tough, wiry leaves are not more than onetwelfth of an inch wide and about 12 to 18 inches long. To judge from herbarium specimens, this is probably a Greek form, similar to that which was described by Janka as I. cretensis. As in many other cases, the author of this name was so intent on showing that the plant was not a certain iris (in this case I. humilis, with which no one with any knowledge of irises could easily confuse it) that he altogether omitted to say how he distinguished the plant he was describing from that are obviously related to it. examination of this and other forms which I have received direct from Greece has failed to discover any difference except size between them and the Algerian

I. unguicularis. Until this season these narrow-leaved forms have never bloomed until March or April, and this seemed a point of difference, which, however, now appears to have vanished. The flowers are smaller and have not the delightful scent of some Algerian plants, but the display lasted all through December and still continues at the commencement of January.

Moreover, some curious plants, which I received some years ago from Muller, of Nocera Inferiore, under the varietal name of pontica, after hitherto remaining flowerless, are now throwing up their buds. The foliage is scanty, short and broader than that of the ordinary Algerian form of I. unguicularis. The few flowers that have already opened have been enough to show that it extremely difficult, if not impossible, to distinguish this plant from another which has lately been introduced as I. lazica. The name pontica suggests the Black Sea, and Lazistan is on its south-eastern shore, so that the identity of the plants is improbable. The flowers are scentless, smaller, of a darker purple, and more distinctly veined than those of typical I. unguicularis. What is remarkable is that, like the Greek forms, the plants from Pontus and Lazistan have always hitherto refused to flower until March or April.

But if it was a surprise to find buds on these various forms of I. unguicularis in December, it was no less astonishing to find that beds of I. histrio and I. histrioides were also showing their buds before the 20th of that month. Since then it has been possible to gather them daily, and they show off their beauty to the best advantage if stuck into wet earth or sand in small flat bowls. In water they are difficult to arrange, but, by filling the bowls in the manner suggested, they are easily induced to hold themselves erect.

A certain amount of confusion appears to exist between I. histrio and I. histrioides, and indeed at first sight there is considerable similarity between the two. Both vary to a large extent in the exact shade of colour and in the markings, and, moreover, each appears to possess more than one form. I am inclined to think that they must be separated from I. reticulata by their method of increase. Both produce at the base of the parent bulb a large number of minute bulblets not much bigger in many cases than grains of wheat.

These never occur in the case of I. reticulata, so far as my experience goes. The chief points of difference between I. histrio and I. histrioides seem to be these. In I. histrio the leaves are at least as tall as—if they do not overtop—the buds; in I. histrioides the buds often pierce the soil before the leaves appear at all. The flower of the former is turbinate, that is to say that the hafts of the falls rise at a sharp angle and form with the standards the outline of a funnel or inverted cone; in I. histrioides the haft of the fall extends almost horizontally.

In colour the latter is more uniform, and the deep blue of the edge of the blade of the falls extends for some distance towards the centre, where it gives place to a white ground blotched with blue. In typical I. histrio the colouring is produced by mottlings and veinings of deep blue distributed irregularly all over a paler blue ground, moreover, the standards are very narrow, and curve gracefully outwards at the tip; in I. histrioides they are broader, and are held more erect. There is, however, a form of I. histrio in which the standards are erect and even actually curved, almost meeting at their apex. To this I have ventured to give the varietal name of orthopetala. The spathes are rather longer than those of the typical form, and the leaves tend to develop more fully before the flowers appear. It would be a help to know where this form is to be found. Herbarium specimens of these species and of their forms are very unsatisfactory, but I inclined to think that this variety orthopetala comes from Lebanon. In any case, typical I. histrio is found in the neighbourhood of Marash, while I. histrioides comes from further north in Asia Minor and is obtained in the neighbourhood of Amasia. It is to this species rather than to I. reticulata, which is probably confined to the Caucasus and Northern Persia, that the plant described by Foster as I. sophenensis should probably be referred. It derived its name from the ancient name of the district in which Kharput is situated. It is found near this town and agrees with I. histrioides in its method of increase, in the poise of the falls, in the short, stout foliage at flowering time, and in its coloration.

Another surprise of this curious season has been the flowering in the last week of December of a number of plants of I. Rosenbachiana, which does not usually flower until February or March. This species is, unfortunately, as rare as it is beautiful. It comes from the mountains of Turkestan and is a true Alpine plant. That is to say, that it flowers as soon as the foliage pierces the soil, and the pace at which the flowers develop when once the broad, nipple-shaped sheath of the leaves has appeared above the surface is simply amazing. In a few days the gorgeous flowers are fully developed and stand 4 or 6 inches high on their long perianth tubes. In colour the plants are very variable, one of the commonest forms having flowers of white and crimson, with a raised golden crest on the falls. The leaves only develop later in most forms but it is then clear that the plant is a true Juno Iris, producing its flowers from the axils of the leaves. Unfortunately, my experience, and I believe, that of others, has been that I. Rosenbachiana increases very slowly by offsets. My present plants have all been raised from seed. This is a slow process, taking about four years, but when at last the flowers appear the trouble is well rewarded. Like many other plants in which increase by division is slow, seeds set with some freedom if the flowers are protected from wet, which, of course, destroys the pollen. The capsules, also, contain as many as 80 or 90 seeds, though these do not, unfortunately, germinate very easily. They often lie dormant for several years and then suddenly germinate. Many attempts hybridise I. Rosenbachiana have been made and have failed, and I believe they are doomed to fail until some other members of the group to which this Iris belongs are introduced into cultivation. All the Juno Irises that we have at present, except I. Rosenbachiana, belong to one or other of two groups, which have never so far been crossed, and it is therefore not surprising that this exception, which is totally distinct from both groups in its seeds and the shape of its falls, should refuse to hybridise with the members of Possibly I. Rosenbachiana stands entirely alone, but I am inclined to think that I. drepanophylla, from the neighbourhood o f Askabad and southward Afghanistan, and possibly also I. linifolia, from Bokhara and Ferghana, may prove to be allied to it.

EARLY BEARDED IRISES.

(" The Garden "-June, 1918.)

When examined under a microscope, most irises appear to be bearded, for in nearly every case the centre of the back part of the blade of the falls is covered with minute projecting processes which might hairs. bе called Two bulbous Tubergeniana and Boissieri, have a few straggling hairs which are obvious to the naked eye, but the name of Pogoniris, from the Greek word for a beard, is usually bestowed only on the well-known class of irises to which the so-called Iris germanica belongs, and of which a few representatives are to be found in nearly every garden.

Probably no iris name is more frequently found in catalogues and on garden labels than that of pumila, and yet the true plant is comparatively rare cultivation. It is a native of the limestone districts of Central and South-eastern Europe, though, strangely enough, it occurs also in parts of Hungary, on the northern shores of the Black Sea, and near Sarepta on the Volga, where the soil is presumably sandy. From the last two sources I have never yet succeeded in obtaining living plants but the Hungarian forms grow and flower in the sandy soil here in a way that plants from limestone homes never succeed in imitating. I remember spending ten hours on a blazing hot day at the end of April searching for I. pumila in the stony wastes near the Austrian naval harbour of Sebenico on the Dalmatian coast. All day long I climbed up and down among the rough limestone, and was just about to give up the search when at last I found a few patches of tiny leaves not more than 1 inch or 2 inches in length, and the withered remains of a single flower projecting from among the stones. The rhizomes were embedded in the stiff red soil which always seems to form in the course of time in the crevices among the limestone. The dried remains of the flower were enough to show that I had found I. pumila, and though I did succeed in getting a flower or two from the rhizomes in my garden here the next year, it was not until I saw the plants which had developed from some of the rhizomes in the heavy fertile loam of Northamptonshire that I realised the possibilities of I. pumila. There each rhizome had

grown into a circular clump, from which there rose twenty or thirty flowers, so closely packed as almost to hide the foliage. Here in this sand I can never get I. pumila to do so well, but, by dint of frequently moving the plants into as rich a top soil as I can produce, I usually contrive to have a fair number of flowers in early April. The plants do not root deeply and therefore soon exhaust the soil within reach of their roots. Then the rhizomes rapidly begin to dwindle.

I. pumila is valuable for more reasons than one. In the first place, it flowers before all other Pogoniris. This year the few warm days towards the end of March actually brought out the first flowers on March 25th, but it is usually not in flower until early in April. advantage is the extraordinary range Another colours to be found in the flowers. It is true that my plants from Hungary are all of one or two forms, a redpurple and a blue-purple, but my Dalmatian plants were all different, various shades of purple, yellow, and even white. I have long since given up trying to describe the colours of irises as being lilac, mauve, lavender or violet, because I have found that no two people agree as to what these colours really are. It seems best to confine oneself to red-purple and bluepurple, and to qualify these two by the addition of pale or dark. I have also received plants from Moravia, of which every one was different, and the same is the case on the Geissberg, near Vienna. At the present moment some dozens of seedlings are opening here, and the variety among them is endless, though yellow forms are certainly less numerous than the purple.

I pumila is distinguished from I. chamaeiris, with which it is so commonly confused, by the fact that it has practically no stem and a comparatively long perianth tube between the ovary and the segments of the flower. I. chamaeiris, however, always has a stem that is at least as long as, if not longer than, the tube. In I. pumila when the seed capsules are ripe, they are quite sessile among the leaves but those of chamaeiris are always raised on a stem. Moreover, the shape is different. The seed-pod pumila quite o f gradually to a sharp point and has a further peculiarity in that the internal divisions, which should divide it three entirely separate compartments, usually apart towards the base; that of chamaeiris narrows no more abruptly at the apex than at the base

and is divided into three compartments in orthodox fashion.

I. chamaeiris is only found in Southern France and Northern Italy, but, because local conditions influence its growth and stature, it has been given a number of specific names. The actual size of an iris is of little importance; it is the relative size of the tube and stem that matters. Thus I remember finding on Majour two yellow irises. That which grew among bushes near the base was quite a foot or more in height description of the lutescens. unfortunately for the author of that name, it was really the same species—namely chamaeiris—as the small plant 2 inches or 3 inches in height that was growing on the open rock higher up the hill, for the two plants flowered side by side in my garden here the next year and were identical in every way. I. chamaeiris is just as variable in its many colour forms as I. pumila, for it can be obtained in endless shades of purple and yellow, and there are also white forms. Moreover, as with I. pumila, in some localities one colour seems to prevail, but in others many forms grow together. Thus on Mont Coudon, which towers above Toulon, all the plants seem to have yellow flowers, but at Roquehaute, near Beziers, many forms grow together. Those gardeners who delight in named varieties will find them in catalogues, but others will derive more pleasure from raising their own seedlings and picking out those forms which please them most. There is endless variety in height, colour and fragrance.

In south-eastern Europe there is another pair of species, corresponding to I. pumila and I. chamaeiris, namely, I. mellita and I. Reichenbachii, which differ from the western pair in having prominent, sharp keels to the spathes which enclose the buds. In I. pumila and I. chamaeiris these are rounded and shapeless; in I. mellita and I. Reichenbachii they are flattened and have a much more definite shape by reason of the rigid keel that runs along their outer edge.

I. mellita is stemless and has a long tube; I. Reichenbachii has a stem of 6 inches or 8 inches or less and a relatively short tube. Both have purple and yellow flowered forms, but the texture of the flowers is quite different from that of I. pumila and I. chamaeiris. I. mellita is chiefly found near

Philippopolis in Bulgaria and one form of it has rededged leaves and is sometimes grown under the name of rubro-marginata. I. Reichenbachii has many synonyms, for the purple form has been christened balkana, Athoa, macedonica and Straussii; while serbica, bosniaca and Skorpili are merely names of the yellow form. Both mellita and Reichenbachii are very desirable irises, but to do well they must have a good strong loam and plenty of lime.

Far away in Tibet there is another pair of dwarf bearded irises—tigridia and Potanini. The former has a short tube and finely pointed leaves and the latter a longer tube and curiously blunt or abruptly rounded leaves. Mr. Farrer encountered both species on his recent travels, but it remains to be seen whether he has succeeded in introducing them to our gardens. Of both there are yellow and purple forms, and it would be interesting to see both in our rock gardens.

Differing widely from the irises already described, and belonging perhaps rather to the Regelia section than to the Pogoniris proper, are the beautiful little I. flavissima or arenaria from Hungary and Siberia, I. Bloudowii from Siberia and I. mandschurica from the Far East. The first-named is the most common in our gardens, and sometimes flowers freely from its slender, running rhizomes. The flowers are of a brilliant yellow with golden beards.

In southern Italy and in Sicily—on the slopes of Mount Etna, for example—grow I. pseudopumila, which comes midway between I. pumila and I. chamaeiris, for it has the long tube of the former and the stem of the latter. It needs a warm, sunny corner if it is to succeed in our climate and its many colour forms would make it welcome if only it did not so frequently succumb to our winters.

Perhaps the rarest of the dwarf European irises is I. sub-biflora, which is only found on the rocks near the seashore in Portugal and probably also in a few localities in Southern Spain. It was first described by Clusius, when he found it growing near Coimbra in 1565, and I have one form of it that has grown here unprotected for eight or ten years, and which, though it does not always succeed in escaping late frosts,' which destroy the buds, sometimes produces a number

of magnificent flowers of a very deep blue-black colour, finer than that of any other known irises. Other forms are of a poor reddish-purple colour. Botanically, I. sub-biflora comes very near to I. pseudo-pumila, but the spathes are shorter, greener, more acute and more rigid. Both plants flower in April in England. Clusius tells us that his plant sometimes flowers again in the autumn, but it loses this desirable habit in our climate.

AUGUST IRISES.

(" The Garden "-September 28th, 1918.)

An iris garden in August is never gay with flowers; it consists almost entirely of foliage and ripening seed-pods. There are, however, one or two irises which always give me flowers in this month. At any rate they have done so now for several years, and I have no reason to suspect that they will ever fail me here, although it would be rash to expect that they would certainly behave in the same way in other gardens where the conditions were perhaps less genial.

any large collection of irises it frequently happens that here and there an odd flower spike appears in August or September. This year I have already seen flowers of the Balkan I. Reichenbachii and of the wild form of I. variegata, and I remember once having a number of spikes of flowers of Gracchus, a garden variegata, late in September. I. aphylla comes from the neighbourhood of Ermihalyfalva in Hungary. Plants of this form of aphylla flower regularly twice every year in May and again at the present time. They are remarkable for the vivid dark-purple coloration of the base of the leaves and also of the whole of the inflorescence when this first appears among the leaves. It is extraordinary to see these dark purple buds emerging from the green of the leaves, and, since in spring the buds come up almost with the leaves, the appearance of the plants in April is even remarkable.

When the plants flower the spathes are wholly of a red-purple colour which is also suffused over the upper part of its stem and of its branches. The flower is of a deep blue-purple with a bluish beard. The stem is much branched, and the main lateral branch starts very nearly at the ground line. This forking of the stem below its centre is characteristic of I. aphylla, of which there are numerous forms in Central Europe and even in the Caucasus. It is an extremely hardy plant and owes its name "leafless" to the fact that it loses its leaves entirely in the autumn and remains dormant underground until the spring.

The other iris that always flowers here from August until October resulted from a cross between two most uncongenial parents. It happened a good many years ago that I noticed in June a single flower-spike on a patch of purple chamaeiris. I. trojana was, I believe, the only bearded iris that then remained in flower. At any rate, I used its pollen to fertilise the flowers of chamaeiris. A few seeds formed, and one germinated. The plant developed into intermediate in its growth between that of chamaeiris with its simple unbranched stem 6 inches to 12 inches high, and that of trojana with its much-branched stem 3 feet or more in height. The hybrid grows about 20 inches or 24 inches high with two lateral branches arranged as in typical I. germanica, four or five flowers of dark blue-purple, and a beard of bluish hairs tipped with dull yellow. The flowers are neither very striking nor very large but the plants are valuable because they invariably give me two crops of spikes, in spring and in autumn.

It is curious that the flowers of these two autumn-flowering irises should be so very similar in size, shape and colour. As they stand before me they form a striking and very pleasing contrast to the yellow and salmon tones of the beautiful hybrids of Gladiolus primulinus.

AUTUMN-FLOWERING IRISES.

(" The Gardeners' Chronicle "-November 5th, 1910.)

Although a garden that is devoted mainly to irises can never be as gay in the autumn months as it may reasonably be expected to appear in May and June, there are, nevertheless, a fair number of irises that can almost certainly be depended upon to bloom in the months between August and Christmas. It is, therefore, not impossible to have some irises in bloom during every week in the whole year. To obtain this end, it may be necessary to buy each year newly-imported bulbs of I alata and I. Vartani but it is worth some sacrifice to have flowers in the open in the dark days of November and December.

The time at which these two species flower depends to some extent on the weather, but still more on the date at which the bulbs are put in the ground. Sound, well-ripened bulbs, planted early in August, should be in flower by the first week in October, and as I. alata generally produces several flowers in succession the display lasts some time if the weather is not too boisterous or severe.

Iris alata is a native of the western shores of the Mediterranean, being found in Spain, Morocco, Algeria, Sicily and Italy, and it appears to be largely cultivated in the last-named country for purposes. As in the case of the other members of the Juno group, its fleshy roots are easily broken off from the base of the bulbs and those bulbs to which few or no roots remain attached can hardly be expected to produce fine or numerous flowers. It seems to do best in a rich, well-drained, if somewhat heavy soil, in a warm corner which catches the winter sun. Its eastern relative, palaestina, from Mount Carmel and other parts of Palestine is very similar, but smaller, and the flowers are usually of a green or yellow colour, though forms have been found that resembled the deep blue of alata. For some reason it seems disinclined to flower much before Christmas, but early planting might overcome this difficulty.

The third bulbous iris that may be depended upon to flower before Christmas is I. Vartani, which is interesting as coming from the neighbourhood of Nazareth, and as being, therefore, the southernmost representative of the reticulata group. Its colour is apt to be a rather poor slaty blue, but it atones for this by giving out that most delicious scent of almonds when the sun shines for a moment upon it.

The difficulty of keeping these three bulbous irises from year to year lies in the fact that they expect to be able to develop their foliage immediately after flowering and then go slowly to rest and aestivate. Unfortunately with us their young leaves suffer sadly in the worst months of the year, and it can scarcely be a matter of astonishment that the bulbs are seldom sufficiently ripened to do well in the following year.

So much for the autumn-flowering bulbous species, and, if we had no others, September and October would be usually be blank. Fortunately, however, several non-bulbous species seem to bloom at this time inclined to think that this is the case not only in the warm, dry Surrey sand, but also in heavier and damper soils.

I. rubro-marginata, a variety of I. pumila, from the neighbourhood of Scutari, flowers here regularly in September and October in sunny nooks on the rockery, and, if anything, is more floriferous then than at its other flowering season in April. The peculiarity of this plant is that the crimson edge to the leaves and spathes is but slightly marked, if visible at all, except at the flowering season. This character is found again in the form of I. germanica from Kharput in Asia Minor, and in another, which was sent to me a year or two ago from Kashmir. In these, too, it is not persistent throughout the year and scarcely constitutes a sufficient difference to justify a specific name.

Another curiously local iris, namely, I. lacustris, which appears to be a form of cristata and only to be found on the shores of Lakes Huron and Michigan, also flowers regularly at this time, and with me, at any rate, more freely than in the spring. Its claim to specific rank is somewhat doubtful for it differs in no way from cristata, except in its diminutive size, and, moreover, it possesses in common with that iris a peculiarly characteristic seed, which does not occur in any other known species. Last year I obtained a few seeds of lacustris and a plant that I have already raised from

these bids fair to grow to larger dimensions than its parents.

There is one unique plant here, which, within the diameter of a little more than a foot, has now for the third year in succession produced at this season a sheaf of spikes about two feet in height. This year there are at least 15, and each stem bears four or five flowers. It is the solitary product of a cross between a stray flower of a form of I. chamaeiris which happened to appear late in June and I. trojana. The flowers of the hybrid are intermediate between those of the two parents, being of a rather dull blue-purple, with a blue beard. In stature, too, the hybrid is a compromise, and though compromises are never entirely satisfactory, this plant is, nevertheless, a very welcome addition to the iris garden at this time.

Another regular flowerer is a form of the ubiquitous I. Güldenstadtiana. The flowers are small, of the usual dingy yellow or pale purple, and the plant can hardly claim to be even of botanical interest, the euphemistic term beloved by the compilers of nurserymen's lists.

A prettier plant is a pearly-grey flowered hybrid of I. Alberti which was raised by Sir Michael Foster, of which he did not know the pollen parent. This plant is apt to flower at any time, and the blooms show clearly the influence of I. Alberti in the curious way in which the heavy veining at the base of the falls ends abruptly at the level of the end of the beard. This is always a marked characteristic of I. Alberti and persists in seedlings, even in two yellow forms of that species that appeared for the first time this year.

This ends the list of the irises which can be relied upon to produce flowers in autumn though many others are sometimes so good as to favour us at this time. Last year, I remember that the variegata Gracchus flowered most freely in October, and this year there are in flower now, I. Milesii and a hybrid of germanica crossed with benacensis, raised by a neighbour and affording one of the very few instances of hybrids of germanica raised in this country.

IRISES FROM OCTOBER TO AUGUST.

(" The Garden "-March 23d, 1907.)

It may be interesting to you to know that with the aid of a few hand-lights and a frame which has no front and open sides, and which, therefore, only keeps rain and a certain amount of frost off the plants growing in it, I have had a continuous display of iris bloom from the last week in October until now, and I do not anticipate any break until August.

Alata was the first to flower in October, and one plant is just opening its first bud to-day. This was closely followed by Vartani. Since the new year I have had stylosa, histrio, Danfordiae, histrioides, Krelagei, Rosenbachiana, Bakeriana, palaestina and various forms of persica all in flower one after the other and reticulata is now beginning to bloom.

I. palaestina seems to have been hardly treated in the articles in "The Garden" last autumn. A dozen plants have given me flowers for two months and the display is not over yet. They vary from a yellowish green to a colour that is almost pale blue or turquoise, and each plant sends up two or three flowers in succession. I. galatica is also showing its colour and most of the tall Junos are already in bud. I have them planted in the open frame already mentioned, and the fact that the frame has no front enables one to grow little things like Danfordiae full in the sun with shelter overhead in bad weather. It is grateful for this protection, and the flowers have lasted quite three weeks in perfection.

AN IRIS GARDEN IN WINTER.

(" The Gardeners' Chronicle "—March 22nd, 1913.)
There is not much that can be said in praise of the winter climate in Southern England, and yet the fact that it is unusually cold and mild by turns seems to induce plants from climates both colder and warmer than our own to behave as they would in their homes. If we had long periods of continuous frosts in winter, we should certainly be unable to grow many irises from the warmer regions, as, for instances, the Californian species, which Dr. Britton tells me he is unable to grow in New York, while, if frost were almost unknown, the species from the colder regions would be unable to rest in winter and would exhaust their energies in constant leaf growth. This happens in the Azores where many irises remain flowerless even if they manage to exist.

Observation of the behaviour of plants of many species of iris seems to show that the climate-character—if such an expression may be coined—of each species remains constant here. It shows, further, that there are certain laws governing their behaviour which may be used to determine to a certain extent the habitats of plants of unknown origin. These laws cannot, of course, give us positive proof that the plant in question comes from a particular country, but they do seem to enable us to eliminate the countries from which it cannot come.

There appear to be four main types of climate-character among irises—the alpine, the mild-winter, the hard-winter and the Central Asiatic.

alpine class includes those irises whose flowers develop as soon as or almost as soon as, the leaves, and whose leaf-growth is of comparatively short duration. This class is confined to the bulbous species of the Reticulata and Juno groups and it is interesting to notice that of both these groups odd species seem to have strayed away from the natural habitat and to have become weak and effeminate under the influence of the enervating climate of the lower levels. reticulata itself from the Caucasus is perfectly hardy here and so is I. histrioides from the mountains near Amasia. Both of these increase rapidly by seeds and offsets in suitable soil, provided always that they escape fungoid attacks. I. histrio, however,

southern Asia Minor and I. Vartani, which may be looked upon as the southernmost form of histrio, coming as it does from the neighbourhood of Nazareth and Jerusalem, are much less hardy, and tend to lose their alpine character by developing their leaves before the flowers appear. Of the Juno group the effeminate stragglers are I. sindjarensis and some of the small persica forms such as I. issica. Sindjarensis comes from the low hills in Mesopotamia and shows debility in that after flowering the plant has seldom sufficient strength to form a bulb of flowering size for the following year. It splits up into several small bulbs which take several years to reach flowering size. I. bucharica on the contrary is a hardy mountaineer from Bokhara and each flowering bulb leaves two or three full-grown descendants to replace it next year.

A noticeable feature of these alpine species of iris is that the flowers are able to resist hard frosts. Fragile as they may appear, the flowers of the galatica form of I. persica and of the white form of I. orchioides have recently passed unharmed through several very sharp frosts. This resistance to cold is doubtless a character acquired in their alpine homes, where night frosts must be common at flowering time.

Those species of iris which show either the mildwinter or the cold-winter character are by far the most numerous. Species from regions which have a mild, moist winter begin to grow in autumn and have foliage of some length in winter, while those from more rigorous climates lose their leaves entirely in autumn and lie dormant until the spring. Some of the latter by developing their flowers rapidly-e.g., I. pumilawould seem to approach the alpine section but they differ in that their foliage develops slowly throughout pumila is, in whole summer. Ι. characteristic cold-winter iris, and may be contrasted with I. chamaeiris, which has leaves of some length in winter, and of which, imported plants are often killed here by sharp frosts though seedlings tend to become acclimatised and to gain in hardiness.

Other similar pairs of species are I. aphylla from Bohemia and Hungary, which is leafless in winter and quite hardy, and I. sub-biflora, from the Portuguese coast and southern Spain, which is evergreen and tender, I. variegata, from Hungary and the Balkans,

and I. germanica, of whose habitat it can only be said that it cannot be Germany, because the foliage grows in the autumn and because the flowers are only too liable to be nipped in the bud in March or early April. I. germanica is probably a native of the Mediterranean coast which has gradually spread by human agency. If we accept the theory which is here put forward, we shall not hesitate to say that the forms of I. germanica, which are now common in Srinagar and in Khatmandu, must have been introduced from the west, for their climate-characters are those of mild-winter irises, and entirely unlike those of the undoubted Himalayan species, which behave like those of the Central Asiatic section.

Among the Apogon Irises there are many examples of both mild-winter and cold-winter characters. Thus I. longipetala, I. Douglasiana, I. Purdyi, and other species from the Californian coastal region while I. missouriensis, from evergreen here, mountainous region in which the Missouri rises, is practically only a form of I. longipetala, which behaves as a cold-winter plant. The flowers of the two species are almost indistinguishable.

The difficult question of the various forms of I. spuria and I. halophila has some light thrown upon it when we examine the plants in winter. From Hyères, Vendée and Hérault, come slightly varying forms of I. spuria, but all agree in having leaves of some length in winter, as have also the ochroleuca group from western Asia Minor.

I. halophila, however, from Central Asia, loses its leaves entirely, and in winter only shows a few short, sturdy leaf tips, which look capable of standing any degree of cold. In view of this fact, I am inclined to believe that plants that are now common in Kashmir, I. aurea and a beautiful blue form of I. spuria, closely resembling, if not identical with, Foster's Monspur forms, are really introductions from Western Asia and not indigenous to their present habitats. All cold-winter irises. Sibirica group are but instructive to notice the different behaviour in winter of I. fulva and I. hexagona, from the swampy ground near New Orleans, and of I. foliosa (La Mance's form of I. hexagona) from the Osark Mountains in Arkansas. The latter reserves its energies for the spring in summer, and then flowers readily, while the two former battle with our winters, often get the worst of the contest, and remain flowerless in summer.

Typical Central Asiatic irises are not common in our gardens. I. halophila, which has been contrasted already with I. spuria, is an approach to the type, but the flowers develop at a much later stage of the growth of the plant than do those of characteristic examples. such species, however, as I. kumaonensis, I. and I. nepalensis, growth commences Hookeriana about the time when, in their homes, the plants would begin to feel the influence of the warm and moist south-west monsoon. The flowers develop rapidly and are over before the leaves have attained to any considerable size. I. ensata ought to behave in a similar way, but for some reason or other it usually wakes up too early in the year in our mild winters. In its native home in Central Asia the flowers appear while the leaves are still quite short, as many herbarium specimens prove, but here a spell of mild weather in January or February induces it to send up growths which are checked or even destroyed by late frost. Flowers are therefore seldom numerous here except in sheltered positions, but in Asia when once the change from winter comes, frost is probably unknown, and the flowers are accordingly numerous.

As might be expected the alpine and the cold-winter irises are those which do best with us. The mild-winter species will always be disappointing, and our loss must be great, for these latter include all the larger Oncocyclus irises, and also some of the finest Pogonirises, such as I. cypriana and I. Ricardi (mesopotamica). Of these latter some magnificent hybrids have been raised by using the pollen of the best of the so-called German irises. They were produced in the south of France, and are extremely large and handsome, but, unfortunately, experience of their behaviour during the last two or three years seems to show that they have the inherent weakness, in our climate, of typical mild-winter irises.

SOME GARDEN IRISES.

(LECTURE.)
(Journal of the Royal Horticultural Society —
November, 1914.)

It would obviously be impossible in the short time at our disposal to give anything approaching an adequate account of all the irises that our gardens now contain. I propose, therefore, to deal primarily with certain groups of irises among which confusion seems to prevail, and as we pass from one group to another to bring to your notice some of those irises which are still rare in cultivation, either by reason of their recent introduction, or from what appears to me to be unaccountable neglect. It may be that I have quite unreasonable prejudice in their favour. I probably have.

The first irises, then, to which I propose to draw your attention are the three which appeared in this Society's list of plants for distribution at the beginning of this year. They serve to illustrate the fact that gardeners have—and indeed must have—tenacious memories for names, though the mental processes by which the names have become attached to the plants will not always bear logical analysis.

The first of the three names on this list is that of Iris germanica. It may be a paradox, but the only two facts on which I feel justified in insisting with regard to this iris are, firstly that it is not a native of Germany, and secondly that of the vast series of plants which we find under this heading in catalogues and garden lists only a very small proportion have anything whatever to do with Linnaeus' species I. germanica.

Of all the twenty or thirty irises known to Linnaeus this is perhaps the most difficult to identify. If we had only his short Latin diagnosis, we should be utterly unable to decide to which of the number of plants he gave the name. Fortunately he quotes his authorities, and by inquiring into the sources of his information, as well as by the process of eliminating those species of which his descriptions are more definite and adequate, it is possible to arrive at a definition of I. germanica. This can be checked by

comparison with the dried specimen which is still preserved in his herbarium at the Linnean Society here in London. Of colour there is of course no longer any trace, and since such words as purple, lavender, lilac and violet convey such different impressions to different individuals we cannot be certain which of several colour-forms Linnaeus had in mind.

may, however, define I. germanica rhizomatous bearded species, with a branching stem, which in its typical form seems to produce four flowers, though a fifth may often develop immediately below the terminal head of two flowers. Apart from the inflorescence, the characteristic features seem to be the spathe-valves, which are half scarious at flowering time, the presence, usual, but not invariable, scattered hairs at the base of the standards on the inner side, the sharply three-sided capsule, the oval or pear-shaped and not compressed seeds, and the length of the perianth-tube, which measures about an inch. Lastly, and this is a feature to which I would specially draw your attention, this iris is evergreen practically so. It does not wait until after the turn of the year before pushing up its new growths. These develop rapidly during the autumn rains, and in midwinter I. germanica is at once noticeable among its relatives in any collection of irises.

It is precisely this characteristic habit of leaf-growth that shows us that the plant cannot be a native of Germany, or indeed of any part of Central Europe. If you search in winter for I. aphylla (forgetting for the moment that its very name means leafless) or for I. sibirica, graminea, pumila or variegata, all of which are undoubtedly natives of Central Europe, you will have some difficulty in seeing even the merest tips of the leaves above the surface of the soil. All are adapted to resist the rigours of the Continental winters, and have learnt to restrain their energies in the direction of leaf-production until the worst of the weather is over and spring is at hand.

Here it may be well to digress for a moment to notice the confusion in our gardens between I. pumila and I. chamaeiris. The former is comparatively rare, but may be known at once by being leafless in winter, by the almost complete absence of stem, and by the long perianth tube. It is a native of Austria and

Hungary, and stretches round the north side of the Black Sea to the Caucasus, all districts with rigorous winters. I. chamaeiris, on the other hand, starts into growth just as does I. graminea in autumn, and it is no surprise to find that it is confined to the south of France and to Northern Italy, where the winters are comparatively mild. It should be readily distinguished from I. pumila by its habit of growth, by its stem and by its relatively short tube. We may notice, too, that the only known iris from Arabia, namely, I. Madonna, and its albino form, I. albicans, both retain their leaves in winter, just as does I. germanica.

compare the growth and habits germanica with those of the species already mentioned, we shall be forced to the conclusion that I. germanica is a native of Southern Europe, or of some part of the Mediterranean basin. The question of its origin is indeed complicated by the fact that the form which we know as atropurpurea or " Purple King " was described as I. nepalensis by Wallich and is in cultivation in Nepal, while the well-known variety "Kharput" which Foster received from the town of that name in Asia Minor, has long been naturalised near Srinagar in Kashmir. It also, curiously enough, decorates the Guards' Monument at Sebastopol, and only last year I found that it is the common form of I. germanica at Mostar in Herzegovina. That I. germanica could have an Indian origin would seem to be very improbable, since such undoubtedly native species as the real I. nepalensis of Don and I. kumaonensis lie entirely dormant for several months in winter, and even until late in spring, as indeed the climatic conditions would lead us to expect.

A consequence of this southern origin of I. germanica is that it is not absolutely hardy here in England. Complaints that "Purple King "flowers but shyly are often due to the fact that the late spring frosts destroy the embryo inflorescences before they have emerged from the leaves. The brown decaying remains can often be found by dissection enclosed in the tufts of leaves although it is but poor consolation to have our theory of the origin of the plant confirmed in this negative fashion.

Still more important for our purpose is the further consequence that it is extremely rare that any form of I. germanica ripens sound seed in England, or, indeed,

as far as I can gather, in Germany or even in the south of France. I. aphylla, I. variegata and I. pallida on the other hand, all mature seeds readily, and this fact, together with the results of raising a number of seedlings from them, confirms me in the belief that our common garden hybrids are to be traced, not to I. germanica, but rather to I. variegata, from which they certainly derive their yellow tints, and to I. pallida, with its more complicated inflorescence.

We may notice in passing that the names "squalens" and "sambucina" in all probability only denote two of the almost innumerable hybrids of I. variegata and I. pallida and have themselves no specific value, although the name squalens may serve as a useful label to denote those plants in which the yellow of variegata and the blue-purple of the other parent struggle for the mastery and produce shades of colour which may well be called muddy or squalid.

Since these notes were written on a winter evening, when time was a little less scarce than it is at this time of the year, the flowering of some plants which I found last year on the Dalmatian coast has afforded striking confirmation of this theory of the origin of our garden hybrids misnamed German irises.

A few years ago there was discovered on the top of a mountain some 4,000 feet high in the Velebit range in Croatia, within a mile or two of the coast as the crow flies, an iris which I did not recognise when Dr. Degen, of Budapest, was so good as to send me dried specimens. It appeared to be either a yellow form of I. aphylla or some new species. By the kindness of the late Herr Dobiasch of Zengg, who provided me with a native guide and to whose memory I wish to take this opportunity of paying tribute, I was able in April, 1913, to see this iris in its native home. It was a stiff climb up from the coast over the roughest and steepest of limestone hills. As I had been travelling all night by somewhat primitive means of conveyance, and as it was pouring with rain, I was beginning to wonder as we the top whether it was worth while persevere, when I was cheered by the sight of a few iris leaves among the rough limestone of the slope that faced the Adriatic and the island of Pago. My guide urged that it was not worth while to stop to collect any of these plants, as we were close to the cup-shaped hollow near the summit where the iris of which I was in search was known to grow. However, I dug up a few of them, and am now very glad that I stopped to do so, for they have turned out to be a small pallida of the same description as those which were first described as I. illyrica, to which the well-known I. Cengialti is closely allied, if indeed, as I am inclined to think, the one is not merely a local form of the other.

On reaching the hollow for which I was bound, I was rewarded by the sight of flowers on all sides; patches of Gentiana tergestina, which is closely allied to G. verna, a yellow primula, crocuses of a species which has not yet been determined, varying in all shades of colour from white to purple, and coming up through the gentians and among the crocuses, the short immature leaves of an iris. The soil was a black, almost peaty vegetable mould, very different from the scanty but strong reddish soil, familiar to all those who have dug plants out of the limestone hills of Southern Europe. Snow was still lying in patches, and no signs of flower stems had yet developed on the irises. However, I brought home a number of plants for my garden, and for that of a friend for whom I was also collecting. In May of this year they have flowered freely.

These plants from the hollow at the top comprise at least two irises, namely, I. variegata, with pure light yellow standards and red-brown veins on the falls, and another which is obviously a natural hybrid between I. variegata and the I. illyrica which has just been mentioned as growing in the immediate vicinity. The latter, being a pallida, has spathe-like valves that are wholly dry and scarious at flowering time; those of I. variegata are entirely green, while those of the hybrid are green at the base and scarious in the upper part. The latter is identical with those numerous hybrids which have long been common in gardens under the names of squalens and sambucina.

Of the newer hybrids I cannot too strongly recommend as good border irises "Iriskönig," the best of the variegatae, "Oriflamme" which is nearly a pure germanica and an improvement on macrantha, "Black Prince" which is specially valuable for its deep velvety flowers and for its late-flowering habit, and "Isoline," of which I suspect one parent to have been I. trojana.

To those who wish to raise hybrids I would specially recommend the latter, for it has already given me one seedling which produced a spike containing no less than fifteen flowers.

Other pleasing hybrids may easily be raised by crossing pallida with pollen of I. Cengialti and of its variety "Loppio." The resultant plants mostly give us the clear shades of purple with the habit of a smallish pallida, not infrequently with the addition of a deep golden beard, which sets off a strikingly handsome flower.

We will now pass on to the second iris on the list, which appears as I. laevigata, syn. I. Kaempferi. These two names have long been in horticultural use, but their association only serves to perpetuate an obvious confusion. One would have thought that even the most rapid consideration of the common Japanese Irises would have driven us to question the suitability of the name laevigata, which means "smoothed." Their leaves are rough, with a prominent central rib, the seeds are wrinkled, the petals crimped, and indeed it is hard to see what feature could possibly have suggested the name.

Like several other plants which we associate with Japan, such as I. japonica, which comes from the hills near Ichang in Central China, I, Kaempferi is a native of China and grows wild in the marshes along the Amur. In its natural state it appears to be always single, and there is no accepted explanation of the means by which the Japanese have evolved from it the long series of double, distorted and even bloated hybrids with which the student of Japanese art has long been familiar. In the natural state the colour is a deep red-purple though albino forms most undoubtedly occur. In the famous ditch which runs through the lower corner of the Wisley garden, I. Kaempferi has now been growing for many years since Wilson first planted there importations from Japan. Innumerable seedlings must have grown up there in the course of time, and it is interesting to notice that the self-sown reversions to the single wild form of a uniform redpurple or white now far outnumber all the other forms to be found scattered among them.

I. laevigata is also a native of the Amur marshes

and may easily be distinguished by its foliage, which is smooth and has no prominent central rib, and by its large smooth polished seeds, which closely resemble those of our native yellow water iris, I. pseudacorus. The colour is purple, usually of a blue, but sometimes of a red shade, with a narrow central streak of yellowish white. Good forms of this species are, I think, undoubtedly among the finest blue irises that we possess.

Curiously enough, this iris also first reached us from Japan in the form of a quasi-albino variety, which came to Kew mixed with I. Kaempferi, and which was by Mr. Baker and described albopurpurea. We must accordingly reduce this name to I. laevigata var. albopurpurea, and try to realise that the two names laevigata and Kaempferi represent two totally different species. Among collected material now preserved in herbaria, I have found no evidence that natural hybrids of these two species occur, and efforts to cross them in the garden have so far proved futile, though I should be the last to attach any great such purely negative evidence. conditions that determine the fertility of an iris little is known, and after succeeding quite unexpectedly in crossing a bearded Pogoniris with a crested Evansia, although many previous efforts had always resulted in failure, I am inclined to think that it may not be impossible to cross any two members of the genus.

In this connection, may I suggest to the hybridiser the interest that would attach to a hybrid between a bulbous and a non-bulbous species? Unless outward appearances are very deceptive, I am inclined to think that the point of contact, and consequently the greatest hope of success, lies in the neighbourhood of I. xiphium, and I. spuria. The flowers of these two species are curiously similar in shape, and we must also remember that the former sometimes, though rarely, produces one or two vertical lateral branches in the axils of the leaves precisely similar to those that we find in I. spuria. They are also still to be found growing wild in the same region, for they both occur in Spain and in North-west Africa. Moreover, I. xiphium has been recently rediscovered on the French coast, between Marseilles and the Spanish frontier, where I. spuria is also not unknown.

If repeated attempts are made to cross these two species, sooner or later one may succeed, and the interest will then be to see what kind of rootstock the plant will form. The resultant plant might perhaps throw some light on the question whether the bulb arose from the rhizome or the rhizome from the bulb, or whether both have been evolved from a common ancestor.

We must now pass on to the third name on our list, namely, I. sibirica orientalis, which may perhaps have been intentionally compounded to describe a hybrid between two species, for I. sibirica and I. orientalis are totally distinct. The former is, I believe, confined to Europe east of the Urals, between which and Lake Baikal there occurs a gap before I. orientalis begins in North-eastern Asia. I must admit in passing that there is apparently in Corea a puzzling plant which seems in some dried specimens to be merely I. orientalis, but which in other cases comes very near to being a dwarf, large flowered sibirica. I live in hopes of eventually obtaining seed of wild plants of this Corean iris, for I have always had some doubt about authenticity of reputed specimens from Corea which I have grown from time to time. I. sibirica and I. orientalis are totally distinct in habit, and, what is even more important, have entirely dissimilar seeds and seed-vessels. Both have hollow stems, and narrow, almost grassy, foliage. Here, however, the likeness ends, for the spathes of sibirica are entirely scarious while those of orientalis are wholly herbaceous. The capsule of sibirica is broad, rounded and inflated, and the seeds large and flattened, while in the case of I. orientalis the capsule is much narrower relatively to its length and the seeds are much smaller, with a tendency to be cubical.

Of both species albinos are common, and the well-known and beautiful "Snow Queen " is a typical albino form of I. orientalis. It breeds true to the white colour, which acts as a Mendelian recessive.

The rehabilitation of Thunberg's I. orientalis as a good species is fortunately rendered possible by the evident confusion that underlies Miller's iris of that name. The latter is said to be bearded, and yet the figure is that of some member of the spuria group. In view of this confusion in the original description, we

are able to keep Thunberg's name of I. orientalis for the relative of I. sibirica, and also to restore to a wellknown and stately garden plant, the appropriate name of ochroleuca.

Both I. sibirica and I. orientalis have great possibilities for the raiser of seedlings. Some of these are more floriferous and vigorous than others, and the shade of blue in the flowers is also apt to vary. The finest sky-blue shades may be obtained by crossing I. orientalis with its albino forms, while the stature and habit of I. sibirica may be combined by hybridisation with the larger flowers of I. orientalis.

With the recent introduction of two yellow-flowered relatives from Western China, I. Wilsoni and I. Forrestii, the possibilities are still further increased, and I have already obtained some very pleasing results, in one of which the yellow of I. Wilsoni is distinctly visible at the base of all the segments of a pale blue flower.

It is impossible to pass from the sibirica group without mentioning what is perhaps the finest plant of all, namely, chrysographes, to my mind one of the best of many beautiful Chinese plants we owe to Mr. E. H. Wilson. In its best forms it is really magnificent, and I shall never forget the experience of watching the first flower unfold, and of seeing for the first time the brilliant golden markings on the rich velvety deep purple-violet falls.

Before I conclude these notes, may I venture to put before you a point which I had hoped to be able to illustrate to you more fully from living specimens. It concerns a confusion which has arisen around the name of I. filifolia. The true plant is still rare, though I hope that several hundred seedlings which I have raised will soon have all reached flowering size. The plant is found in North-west Africa and in Southern Spain, and I considered myself very lucky when I obtained a few bulbs and some seeds through the kindness of a friend at Gibraltar, who, owing to his official position, was able to obtain them for me from a station near the top of the rock, where it grows almost a part to inaccessible in which visitors are admitted. The colour is a rich red-purple with a central yellow blotch, round which the juxtaposition of the purple and yellow produces a kind of bluish halo. What I particularly want to point out is that a large and early form of I. xiphium which the trade dealers have put in their lists for years as I. filifolia has nothing whatever to do with that species. The difference is at once apparent in the long slender perianth-tube of I. filifolia, the false plant having only the short funnel-shaped tube of I. xiphium.

Those with whom Spanish Irises succeed cannot do better than obtain a supply of the pseudo-filifolia, which might be more appropriately known as I. xiphium var. praecox, from its early-flowering habit, and cross the flowers with pollen of the best of the older Spanish Irises from which early blooms have been obtained under glass. The result will be a series of large-flowered forms, similar to, and I believe, identical with those which have been introduced under the name of Dutch Irises during the last few years.

Those whose gardens are sufficiently warm and sheltered to be able to flower I. tingitana might use this to obtain an even finer series, for the few known hybrids of this magnificent iris with I. xiphium have the size and brilliance of I. tingitana and almost the hardiness of the other parent. It is interesting to note, too, that the long perianth-tube of I. tingitana is dominant nor neither recessive. in Mendelian phraseology, for the resultant hybrids have a short linear tube, and so stand half way in this respect between I. tingitana and I. xiphium. At the same time the flowers closely resemble those of I. tingitana, while the plants are as early as that species, hardier and more floriferous.

In conclusion may I ask your pardon for leading you into much dry detail. My only excuse is that to me, at any rate, my flowers have become the more interesting the more closely I have examined them and the more searching the inquiry I have tried to make into their origin and history.

GARDEN IRISES.

(" Country Life "-July 4th, 1914.)

The Iris family contains so many and such varied members that there can be no English garden in which some may not be grown with success. With a little trouble indeed, it is possible to grow more or less, well, nearly every member of the genus that can be obtained, though in any particular case it doubtless be necessary to make up special beds for some of them, to cover others with lights to keep them dry after flowering or to provide others again with moisture at the roots by some sort of subterranean irrigation. These notes will aim at showing which groups of irises are best suited for gardens different soils, and it is hoped that those who desire to grow representatives of the whole genus may find in them some hints which may help them to provide for their various needs.

We will begin by dividing the genus into those species whose root-stock is a bulb and those which form the well-known creeping stems or rhizomes. With the single exception of Iris xiphioides, which comes from Pyrenean pastures where moisture is abundant, bulbous irises prefer a dry, warm soil. consequently, on cold, moist ground, the only hope of continued success with them is to lift the bulbs annually when the foliage dies away, store them in sand or dry husks until September or October and then replant them in well worked soil where the drainage is as good as possible. I. xiphioides is often known as the English Iris, not because it is a native of this country, but because several centuries ago, when Bristol was an important harbour for ships trading to Spain France, bulbs of this species reached that town and were sent from its neighbourhood to the Continent. In the wild state the colour is usually a deep violet-blue, but in cultivation all shades of colour from this to white, through mauve and pearl grey, have been obtained. There is a central yellow line of the falls, but no wholly yellow form of I. xiphioides is known to occur. This is found, however, in I. xiphium, the Spanish Iris, of which both yellow and purple forms occur in the wild state, while under cultivation every combination o f the colours two obtainable. Those who are attracted by the rarer and more difficult plants may try in a warm corner, I. tingitana, a glorified early "Spanish "Iris from Tangiers; the bearded I. Boissieri from the Gerez Mountains in Portugal and the golden I. juncea from Tunis and Algeria.

Among other bulbous irises, the Juno group is not nearly as well known as it deserves to be. It is true that some of its members such as I. persica or the Afghan I. Fosteriana with its yellow falls and drooping purple " standards " are difficult plants to manage, but it would be hard to find a better garden plant for any well drained soil than the April-flowering I. buchartca. Like many Bokhara plants, such as Ixiolirion Fritillaria pallidiflora, I. bucharica has the good sense to remain underground until the worst of the winter is and is therefore far less tender than Mesopotamian I. sindjarensis, which, when it flowered once needs several seasons build to flowering bulbs from the remaining offsets. The growth of I. bucharica reminds one of a young plant of maize, and each stem produces from five to nine flowers in succession from the axils of the leaves. The colour is white and clear yellow, and the successive flowers make the plants decorative for at least a month. The special virtue of the plant seems to be that it increases very freely from offsets, which are almost invariably of sufficient strength to flower the next year. Closely allied to I. bucharica are I. orchioides, with flowers of deep golden yellow, and having an albino as well as a pale blue form, coerulea, which is probably a hybrid, and I. warleyensis, with small but very richly-coloured flowers of deep violet with a yellow blotch.

A small group of bulbous irises, which should be represented in every garden, is known to most in the form of I. reticulata, from the Caucasus. Allied to this there are other species in Asia Minor, Syria, and Mesopotamia, all of which give great Pleasure in the early days of the year, either in sunny corners in a rock garden, or in the shelter of an airy frame, where the bulbs can be kept dry when the flowering season is over. The smallest of them is I. Danfordiae, which is also distinguished by its yellow colour and by the fact that its standards have dwindled to mere bristles, while the largest and one of the most beautiful is I. histrioides, from the neighbourhood of Amas or Amasia in northern Asia Minor. This group has one great enemy—a fungoid disease, of which the first signs are

inky blotches on the bulbs. The remedy is an annual lifting of the bulbs, which, when they have become thoroughly dry, should be soaked for two hours in a solution of formalin of the strength of one part to three hundred of water. The bulbs may then be replanted, for they only deteriorate when kept out of the ground for any long time.

Passing now to the rhizomatous species, we shall find that, as a general rule, the Pogoniris, or bearded kinds, do best in a heavy soil containing lime, while the Apogons or beardless kinds dislike lime and prefer a loose soil rich in humus. The chief exception to this rule is, perhaps, the spuria group, to which belong such stately border irises as I. ochroleuca, white and yellow and I. aurea which, in its various forms, stretches from Spain and Algeria along the shores of the Mediterranean, and then by way of the Caucasus and Persia right away to Kashmir. Related to these is the little-known I. graminea, whose flowers have the scent of a ripe greengage on a warm wall. This group does best in a rich heavy loam, and is always more vigorous in a stiff than a light soil.

While it is undoubtedly true that the bearded species of iris do best in a heavy soil, it must not be forgotten that they all come from regions where the summers are both hotter and drier than the average English summer. This suggests a period of drought in summer, and we must therefore do our best to obtain this for them, either by planting them on sunny slopes, or, if our gardens are level, by throwing up banks or mounds where the drainage will be good, and on which consequently luxuriate. irises will remember the various visitors to my irises who have singled out for praise plants which were mentally marked out for the bonfire as soon as the flowers should be over, I hesitate to draw up any list of desirable varieties of bearded irises. Perhaps, however, I may mention some of my own favourites, and trust that some at least of them will find favour with others.

Any form of the true I. pumila is desirable, but it is a rare plant. It is extremely variable in colour, and is known at once by the entire absence of stem and by the long perianth tube. It flowers in April, and in heavy, well-drained soil flowers so abundantly that the blooms entirely hide the leaves. Its name appears in

many catalogues, but the plant supplied in its place is usually I. chamaeiris, from the south of France and North Italy. This produces a stem of varying length from two to six inches and is an admirable plant for an edging to borders. The range of colours is large and as the names vary in different gardens, we must either select the colour that appeals to us regardless of the name, or, better still, beg seeds from a friend and make our choice from the resulting plants.

little later than these comes I. aphylla, a Central European species, characterised by the entire loss of its leaves in winter and by the branching stem which forks below the middle, often at the very ground line. The flowers are of varying shades of purple, and there is a very sweet-scented form which has flowers of a curious grey shade irregularly mottled with purple. Of the various varieties of the true I. germanica, the best of the blue-purples are the common so-called type English gardens, Fontarabie, macrantha, and, for the late-flowering form, recently-introduced plant from Askabad. Red-purple is best represented by the dwarf Kochii and the tall Kharput, which by some unknown means has run wild in Kashmir.

Of early yellows, the best are I. imbricata, from the Caucasus, and a yellow form of I. Alberti, which is a Turkestan plant. These, however, are still rare, and their place is usually taken by the somewhat later flowering I. flavescens, which is, almost certainly, not a species at all, but a garden hybrid of I. variegata, a Central European and Balkan plant with yellow standards and purple-veined falls, which is one of the most common parents of many of our ordinary bearded irises. The other ancestor of these latter was probably I. pallida, and on the whole I am inclined to prefer the of the various forms of this self-coloured flower species to the parti-coloured hybrids which have resulted from its union with I. variegata. An albino pallida exists, but it is rare, though forms in which the flowers are white with pale purplish veins round the edges of the segments are fairly numerous. The best known is perhaps Mme. Chereau, but the newer Jeanne d'Arc is, to my mind, far more pleasing. Other good hybrids are Prosper Laugier, deep fawn and rich redpurple, Edouard Michel, a self-coloured purple, Black Prince, with very rich velvety flowers, Caterina, a pale

lavender blue, and Oriflamme, which is an improvement on the well-known macrantha form of I. germanica.

Of white bearded irises there are several, for each variety of I. germanica seems to have its albino form. One of the best known is florentina, of which the purple counterpart is used together with I. pallida to make orris-root in the neigh-bourhood of Florence. But there are several others that are even better. The best I found near the roadside between Matuglie and Monte Maggiore in the neighbourhood of Fiume. Of an even purer white than any of these albino germanicas is the white form of the Arabian I. Madonna, which is known in our gardens as albicans, and which owes its almost universal distribution in the south of Europe to the fact that the Mahommedans have taken it everywhere with them and used it as an ornament in their graveyards.

Of tall, late, purple-flowered, bearded species there are three or four known as trojana, cypriana, mesopotamica and junonia of which the types are still rare in our gardens, and of which hybrids with the older varieties give promise of new races bearing tall stems with many huge flowers.

The Oncocylus and Regelia group are all bearded irises, but they are plants for the expert and the enthusiast. They need all the warmth and sun we can give them, and must have drought after the flowers have faded. They must therefore be lifted and stored under cover until autumn, or covered with glass and thus kept dry artificially. Hybrids between the two groups, known as Regelio-cyclus irises, are now obtainable and are perhaps easier to manage than their parents.

The Apogons or beardless irises are the mainstay of those who garden in a sandy soil, and the addition of leaf soil or old, well-rotted manure will be rewarded by finer and more numerous flowers. In dry localities it may be advisable to lay underground perforated drain-pipes, so that the sub-soil can be kept moist under the dusty surface, but this is only necessary for the sibirica group and for those species in whose leaves, when held against the light, we see numerous minute dots. These dots can be seen, for instance, in

the English river iris, I. pseudacorus and are found also in such plants as I. setosa (Hookeri) from Siberia and North America. I. versicolor, the United States purple counterpart of I. pseudacorus, and the curious terra-cotta coloured I. fulva from the South-eastern States. I. foliosa is a near neighbour of this latter, and it is well worth growing for its large purple flowers, even though it tends to hide them among its abundant leaves.

sibirica with its narrow grassy leaves, hollow stems, and small blue or white flowers, is well known and so also is its Eastern relative, I. orientalis, of which one albino form has almost become equally well known under the name of Snow Queen. Less well known, however, are two yellow-flowered relatives, I. and I. Wilsoni, recently discovered in Forrestii Western China by the two collectors after whom they are named and to whom we owe so many fine additions to our gardens. Even more striking, perhaps, is another new Chinese species, I. chrysographes, of the deepest uniform violet-purple, relieved by a few gold veins at the throat. All these new species will hybridise with another and with I. sibirica. and some charming results have already been obtained. sibirica and its relatives do well in rich border soil, and even better in positions where their roots can get down to the water level of streams or ponds. The Japanese I. Kaempferi has many gaudy double forms, but they are capricious, and often will not flower unless they have been fed lavishly by top-dressing and liquid manure during the winter months, and unless they can send their root fibres down into the water during the summer. The wild species, however, and its albino form are much less exacting, and regularly and abundantly when the Japanese hybrids remain flowerless. With it may be grown the gorgeous blue I. laevigata, which has also an albino form, and others in which the white ground is mottled with blue (albo-purpurea). This species is distinguished from I. Kaempferi by the fact that its leaves are smooth and have no prominent midrib as have those Kaempferi, and by its smooth polished seeds, which seem to indicate a relationship with our native I. pseudacorus.

A little-known but very beautiful group of irises comes from California and consists of I. macrosiphon,

I. tenax, I. bracteata, I. Purdyi, I. Douglasiana and I. Watsoniana. The colour of the flowers is remarkably variable—so much so that no two seedlings are exactly alike. In a warm sandy soil the plants grow rapidly and are extraordinarily floriferous. To do well, however, they must be raised from seeds and put out into their permanent positions as soon as they have made about four leaves. They grow to a height of about eighteen inches. In heavy soil where these species will not succeed they may to some extent be replaced by I. longipetala, from the sea coast of California, by its mountain form I. missouriensis and by I. montana, sometimes known as tolmeiana, which comes from the Rocky Mountains. The Asiatic I. ensata appears to be allied to them and will stand more drought than any other iris. Its root fibres are thick and numerous and descend to a great depth, and when one has tried to uproot a well-established plant of this species, it is not hard to realise why it is that this iris is one of the few green plants that can resist drought in many localities in Central Asia. The flowers are small but numerous, often of a delicate grey blue, which harmonises well with the grassy glaucous foliage.

are three golden rules which must by all who wish to observed cultivate successfully. The first is that they must be grown in with the exception of our native foetidissima and of the small group of crested irises, of which the small members, at any rate-I. cristata, I. lacustris and the daintiest of all, I. gracilipes—do best in half shade. The fine Chinese I. tectorum and its beautiful albino form do not seem to object to a position in which they are shaded by trees during part of the day, and I incline to think that the American I. verna, a beardless iris with the habit of a Pogoniris and the delightful scent of violets, must also have a similar position. The second rule is that irises should always be moved as they pass out of flower. They are then ready to make new roots, as the most superficial inspection will show, and have, when moved at this period, ample time to anchor themselves in the ground before the approach of winter. Lastly, irises must be planted shallow. The rhizomes of the bearded species especially should be on the surface of the soil, and not beneath it, for they seem to require the effect of the sun shining upon them if they are to produce their flower stems in the following year. The observation of these three rules goes far towards making iris cultivation a success, and their very simplicity ought to encourage some gardeners to embark on the more extended cultivation of the less common species of a genus which is very scantily represented in most gardens.

A DALMATIAN IRIS HUNT.

(" The Gardeners' Chronicle "—May 17th, 1913.)

The possibility of obtaining some light on the difficult problem of the various forms and varieties of Iris pallida, led me recently to undertake a journey down the Dalmatian coast, in spite of the warnings of various friends that war scares and mobilisation in Austrian territory might make travelling disagreeable. The term Dalmatian is convenient rather than correct, for my wanderings have not been confined to the province of Dalmatia, but have extended from Trieste and Fiume to Ragusa, and inland as far as Jablanica, on the road from Mostar in Herzegovina to Sarajevo in Bosnia.

After a warm spring day at Trieste in the middle of April, it was disappointing to have a rough passage in the teeth of a violent sirocco to Gravosa, the port of Ragusa, and to arrive there in cold, wet weather. However, I set out at once to search the hills behind Ragusa and Gravosa, for I had heard reports of a pale lavender iris on the rocks above Ragusa, and wondered whether I should find the fine plant that we all know as I. pallida dalmatica. As it happened, I did not go direct up the hill behind the town, but walked round the base to the north-east side of the ridge, where I could find nothing but Tulipa sylvestris, various orchids, and a dark striped fritillaria which I did not recognise. The nearest approach to an iris was Hermodactylus tuberosus, which is sometimes known as I. tuberosa. The flowers were over, but the curious drooping seed vessels and the characteristic foliage were recognisable.

Having crossed the ridge to the slopes behind Gravosa, I came into the neighbourhood of vineyards, and soon found several clumps of an Iris pallida which, to my surprise, was neither the supposed type nor the variety dalmatica, but closely resembled the forms which I have received from the neighbourhood of Riva and Roveredo, and also those produced by crossing the type with I. Cengialti.

The fact that irises only occurred on the slopes above the town led me to think that they might have escaped from cultivation, and I determined to explore further the next day. I therefore started out along the

slopes above the town towards the south, and finally climbed over the ridge to the east. Once more it appeared that irises only occurred on the western side near cultivated areas, and after several hours of wandering on the other side, it seemed that after all no large irises could be considered certainly wild in the neighbourhood of Ragusa.

One of the peculiarities of the limestone formation of this region is the way in which streams appear and disappear again below the surface. Of this phenomenon there is a good example in the Ombla, near which I then found myself. I therefore went down into the valley and across to the point where the river issues in two or three streams at the base of a cliff which towers almost perpendicularly to the height of some eleven hundred feet. The river, as it issued from the rocks, forms a stream at least sixty feet wide. On the rocks just above one of the mouths, I saw an iris, and on looking up the cliffs was amazed to see purple patches on every ledge. The rest of the afternoon I spent in climbing about on the cliffs, uprooting a plant here and there, taking, as far as I could, those that illustrated the range of colour from pale to deep red and blue-purple. It was astonishing to see the range of colour in what must, I think, be undoubtedly a wild habitat. All the time I was on the look-out for an albino plant, for I have always suspected that this must exist to account for various garden forms grouped under the name of plicata. My expectation was not disappointed, for I found one clump of such an albino, which closely resembled—if indeed it was not identical with—the plant grown in gardens as Innocenza. Some plants were almost, if not quite, as pink as Queen of May, and some had yellow and some white beards. The foliage was comparatively narrow and dwarf, and it was certainly disconcerting to find nothing in the least resembling the type.

The fact that this cliff facing south-west was covered with what must be wild plants, makes it quite possible that the parallel ridge on which Ragusa lies may likewise have been an original home of this form of Iris pallida, or it may be that plants now found in the neighbourhood of Ragusa and Gravosa are descendants of some that came originally from the cliffs that tower above the source of the Ombla. It is perhaps worth recording that the white iris cultivated

67

in this district is I. albicans. I saw no white forms of I. germanica here.

On the next day I took the train from Gravosa and went inland to Mostar, which is still essentially a Turkish town. My object was to get up on to the Velez Planina, the highest ridge (between 5,000 and 6,000 feet) in the neighbourhood, for on this mountain I from herbarium specimens. that Reichenbachii has been found. As the whole country was mobilised and all the forts on the hills full of seemed advisable to report myself. with the general in command interview fortifications supplied me with leave to botanise in the surrounding country, on condition that I did not sketch photograph, and that I would stand still flourish my document if challenged by a guard. Armed with this document, I set out accordingly the next morning hoping to find I. Reichenbachii, but was greatly disappointed to see, after climbing the lower ridges which hide the summit from the town of Mostar, that everything above 3,000 feet was deep in snow. I persevered as far as I could, but rough limestone, when the strata emerges edgewise, and the interstices are full of snow, is difficult to traverse, and I therefore returned empty-handed after some ten hours of very hard walking and climbing.

The papers were full of reports of phenomenal snowfall in Bosnia, so that a visit to Sarajevo was out of the question, but I tramped some twenty miles up the wild and desolate gorge of the Narenta without seeing an iris on the lower levels, and the snow made it quite impossible to reach the higher levels at which alone irises appear to occur in this district. The rocky through which the Narenta flows Jablanica and Dreznica is very wild and lonely. Among the rocks there grows everywhere a cytisus which looks laburnum with erect, instead of like a pendant. of yellow flowers. From time to racemes time encountered flocks of goats and lean sheep browsing on the cytisus and the scanty vegetation and tended by peasant women who were also busy spinning wool into the coarse yarn of which their garments are made.

Another plant which forms a conspicuous feature of this district is a large bright yellow-flowered euphorbia, possibly E. Wulfenii, while on the higher levels I crossed wide stony stretches on which a

minute, shrubby species of this same genus formed almost the only vegetation.

Where the valley becomes broader near Jablanica I noticed in meadows the foliage of some large colchicum growing abundantly.

From Mostar I went down to Metkovic near the mouth of the Narenta, and, having to wait a few hours for the steamer to start, proceeded to investigate the town. In the garden of a military store I saw the finest plants of a white variety of I. germanica I have ever seen. The leaves were fully three feet high and over two inches in width, and the plants were obviously an albino form of the somewhat reddish-purple form of I. germanica, which occurs here and there in cemeteries in Mostar and in cultivated areas. One of the: peculiar features of Mostar is the number of disused Turkish cemeteries which lie scattered among the houses all over the town. All are grass-grown and neglected while some are smothered with yellow asphodel, and a few contain a plant or two of this form of I. germanica. I coveted a specimen and at last found a clump on a rubbish heap below the old Turkish bridge across the Narenta. As I climbed a railing and dropped down, a Turk rushed out from the bazaar and seemed to be greatly incensed at my having torn up a few iris Plants. I could not explain myself in Turkish, and neither German nor Italian seemed to appease him. However, a small coin or two enabled me to beat a retreat with the plants before a crowd had time to collect.

The white form at Metkovic was more easily obtained, by the courtesy of an officer, who at once had a plant dug up for me, and I hope that this may prove to be one more of the numerous albino forms of I. germanica of which I. florentina is the best known.

From Metkovic to Spalato takes nearly a whole day in a small steamer, but there was not sufficient time in any of the small ports at which we touched to find any local irises. In Spalato, I noticed in the public gardens that not I. pallida, but a form of I. germanica is grown. In order to explore the hills that surround the town, I took a train up to Clissa and kept a sharp look-out from the back of the platform of the last carriage as we slowly puffed our way up for any signs of irises. I saw nothing until we had nearly reached Clissa, and then,

as we crossed a rocky gully, I thought I saw iris leaves. The last part of the line winds in and out through tunnels, and I considered myself lucky, when, on making my way down, I hit on the right spot, and found the plants I had seen from the train. There were, unfortunately, no signs of flowers, but the foliage seemed to resemble that of I. pallida rather than that of I. germanica.

The southern face of the rock on which the old fort of Clissa stands is smothered with Iris germanica. Plants occur on ledges which are inaccessible without a rope, and it really looks as though the plants were here indigenous. As elsewhere, however, Iris germanica only occurs in the immediate neighbourhood of dwellings, and we must hesitate to say that these plants are certainly indigenous. On the other hand, the fact that I. germanica is almost without doubt a plant of the Mediterranean region and the inaccessibility of some of the ledges on which it occurs makes it possible that these plants are not escaped from cultivation. The colour of the flower is a somewhat reddish purple.

From Clissa I toiled on over the rough, rocky ground all round the top of the amphitheatre of hills which lie above Salona and Spalato, but found no traces of irises except a few plants of the same form of germanica, and these always near cultivated ground.

Spalato I took an early morning train through the desolate barren hills of inner Dalmatia to Sebenico. It was a blazing hot day when I got down to the sea at that port, and I was rather loth to go up again to the rough hills. However, local information said that I. pumila was to be found at a place called Razina in the neighbourhood of Sebenico. Guide books knew nothing of Razina, nor had I been able to find it any atlas. However, in Spalato I obtained the equivalent of our Ordnance Survey map and found that Razina was a district lying five or six kilometers to the south of the town. Fortunately, the district lies low and no point is above 200 feet above sea level. This seemed an unlikely place in which to find I. pumila, which I have always looked upon as a plant typical of regions having a cold winter. The ground was very rough; in places the stones were piled in great heaps and used to form massive walls round vineyards, but there were large patches of apparently virgin soil, mostly covered with a tangled weed of dwarf shrubs. For six hours I scoured the district and found nothing. There were orchids in plenty, including an albino form of O. morio, and muscari was abundant, but no sign of irises could I see. I got tired of climbing heaps of stone and crossing rough tracts of prickly shrub by stepping from one jagged projection of limestone to another, and set out to return to Sebenico, convinced that there was some mistake and I had come on a wild-goose chase. Following a rough track, I noticed over the usual broad stone wall a patch of shrub with more open level spaces than usual. I wondered whether it was worthwhile to explore this, and almost decided that it was not. It seemed, however, foolish to have come so far and then to hesitate to climb one more wall. Scarcely had I got over it than I saw with surprise two minute tufts of iris leaves about an inch high. Careful search revealed other tufts, and although there were no flowers, several withered perianth tubes and finally three green capsules of seed actually longer than the leaves were enough to show that this must be a form of Iris pumila, but why it grows in such a locality has yet to be explained.

Having collected a few plants, I tramped back to Sebenico, weary but content, and went on by a night steamer to Zara. Behind this town there lies a stretch of undulating stony ground, very similar in character to the Razina district. I had been told that I. pumila was also to be found here, and this time I had the good luck to stumble upon a few plants almost as soon as I reached likely ground, although on continuing my search for some hours, I found no more irises. By this time I had discovered that irises do not like grass, even in the hottest positions. The positions in which they are found are always fairly open, usually facing south or south-west and the soil contains, besides the stones, a fair amount of red loam, which is found everywhere in these limestone districts.

Alter Zara, my next objective was the Velebit Range, near Carlopago, but the problem of how to get there was not easily solved. I finally went by a small steamer, from which I had to land about 3 a.m. in a small boat, with half a dozen Croatian natives, at Valcassione, which seemed to consist of two huts. From one of these the postman, who was also the boatman, produced two horses for the ramshackle old diligence

in which I had to drive across the island to Pago. It was an uncanny landing, and only the postman understood a few words of German and Italian. However, a gendarme armed with a rifle appeared on the scene and drove on the box of the diligence. As I walked with him up a long, rough hill, it was just light enough to see that the stony ground was everywhere covered with white Asphodel ramosus, a tall euphorbia and a green flowered helleborus.

From Pago I went across to Carlopago, on the mainland, and by the kindness of a friend, who had a Croatian guide in waiting, I was able to start off at once up the Velebit Mountains to a small plateau, near the summit of Velnae, where a supposed new species of iris was known to grow. The ground was the roughest that I think I have ever crossed, mere limestone boulders piled one above the other. As we got up to about 3,000 feet, crocus leaves seemed to replace grass in the interstices between the rocks, and on the southwest face, as usual, I found a few small iris plants. This was not, however, the locality for which I was bound; to reach this it was necessary to climb higher. At last we got over the brow on to a turfy hollow, and I shall never forget the sight of this little valley covered with tufts of Gentiana tergestina, through some of which iris leaves were actually pushing their way. Purple and white crocuses and a yellow flowered primula and muscari were also abundant. Snow still lay in the hollows facing north, and though iris leaves were everywhere apparent, no sign of flowers could I discover. The plants look uncommonly like I. pumila, but some herbarium specimens, which Dr. Degen very kindly sent me from Budapest, showed that the flowers were yellow and that the plants must be some other species than I. pumila-possibly a yellow-flowered form of I. aphylla. Both these species seem equally strange at such an elevation in this locality; but then a sibirica also occurs on these very rocks, and nowhere else apparently in Europe! For the determination of this iris we shall have to wait until transplanted specimens flower.

From Carlopago northwards the so-called Iris illyrica is plentiful. By the kindness of a friend in Zengg, who seems to know every inch of the country, I was able to see plants in flower along the sides of the valley at the mouth of which Zengg is situated, and

also just coming into flower, but dwarfer, high up on Mount Veljun. Among the plants which I saw in flower, there was considerable colour variation, and I even found specimens with the dark bluish beard, the origin of which in some garden pallidas had always been a puzzle to me. I. illyrica is practically an enlargement of I. Cengialti, and the Zengg plants certainly provided an intermediate step between the latter and the Ragusa pallidas. I. illyrica was first described as coming from the island of Veglia. I therefore set out from Fiume and got across by boat to the island from Cirkvenica. I went right across the island, which consists of rolling, stony ground, in most places covered with scrub. Everywhere grows the usual green-flowered helleborus while the undergrowth was in many places pink with repandum (hederaefolium). Cyclamen Some grassy patches were literally purple with Orchis morio, while O. punctata and the huge O. militaris were also common. Of irises I saw no trace, until I reached the centre of the island, and then only found a few flowerless plants among the stones. The foliage, however, leads me to suppose that they are the typical I. illyrica.

From Fiume I also went up to the top of Monte Maggiore and found Iris graminea growing in open beech copses at about 3,000 feet. The plant does not there make the dense clumps that are formed in our gardens, but each tuft of leaves stands apart, and I even found rhizomes which had run straight ahead for a foot or more without branching at all. I had seen the same thing in a very similar position on Mount Veljun.

On my return to Trieste I was taken by Dr. Marchesetti to see the botanic garden which he has formed on the hillside above the town. The space is relatively small, but the limestone which is everywhere abundant, has lent itself to the construction of innumerable narrow terraces, in the pockets of which all the local plants find congenial homes. My guide also told me of three localities near Trieste where I. illyrica is to be found growing wild.

On Monte Spaccato I wandered for two or three hours, and, though I found an amazing number of orchis, a poeticus narcissus, the dark pulsatilla-like Anemone montana, and even Solomon's Seal and paeonies in flower, I could find no trace of irises. It seemed as though the efforts of the Austrians towards

re-afforestation had been fatal to them. I searched every open space in the wood that now clothes the summit, but in vain; it was only when I came out of the wood again on to the meadow-like land that I found two flowerless plants.

The next day I was able to get to the other localities, and in both found I. illyrica flowering in quantity. In each case the plants were on almost perpendicular rocks facing south-west, and the plants were certainly smaller than those I had seen at Zengg. Indeed they were very little larger than Iris Cengialti. The stems bore about three or four flowers, and the spathes were of that curious brown-scarious colour with a purple line across the base that we find in the Loppio form of I. Cengialti. It was curious to notice also that in one place all the plants bore flowers of a very rich dark violet colour, while in the other locality each plant differed a little in colour from neighbour.

As regards the origin of the typical I. pallida, the results of my search are therefore merely negative. I feel convinced that neither the type nor the variety dalmatica occurs wild along the coast between Fiume and Gravosa. On the other hand, the fact that the Trieste plants were slightly bigger than I. Cengialti, those that I saw at Zengg somewhat larger, and those at Ragusa larger still and a closer approach to the typical I. pallida, seems to suggest that the home of the latter, must be even further south, possibly in Albania or in Greece.

If I have used the name of illyrica, it is because until seeds have been obtained, it is impossible to say whether the plants are to be considered as a separate species or whether they are to be assigned to I. Cengialti or I. pallida. Of these, the former has greyish, almost spherical seeds, while those of the latter are dark red-brown and compressed.

AN IRIS EXCURSION.

THE SOUTH OF FRANCE.

(" The Gardeners' Chronicle "-June 17th, 1911.)

One of the most serious drawbacks to the cultivation of many irises is that there is no time in the year when there is not something to see or attend to in the garden. Narcissus, tulip, and even rose enthusiasts can take holidays, and yet not feel they are missing something in their garden, or not doing their best in the matter of cultivating some other treasure. To the iris grower, no such period ever seems to come, and it was with many misgivings that I tore myself away in the last week in April for a week's iris hunting in the south of France.

The morning after my departure found me at Tarascon, after sundry fleeting visions of various forms of Iris germanica. in cottage gardens as the train rushed down by the Rhone. Tarascon itself proved, as a French friend warned me would be the case "au dessous de tout," which we might render " beneath contempt " if we were not afraid of further offending the worthy townsfolk, whose self-conceit has suffered so sadly from Daudet's caricature. Once at Tarascon, one can hardly refrain from crossing the suspension bridge to Beaucaire and this proved to be well worth while, for the hill on which stand the ruins of the Chateau of St. Louis is covered by thousands of red-purple and white irises, which proved to be germanica atropurpurea and white form of germanica. This was exceedingly interesting, for one of the points on which I hoped to find information was precisely the relationship and identity of the several white irises, the nomenclature of these being sadly confusing.

It was an easy matter to compare the white and purple forms in such a spot, and the growth and the shape of the segments proved to be identical, except, perhaps, that the spathes of the side branches were more apt to be two-flowered in the white than in the purple variety. Another difference was that the hairs on the inside of the haft of the standards were much more numerous on the white than on the purple form. In the latter, indeed, they were sometimes almost entirely absent, although in some flowers they would be quite conspicuous on one standard and almost absent from others. The affinity of the two forms

seemed almost to be confirmed by the frequent occurrence of purple tinges and even stripes in the pure white of the albino form.

From Tarascon I went to Arles, and found that the white iris in the public gardens there was not this white germanica nor florentina, but albicans, of which more will be said later. From Arles it is but a short excursion to Mont Majour, which provided a good instance of the effect of environment on the growth of irises. At the base of the hill, among the bushes, I found a yellow-flowered form of I. chamaeiris, with a stem rather more than a foot in height, while a hundred feet higher, on the open limestone rocks, the same iris was dwarfed to little more than 3-4 inches in height.

The next morning found me setting out early, by a slow train, across the apex of the Camargue, on the way to Montpellier and Cette. It was interesting to see that nearly every wayside station had long rows of Iris germanica, often of more than one form, in endless slight variations of colour between blue and redpurple. It seems as though this iris is more willing to set seed there than it appears to be in England, and these varying forms may well be seedlings.

My errand at Cette was to spend a few days with a French friend and fellow iris enthusiast who lives in the neighbourhood and has a wonderful garden full of interesting plants, a veritable sun trap and rejoicing in a limestone soil. This means, of course, that the Pogoniris, as a whole, do better than the Apogons; indeed, there are few other gardens where Oncocyclus species and hybrids succeed so well, or where the same plants of Iris iberica have been grown for 15 years.

My friend is also fortunate in that the huge and rare I. Ricardi flourishes with him, and has given him, when crossed with pollen of various pogoniris, numbers of magnificent hybrids. These are characterised by stout stems, which, even in England, grow to about 4 feet in height. Ricardi itself is near to I. cypriana, and came originally from Jerusalem, though we do not know that it is native there.

The hills in the neighbourhood of Cette are of rough, loose limestone, on some of which Iris

chamaeiris can be found, but even apart from irises, they are a veritable joy to botanists, Orchids abound amid the dwarf Cochineal Oak (Quercus coccifera), a creeping shrub, not more than 18 inches high, and looking more like a dwarf holly than an oak. The air is scented with wild rosemary, and lavender and Cistus monspeliensis and C. albidus. The name of the latter was given in reference to the glaucous leaves and appears, at first sight, somewhat misleading applied to a plant with pink-purple flowers, growing side by side with the white-flowered monspeliensis. In some places, the hillsides were white with thousands of large, white asphodels and probably Asphodelus ramosus.

From Cette, a most interesting excursion was to Les Onglouses, which name is said to mean Iris in the local dialect (Ongle being the botanical name for the claws of the segments of an iris). The railway runs within a mile of the Mediterranean, and as the train drew up there were millions of white irises to be seen all sides, mingled with occasional patches germanica atropurpurea. The soil is of a deep sand, so loose that straw and reeds from the marshes have to be ploughed in between the vines to prevent it being blown away. The water is not far below the surface, which is drained by cutting deep, narrow lanes between the vineyards. All the banks swarm with the white irises, which even have to be hoed up as weeds among the vines. In local floras, the name is always given as I. florentina, but this is a mistake, for they are all albicans. Indeed, I nowhere saw the true florentina, except in a garden in Hyères, whither it had been imported from Holland.

Iris albicans was first described as a species by Lange, from specimens which he obtained from the neighbourhood of Almeria, but as it is also found in quantities all through Southern France, Italy, Greece, and even far away into Asia, its precise origin has been in doubt. No real proof of the following theory is yet forthcoming, but no one who compares albicans with I. Madonna, will doubt, I think, that we have here the blue and the white forms of the same thing. I. Madonna was first discovered, together with a white-flowered form, by Botta, in 1837, on Mount Saber, in the Yemen, in Arabia, and these specimens exist in the Paris Herbarium. It is not, however, described until 1892 (cf. Bull. Soc. Tosc. Ortic. XVII. 1892. 130), and has

only recently been introduced into cultivation by an Italian firm, who also obtained the white form. This, however, seems to have been rare, and to have been lost, or, possibly, if the theory is right, transplanted among other plants of albicans already growing in the garden. The attractiveness of the theory lies in the fact that, if Madonna and albicans are the blue and white forms of an Arabian iris, it is only natural that this white iris should be found, as is indeed the case, in Mohammedan cemeteries, from Spain in the west, into Persia and even further east. In no other way can we easily account for its very wide distribution, though there are some equally puzzling questions suggested by the fact that the large form of Iris germanica, which Foster received from Kharput, is also the commonest form at Srinagar, in Kashmir, while the Iris nepalensis of Wallich, the commonest iris in Khatmandu, in Nepal, is simply the form that is commonly grown here as Iris germanica atropurpurea.

Before returning home I went east as far as Hyères, and found Iris spuria, only in bud unfortunately, growing in the stiff clay in the marshes between the town and the sea, but failed to find the I. olbiensis of Henon on the Domaine du Ceinturon. It still existed there some three or four years ago, for I have some plants collected then. Unfortunately, they are all specimens of the dingy yellow forms, and not of the clear yellow or deep purple varieties. However, in spite of their poor colour, they have been enough to know that I. olbiensis is only a form of I. chamaeiris.

Another interest was provided for me on the tramp back to Hyères from the sea by the changing forms of Iris pseudacorus along a wayside stream. There was constant variation— within a few yards even—in the amount and distinctness of the brown veinings on the falls, in the shape of the standards, and even in the colour of the anthers.

A hurried visit to the Paris Herbarium, at the Jardin des Plantes, which is particularly rich in Chinese specimens, was the last incident of an iris excursion which proved to be exceedingly interesting.

THE ORIGIN OF SOME GARDEN IRISES.

("The Gardeners' Chronicle "-July 18th, 1914.)
About two years ago I was able, by the kindness of the Hon. N. C. Rothschild and of Dr. A. V. Degen, of Budapest, to see a dried specimen of an iris which had been discovered on the Velebit Range, in Dalmatia. This was recorded in a paper on the local vegetation by Dr. Degen as being related rather to I. chamaeiris, Bert, and to I. lutescens, Lamarck, than to I. variegata, L. The branching stem and the wholly herbaceous spathe showed that it had nothing to do with the

French I. chamaeiris or lutescens, while the fact that the outer edges of the spathe-valves were not keeled was sufficient evidence that the iris was not merely a

form of the Balkan I. Reichenbachii.

In April, 1913, I went to Dalmatia in search of irises, and by the kindness of the late Herr Dobiasch, of Zengg, in Croatia, was provided with a native guide to take me to the exact spot on the Velebit Range where this iris was known to grow. The mountains rise very abruptly from the sea coast and consist of very rough and almost barren limestone. In former days, when this coast was subject to Venice, tribute appears to have been paid in timber, with the result that the hills were almost entirely denuded of trees, and it is only recently that, further north in the neighbourhood of Fiume, attempts have been made towards reafforestation on any large scale.

The iris, of which I was in search, grows in a shallow cup-shaped hollow near the summit, at a height of some 4,000 feet. Just before we reached the edge of the cup, and while we were still on the southwestern slope facing the Adriatic, I found growing among the limestone rocks a few iris leaves, together with crocuses and muscari. My guide urged that it was hardly worth while to stop to collect any of these plants because we had almost reached our destination, where it was far more abundant. However, I took up a few plants, and then we soon reached the top. In this depression patches of snow were still lying on the north side of rocks, and all around were Gentiana tergestina, a near relative, if not a form, of G. verna, crocuses, of a species as yet undetermined, a yellowflowered primula and, coming up among them all, the young leaves of an iris, obviously belonging to the bearded section. The soil of the hollow was a layer of black vegetable mould overlying the limestone below.

During the present year the plants which I brought away with me have flowered well. It was interesting to watch them develop as they grew side by side. The foliage of the plants from the south-west face was noticeably glaucous and the entirely scarious spathes pointed to I. pallida. When the flowers opened it was obvious that here was one more of the long series of plants which in the north, near Roveredo, are called I. Cengialti and in the south I. illyrica.

The plants from the hollow at the top had much greener foliage and were evidently of two kinds, for the spathes were in one case wholly green and in the other scarious in the upper part and green at the base. In both cases the stems branched and the slightly-ribbed foliage of the plants with wholly green spathes led me to conclude that Dr. Degen's iris must be a form of I. variegata, L., which is common in many parts of Hungary. This was what they eventually proved to be. The standards are of a clear, pale yellow and the redpurple veining on the falls is not heavy, and I have no doubt that the veins had wholly disappeared in the of the original herbarium specimens. behaviour of iris flowers as they dry is very erratic. Some keep their colours to an astonishing degree, while others, the yellows especially, rapidly lose all traces of their original hue and become merely a light

It was sufficiently surprising to find I. pallida and variegata growing together, but a still greater surprise was the third variety of iris, which had partly scarious and partly green spathes. The four-flowered inflorescence was that of a small I. germanica, and only the slightly brownish tinge of purple in the buds difference. showed that there was any When flowers eventually unfolded they were a t interesting and disappointing. They were interesting from the fact that they were evidence that the so-called squalens and sambucina are, as I had long supposed, o f pallida I. variegata. Ι. and disappointing because they proved to be only an iris which we have long had in our gardens, but which is no great ornament to them.

In the standards the yellow and the purple of the two parents fight for the mastery, and produce that dingy shade of dull purple which fully justifies the name of squalens. The falls are of a pale reddish-purple with thick darker veins, which allow the whitish ground to show between them only near the end of the beard. This is composed of whitish hairs tipped with yellow, and the flower is, in fact, a typical I. squalens.

All the plants I have described are naturally small, growing as they do in poor soil at a considerable elevation, but I have no doubt that they will develop under better conditions to more than the 15 or 18 inches to which they have attained in this dry year in poor, stony soil.

The discovery of these three plants, the squalens hybrid and its two parents, pallida and variegata, growing together in a locality which certainly was never inhabited, and where they could scarcely have been planted by the hand of man, goes far to explain the origin of many of our garden bearded irises. I have a whole series of hybrid forms, coming chiefly from the neighbourhood of Bozen and Riva, in the Southern some of which the yellow of variegata predominates, while in others the purple of the pallida is more apparent. Judging from the localities from which they come, I never felt confident that they might be described as natural hybrids between I. pallida and I variegata, but after my experience in Dalmatia I am inclined to think that it is extremely probable that they are really wild plants.

Typical I. variegata, such as we know it from Hungary and the Balkans, is not now known to grow at Bozen, but, at any rate, there grows near that place a plant which closely resembles I. variegata, though certain characteristics and the fact that it does not readily set seeds incline me to think that it is a hybrid and not merely a form of that species. In the same neighbourhood forms of I. pallida are also abundant, and I have now little doubt that the original parents of the many so-called "German" irises of our gardens are to be sought among these plants.

Whether the problem of the origin of Iris germanica itself will ever be solved is doubtful, but I am almost inclined to suggest that it may be of hybrid origin. This would explain many of the difficulties—its

almost complete sterility, the frequent malformation of the flowers, and the fact that it has never been found wild. The chief difficulty that is not explained lies in I. germanica's habit of beginning to grow in autumn instead of waiting for spring. If it were not for this there would seem to be no reason why I. germanica should not have resulted from a cross between I. aphylla and I. pallida. The flowers of the latter especially are so variable in their shades of colour that the many varying colour forms of I. germanica could easily be produced and the wholly herbaceous, often purple-flushed spathes of I. aphylla would combine with the wholly scarious spathes of I. pallida to give us the partly scarious and partly herbaceous, often purple-flushed spathes of I. germanica.

These suggestions are only put forward tentatively, but it would be interesting to know whether any seedlings have already been obtained by crossing I. aphylla and I. pallida, or any other tall, bearded irises. I have made the cross recently and hope to obtain seeds which may throw more light on the vexed question of the origin of our garden bearded irises.

HYBRIDISATION IN THE IRIS.

(Translated from the French — Revue Horticole—1923.)

It is now many years since I undertook the revision of the genus Iris, as much from the botanical as from the horticultural point of view. At first I tried to raise from seed all the botanical species, then I made crosses between them in order to prove the truth or falseness of the ideas which I had formed on the parentage of the species. It is with the results of these crosses that I am going to deal in this paper.

First let us review the large divisions which Nature has constituted in the genus. There are the bulbous and the rhizomatous species. Hybrids do not occur between plants of these two sections, although numerous experiments have been made with a view to producing them. An attempt has been made to combine a bulbous with a rhizomatous species, both of which grow in the Iberian Peninsula, viz., I. xiphium and I. spuria, but so far without success. Yet there is a striking resemblance between the flowers of these two species and it should be noted that they grow in the same districts, in Spain and even in France, for I. xiphium still grows round about Béziers and I. spuria is found near the mouth of the Hérault.

The rhizomatous species are divided into Pogoniris Apogon and species). Evansia species). No one has succeeded in producing hybrids between Pogoniris and Apogon. I remember asking the Sir Michael Foster if he had succeeded producing crosses between these two sections of the genus. He replied that he had tried to fertilise an I. germanica with the pollen of an I. spuria. From a few seeds which he believed he had obtained from this cross he had raised a single plant which he showed me. From the leaves it was an I. germanica, and what intrigued Foster was that the plant had never flowered. Consequently he was led to believe that it was a hybrid. "Otherwise," he told me, "this plant ought to have flowered, for all the Pogoniris flower in this garden." It is not known what became of this plant after Foster's death. It has never revealed its secret.

There exists at least one hybrid between the bearded and the crested irises. Before I made the

experiment Foster and M. Denis had already done so without success. I did not expect to succeed myself, but one day I had the idea of putting a little Iris tectorum pollen on the stigmatic surface of I. Cengialti var. Loppio. From this cross I obtained two seeds which gave me two plants. What is more remarkable is that the pollen of I. tectorum gave to the hybrid (Loptec) the flattened shape of this species, while the female parent gave to the offspring its scarious spathes and the hairs of its beard, placed at the summit of a rudimentary crest. Unfortunately this hybrid is quite sterile, for I have made repeated attempts to fertilise it with its own pollen and with that of its parents.

In the bearded species there are at least three large sections: Pogoniris, Regelia and Oncocyclus. very little difficulty in making crosses between them. Regelia and Oncocyclus have given us, thanks to Sir Michael Foster and to M. Hoog, of the firm of C. G. van Tubergen, Haarlem, the Regeliocyclus hybrids, in which the large flowers coloration of Oncocyclus are found united with the floriferous character of Regelia. It is also to Foster that we owe I. ibpall (iberica x pallida), I. ibvar (iberica x variegata), I. parpall (paradoxa x pallida), I. parvar (paradoxa x variegata), I. lupceng (lupina (Sari) x Cengialti), etc. In all these cases the hybrids are more or less midway between the two parents. They are more easily successful than Oncocyclus but they must, however, be given more care than Pogoniris. They must be transplanted at least every three years and given a calcareous soil.

These hybrids are all sterile except in very rare cases; apparently they have never seeded in England, but a few years ago M. Denis sent me, from Balaruc, some seeds coming from an I. Pogoniris x Oncocyclus. From them I raised a single plant which is very remarkable. It is a dark-purple "germanica" with the brown-purple spot of an Oncocyclus. This plant grows as easily as a Pogoniris and flowers profusely.

Nor is it difficult to make crosses between Regelia and Pogoniris. The yellow and purple of I. chamaeiris may be combined with the well-marked veins and almost black beard of I. Korolkowi. The same may be done with I. stolonifera, but all the hybrids of this species which I have so far seen are ugly. There is

always a mixture of colours producing a very disagreeable effect.

As for the bearded Irises of our gardens, they are, for the most part, hybrids. The true I. pumila is as rare in cultivation as the name is common in catalogues. In the wild state, in Austria, Hungary and South Russia, there are numerous varieties of different colours. Nevertheless, I. pumila coerulea must be a garden variety as it hardly ever seeds and the flowers are not formed in precisely the same fashion as those of the wild plants. It is well known that in I. pumila there is no stem, while the tube above the ovary is relatively long. In Iris chamaeiris the stem is at least as long as the tube and usually much exceeds it. Now I have succeeded in combining these two species in a sterile hybrid.

In my opinion, the commonest iris of all, I. germanica, is nothing but a hybrid. It seeds with difficulty and the few plants which have been raised from its seeds are all dwarfs, very similar to I. aphylla. species, widespread in central Europe, is remarkable in that its stem divides below the middle and even at soil-level, and this character is also found in the sowings of I. germanica. Moreover, all the Central European species: aphylla, variegata, pallida, sibirica, pumila, lose their leaves in autumn and do not sprout again until spring. I. germanica, contrary, starts growth from the time of the autumn rains and it often happens that the clumps do not flower because the buds are frozen before emerging from the leaves, a thing which never happens with the Central European irises. The majority of the bearded irises of our gardens come, not from Iris germanica, but from the cross of Iris variegata with Iris pallida. The two species grow together in the wild state round Botzen, in the Tyrol, and also on the Velebit Mountains in Dalmatia. In both cases are found, among plants of the two species, hybrids of a smoke-colour, i.e., squalens, sambucina, etc. This coloration results from the conflict between the violet of pallida and the The vellow of variegata. amoena irises are variegata irises with a white ground instead of a yellow one, like leucographa, which has been found wild in Hungary.

This is, to my mind, the origin of the old varieties.

I. trojana and other species with a tall stem, of oriental or rather Levantine origin, were already employed some years ago for hybridisation. Thus, M. Denis used I. Ricardi (=mesopotamica) to produce his fine hybrids, while Isoline is evidently the result of a cross of I. trojana.

All the yellow tints come from I. variegata—except some dwarf precocious-flowering plants which are hybrids of I. chamaeiris. I. lutescens is only a variety of this last species, while I. flavescens approaches I. variegata. I. flavescens has been long confused with I. imbricata, from the Caucasus, quite a different plant which has not yet given any hybrids.

If we examine closely the spathes of the garden varieties we find that they are entirely herbaceous at the time of flowering in I. variegata, I. aphylla and I. trojana, entirely scarious in I. pallida, and half herbaceous, half scarious in I. germanica and the majority of the well-known varieties. Here is yet another proof of the hybrid origin of I. germanica.

Among the I. Apogon there are numerous groups of plants more or less closely allied and, within these groups, it is not difficult to produce hybrids. Thus, I. sibirica which is, strictly speaking, a European species, may be combined with its Asiatic relative, I. orientalis (Thunberg). From the former comes the tall stem raising itself well above the leaves, while the latter gives large flowers with the lower segments well spread. These two species have albino forms and consequently to obtain sky-blue flowers one has only to combine the dark-blue of the wild plant and the white of an albino. Some of these hybrids are fertile and give good seed abundantly, but there are some sterile ones.

It is now about ten or twelve years since two irises of the sibirica group, with yellow flowers—I. Wilsoni and I. Forrestii—were introduced from China. The former is easily combined with I. sibirica and from the cross is obtained a blue I. sibirica with a yellow ground, entirely sterile. I. chrysographes is a beautiful Chinese species with dark violet flowers, spotted with gold; sometimes there is only a single line of gold in the centre of the lower segments. The combination of I. chrysographes and I. Forrestii gives us two almost identical hybrids in which the yellow spots are much

larger and more numerous. The remarkable thing is that the hybrids between these Chinese species are fertile. They seed easily and give a whole series of different and interesting forms.

Moreover, I. chrysographes and I. Clarkei may be combined with the Californian species, such as I. Douglasiana and I. tenax. These hybrids are very beautiful and floriferous, but they remain sterile. I have also combined I. Wilsonii and I. tenax. This hybrid is extraordinarily floriferous, but sterile. The flowers are rather ugly, dark-blue dotted with pale yellow.

Flowers with this coloration are also found among the hybrids between I. pseudacorus and the neighbouring American species I. versicolor, and between I. spuria and I. ochroleuca. It was Foster who made hybrids between the last-named and who has given us I. Monspur. I. Monnieri is only a garden variety of I. ochroleuca or perhaps a hybrid between this species and I. aurea, from Kashmir.

The Hexagona group contains only three species: I. hexagona, I. foliosa and I. fulva. I. foliosa is a dwarf form with the large flowers of hexagona, and one day I had the idea of attempting to give it the tall stem and the terra-cotta colour of I. fulva. The cross succeeded and I. fulvala is a beautiful, vigorous hybrid with dark-purple flowers, even giving seeds. From these seeds I have raised varieties with more or less chamois-coloured flowers—an unexpected result.

As for the Japanese Irises, I do not believe that there is anything in them other than I. Kaempferi. I. laevigata is quite a distinct species. The leaves of the former have a raised nervation, well marked in the centre, while those of the latter are smooth. The seeds of I. laevigata are almost identical with those of I. pseudacorus, with a shining epidermis; those of Kaempferi have an irregular and flattened shape. By what means have the Japanese succeeded in modifying the wild plant, obtaining varieties with double flowers, spotted and variegated with all colours? It is not yet known, but they have done the same with the chrysanthemum and with the cherry and plum-trees which ornament their gardens in spring. The same applies to I. laevigata; they have obtained varieties

with white flowers spotted with purple (I. albopurpurea) and others with double flowers of the same colours.

The bulbous species lend themselves easily to hybridisation, although the resulting plants generally sterile. Let us begin with Xiphion. The true I. xiphium is easily distinguished from all its allies by its short funnel-shaped tube. All the others have a linear tube, e.g., I. tingitana, I. filifolia, I. juncea, etc. In combining these species with I. xiphium the length of the tube is reduced by half, and we shall find examples of this shortened tube in some of the socalled Dutch varieties. These few varieties are hybrids (tingitana x xiphium), while the majority of them which have only the short funnel-shaped tube are garden varieties of I. xiphium praecox. The last-named is a precocious-flowering variety with large flowers, coming from Southern Spain.

I. Boissieri is a bearded species, the beard being composed of long yellow hairs. It is possible to shorten by half the length of these hairs by making hybrids with I. xiphium or with I. tingitana, both non-bearded.

Among the irises of the section Juno there are species with spherical seeds, others with cubiform seeds and still others whose seeds are distinguished by a white caruncle. Between the members of these three classes there are no hybrids, while the members of the first two classes cross fairly easily among themselves. I. persica and I. sindjarensis belong to the first class and we have I. sindpers, etc. I. bucharica, I. orchioides and I. warleyensis have cubiform seeds and plants with large yellow flowers may be obtained by combining I. orchioides. bucharica and Ι. The bucharica warleyensis hybrids have yellow or greenish flowers bordered with green or brown. Of the third group, we cultivate only I. Rosenbachiana, with yellow pollen, and probably another closely-allied species of which the pollen is white. These two species give hybrids easily.

In the Reticulata section there are not many hybrids. It is well-known that Iris reticulata has quadrangular leaves, while those of Iris Bakeriana are almost cylindrical, with eight parallel nerves. In combining these two species, hybrids of extraordinary

beauty are obtained, the colours being very bright and the leaves having six nerves.

We have just reviewed the hybrids which have been obtained in the genus Iris. What conclusions may be drawn from these experiments? Here are some:—

- (I) The large sections of the genus: Apogon, Pogoniris, Juno, Xiphion, etc., do not cross with each other. (Hybrids may be made, however, between Pogoniris and Evansia).
- (2) All the species of section Pogoniris will combine with each other. I have even succeeded in fertilising I. trojana with the pollen of Iris chamaeiris.
- (3) Hybrids produced by two closely-allied parents are often fertile; e.g., the hybrids between the Chinese members of the sibirica group and Iris fulvala.
- (4) Hybrids produced by a cross of two species far apart in the classification of the genus are always sterile.
- (5) When hybrids between two quite distinct species are obtained, their characteristics are more or less midway between these two parents. There is no Mendelian dominance. Unfortunately, successive generations cannot be raised, for these hybrids remain sterile.

CURIOUS RESULT OF HYBRIDISATION.

("The Gardeners' Chronicle "-November 13th, 1915.) For three years now I have had Iris unguicularis, or, as it is more commonly but less properly called, stylosa, in flower in the last week of September. The plants which give me these very welcome flowers are a few that resulted from crossing the typical Algerian plant with a dwarf Greek form. The interest of the cross lies in the fact that the Greek plant has never in my garden flowered until March or April.

It would be interesting to know whether any work has been done with a view to discovering the factors that determine the date at which a plant flowers. Such evidence as I have so far accumulated scarcely seems to throw any light on the question. For instance, a stray flower of Iris chamaeiris fertilised in June with pollen trojana. produced a hybrid. which intermediate in size between its two parents and which has flowered regularly for six or eight years past in September and October. Strange to relate, however, this hybrid has refused to flower in the autumn in the south of France in a soil in which bearded irises are far more vigorous than they are here in this light sand. On the other hand, a cross between I. chamaeiris and the so-called I. florentina, which a neighbour raised in a garden not half a mile away, frequently gives him many spikes of white flowers in the late autumn, while in this garden it always refuses to flower except in the spring.

SELF-FERTILISATION IN IRISES.

(" The Gardeners' Chronicle "-December 4th, 1909.)

It is usually supposed that irises are a good example of Nature's provision that self-fertilisation should be impossible, and it is a plausible theory that the co-operation of insects is necessary in this genus. Having regard to the position of the stigma relatively to that of the anthers, it does seem at first sight as though fertilisation would be impossible without the intervention of insects. The latter are said to collect pollen on their backs as they brush against the anthers in their endeavours to reach the nectaries at the base of the flowers, and then to deposit the grains on the stigma of the next flower they visit. Knuth (Handbuch der Blutenbiologie, vol. ii., Part II.) has even gone so far as to draw up lists of the various insects that have been observed to visit each species.

Some irises are undoubtedly fertilised by this means, but anyone who visits a garden containing a number of species of iris cannot fail to be struck by the of capsules of seed on such pseudacorus, sibirica, versicolor, Hookeri (or setosa), graminea, ochroleuca, spuria, etc. Nearly every flower seems to produce a capsule, while the larger, bearded set seed only comparatively rarely, artificially fertilised. A little observation reveals two facts: first, that the ripe pollen of all the species mentioned is very easily dispersed from the anthers by the slightest movement, and, second, that the stigma is in every case a triangular tongue, which projects downwards. The motion of the plants in the wind precipitates the pollen on to the hafts of the falls, which are touched from time to time by the pendulous stigma, and self-fertilisation is thus effected. The shape of the pollen grains of these Apogon Irises is entirely different from that of the bearded groups, and apparently, lies the explanation phenomenon.

IRISES FROM SEED.

(" The Garden "-September 21st, 1918.)

It is astonishing that so few gardeners think it worth while to raise irises from seed. The process is supposed to be much more intricate and lengthy than it really is, and yet, surely, even if seeds sown now will not give flowers before 1920, the interest and pleasure that the flowers afford us when they do unfold is of a different quality from that which we derive from bulbs or roots ordered by the dozen from a catalogue. Some plants, indeed, such as the beautiful Californian Irises, tenax, Douglasiana, Watsoniana and bracteata, only be satisfactorily grown from seeds; others, such as all the members of the sibirica group, are much more vigorous and floriferous when planted out seedlings and left undisturbed. All species seem to vary within certain limits when raised from seed, and it is pleasing to be able to select one's own favourites, and then increase the stock of them by division of the plants. All seeds should be sown within the next month or six weeks, for, if it is delayed until the new year, their vitality seems to be much impaired. It is a curious fact that seeds of bulbous plants, which are not sown by about the time at which the bulbs begin to grow again in the autumn, often refuse to germinate at all, whereas, when they are sown early, they germinate with great freedom and regularity. The seeds should be sown in pots of rich, light soil, and covered about half an inch deep. The pots should then be sunk to the rim in the open ground, and by preference protected from birds by a covering of wire netting. There the pots should remain exposed to the weather, and in the new year it will not be long before the tips of the seedlings begin to break through the ground. Then, especially in severe weather, the protection of a sunny, airy cold frame is an advantage, though I have raised thousands of seedlings without even this protection.

When rhizomatous irises have made four or six leaves, by May or June, they should be planted out in their flowering positions, and growth should be encouraged by a light top-dressing and by stirring the surface frequently. The majority should then flower in the following spring. Bulbous plants, however, should be allowed to dry off under glass or in the open and be kept dry, if possible, until the autumn, when the pots may be plunged again in the open. At the end of their

second summer, the little bulbs should be sifted out of the pots, and be planted in beds in the open. They should begin to flower two years later.

ON RAISING IRISES FROM SEED.

(" The Garden "-November 22nd, 1924.)

It is always astonishing to find that comparatively few gardeners take the trouble to raise perennials from seed. It is quite true that in most cases garden varieties will not breed true and that all the seedlings from one pod of seed are usually slightly different from each other, but, on the other hand, there is no better way of obtaining a large number of healthy plants, for home-raised seedlings are often far more vigorous than stock which is raised by the division of purchased plants. Besides, there is always the chance of obtaining some striking new variety.

There is no mystery about raising irises from seed, nor is it a very lengthy process. In fact, it is not impossible even now to sow seeds of Iris pumila, which will germinate early in the spring. If the young plants are carefully grown on and planted out as soon as possible, some of them may even flower next autumn, while all should flower in the following spring.

The chief difficulty will probably be to obtain the seeds. Few nursery firms offer iris seeds in their lists, and those lists which do contain them do not usually appear until the new year. Now, if iris seeds are not sown until the new year, they will often lie dormant for a year before they germinate. Even if they are sown as soon as they are ripe, some hybrid seeds will lie unchanged in the soil for ten or fifteen years, and then germinate, but, as a general rule, seeds of species and of the common bearded hybrids which are sown in October or November will germinate readily in the spring.

Seeds should, therefore, be obtained in the autumn from a nursery or from a friend's garden and be sown with as little delay as possible.

Very little that is accurate seems to be known as to the conditions under which seeds germinate most readily. My own belief and experience is that germination is much more certain in an open porous soil than in the close, finely-sifted soil in which it seems to be the custom for gardeners to sow seeds. Possibly this finely-sifted soil may be necessary in cases where the seeds are extremely minute, but,

unless the seeds germinate quickly, it is extremely difficult to keep pots of this finely-sifted soil free from moss, which, if allowed to remain, must tend to choke the tiny seedlings.

Iris seeds are by no means minute and, if the soil is passed through a quarter-inch sieve, it will be quite fine enough. The actual soil which is chosen will depend on the section of the Iris genus to which the seeds belong. In all cases the basis may be well rotted leaf-soil. If the seeds are those of bulbous species (xiphium, reticulata and Juno sections) or of the bearded irises, then leaf-soil and sifted mortar rubble may be mixed together in equal proportions. If, on the other hand, the seeds are those of the Californian species or of I. sibirica and of its relatives, then sand or sandy soil should be substituted for the mortar rubble.

The pots should be carefully drained, and I have for years used circles of wire gauze instead of pieces of broken flower-pots with which to cover the hole at the bottom of the pot. Over the wire gauze is placed a little moss, and I find that this drainage remains good for several years. No worms can get into the pots through the wire gauze, and this is certainly no small advantage, for worms in a seed pot are apt either to throw the seeds out on to the surface of the soil or to drag them down too far beneath it.

When the drainage has been provided, the pots are filled with the prepared soil to within rather less than an inch of the top. There is no need to ram the soil down hard. One push with the fingers and a shake of the pot settles the soil in position, and the seeds may then be sown and covered with about half an inch of the prepared soil. Then the pots are well watered in order to soak the soil thoroughly.

The next step is to plunge the pots to the rim in the open, either in sand or in ashes. In sandy soil they can just be sunk in the ground, but when the soil is clay it is better to make up a special plunging bed of ashes and to put the seed pots into this. It is a great mistake to coddle iris seeds, and they should never be placed in a frame in the autumn. The stagnant air seems to have a bad effect on the seeds, of which a large number rot without germinating, while those

which are fully exposed to the action of the weather germinate much more readily. More than once I have amused myself after a fall of snow by rolling huge snowballs across the lawn and then on to my seed pots, until I have been able to pile the snow up four or five feet high. Such a heap usually takes a week or two to melt completely away, and when it is melted a sharp look-out should be kept for the tips of the young seedling leaves.

As soon as the tips of these appear, the pots in which germination has begun should be placed under glass, either in a frame or in a cold-house. The object of this treatment is to take advantage of the slight increase in temperature which is found under glass and which will assist the young plants to grow rapidly.

The object of making them grow rapidly is to ensure that the young plants should be big enough to be planted out in their permanent positions if possible before the end of May and in any case early in June. This applies, of course, only to the rhizomatous species, for if the seeds of the bulbous irises are not sown too thickly, the young bulbs may be left to complete a second season in the pots in which the seeds were sown. As soon as a plant has made four or five leaves, of which the longest are about four or five inches long, it is ready to be planted out in the position where it is to flower. The holes for the plants should, of course, be made with a hand-fork or trowel, and never with a dibber, and if the soil is very dry it may be necessary to fill each hole with water before inserting the plant. The surface will then be left loose and dry, thus acting as a mulch and the water used will be available for the roots of the plants and will not be so rapidly drawn out of the earth by the sun as is the case when it is poured on the surface after the plants are in position.

Seedlings of bulbous species should remain in an airy cold frame in their first season until the leaves turn yellow and die down. Then the lights should be left on the frame until September or October, so that the soil in the pots becomes quite dry and warm. In the autumn the old leaves may be cleaned off, taking care not to pull out the young bulbs with them, and a top-dressing of fresh soil of the same composition as that in which the seeds were sown may then be applied

with advantage. The frame should now remain open until the young leaves appear and the lights need only be put on to protect them against bad weather. At the end of the second season the bulbs should be lifted out of the pots and planted in their permanent positions early in the autumn. Two years later the first flowers should appear.

All seed pots must be weeded occasionally, and for this purpose the fine sharp point of a knife is as good as anything. With this it is often possible to cut through the root or roots of the weed, which is just pulled up as far as it will come without tearing up the soil or disturbing the seeds or young seedlings.

IRIS ACUTIKOR.

(IRIS ACUTILOBA AND I. KOROLKOWI.)

(" The Gardeners' Chronicle "-July 2nd, 1921.)

It is a good many years ago now since through the kindness of the authorities of the Tiflis Gardens. I received some rhizomes of the Caucasian Oncocyclus species, Iris acutiloba. In the following year some of the plants flowered, and, knowing that I should probably not succeed in keeping them alive, I fertilised them with pollen of I. Korolkowi. I obtained which seeds. germinated with the irregularity and uncertainty of these hybrids. plants thus obtained showed clearly the influence of their parents, and some at least of them, those that have survived, are both sturdier and more floriferous than either of the species from which they are derived.

The foliage is narrow, stiff and upright, except for the outer leaves in each tuft, which are inclined to be falcate. The stems overtop the leaves and are about nine inches or a foot in height, and bear either one or two flowers. The long, narrow spathes are entirely herbaceous, green in the lower part and slightly flushed with purple near the top.

The flowers have the poise of I. acutiloba, with the pointed outstretched outer segments or falls of that species. The falls are conspicuously veined with deep brownish-purple on a creamy-white ground. The dark signal patch of the Oncocyclus species is very obvious, and is formed by the coalescence of the veins. On the style branches the purplish veining almost wholly obscures the lighter ground, while the broad, pointed beard is composed of scattered dark, black-purple hairs. On the standards the colour scheme is the same as on the falls, except that slight purplish shading partially obscures the cream-coloured ground between the veins, with the result that the standards look distinctly darker than the falls.

There is something peculiarly pleasing about the neat, clear-cut flowers with their conspicuous veining, and they always seem to attract attention when they are growing among the rest of my Regelia Irises. They are easy to cultivate, provided that the rhizomes are lifted in July and stored in dry quarters until October, when they should be replanted in well-drained, rich

soil.

In another hybrid from the same cross, the veining is of a blue-purple colour, and both the standards and falls are rounder at the apex, as they are in some forms of I. Korolkowi. The falls tend to reflex instead of extending horizontally, and the signal patch is much broader, while the broad standards are held erect and do not curve in to meet one another.

99

IRIS ALBO-PURPUREA.

(" The Gardeners' Chronicle "-November 20th, 1909.) It does not seem to be generally known that the wild type of this species is one of the finest irises of real blue colour. The plant, originally described by Mr. Baker and figured in " The Botanical Magazine" (t. 7511) as having white flowers delicately mottled or dotted with blue, always looked to me like a hybrid when I saw it growing in the tank that used to stand at the end of the herbaceous ground at Kew. After several attempts, I have at last succeeded in obtaining plants this Japan, which blossomed summer, produced splendid flowers of a deep blue colour, with a small yellow signal patch at the bend of the falls. In the structure of the flower-spike and in the yellowishgreen leaves, which have not the distinct midrib of I. laevigata and which do not clasp the base of the stem, the plants agree closely with Mr. Baker's description, was also the case with some monstrosities either of a grey-blue or of a deep indigoblue colour. This last is the albo-purpurea coerulea of the Japanese nursery firms. The method by which these double forms are obtained still remains a mystery, and the same time it is almost incredible that the artistic sense of the Japanese can tolerate these shapeless varieties, when the wild type has beauty of form as well as richness of colour.

It is unfortunate that Mr. Baker gave a colour name to this species, but it is undesirable to multiply synonyms, and it seems best, therefore, to follow the Japanese authorities in keeping I. albo-purpurea as the name of this species and in making the Kew plant I. var. albo-purpurea Baker. As to the further point of the identity of the albo-purpurea with the laevigata of Fischer and Meyer, I shall hope to have more to say next year, if some plants of the latter which have just reached me from Russia are kind enough to flower.

IRIS ALBO-PURPUREA COLCHESTERENSE.

(" The Garden "-July 2nd, 1910.)

The varietal name here given distinguishes a very beautiful and highly ornamental plant from the species described some years ago in "The Botanical Magazine," the present plant having been received from a distinct source under the specific name. In many ways the plant is a great beauty, indeed, well-nigh unique, and for water-side gardening or those moister spots in the garden in which so many plants delight will be found a great gain. The long, ovate falls are of deep violet-blue, with white base, and irregularly bordered white.

The long, erect and narrow standards are bluishwhite and slightly waved at the margin. It is a plant of distinction and great merit, of which any description would prove inadequate.

IRIS APHRODITE.

(LORTETI X GATESII.)

(" The Gardeners' Chronicle "-July 8th, 1916.)

Last autumn I received from Mr. C. G. Van Tubergen, junr., of Haarlem, a rhizome of this Iris, which resulted from a cross between I. Lorteti and I. Gatesii. The growth of the leaves is weak, and resembles rather that of Iris iberica than that of either of the parents. The solitary flower has recently opened, and is truly extraordinary. The stem is about a foot in height and, as usual in the Oncocyclus section, bears only the one flower. The narrow spathe is nearly four inches long, and remains green, except at the tip, even when the flower has expanded.

The orbicular standards are white, three and a half inches in diameter, very faintly veined and minutely dotted, especially in the central portion, with violetpurple. For twenty-four hours after the flower first opened the falls remained extended horizontally and deeply concave, as in Iris iberica. and indeed it appeared at first as if this latter iris must have been one of the parents. Then, however, the falls began to droop and became conspicuously convex, the outer edges bending back so far as actually to meet behind. The colour is a faint creamy-yellow, closely dotted all over with violet-purple, and, when expanded, the blade measures three inches across. The most pear-shaped feature is perhaps the patch of rich velvety crimson-purple in the centre of the fall, above which there is a broad straggling beard of pale, strawcoloured purple-tipped hairs. The style branches are coloured and dotted in the same way as the falls, and bear the widely-separated, triangular crests which are characteristic of the Oncocyclus Irises.

I do not know for how many years this beautiful hybrid has flourished in Haarlem. We can only hope that it will prove to have a more robust constitution than either of its parents appears to have, at any rate in this sandy soil. Each succeeding year's experience of the behaviour of bearded irises here and elsewhere makes it more and more clear that there are no exceptions to the rule that, given a sunny and well-drained position, all bearded irises are more vigorous in a heavy soil rich in lime than in any other conditions. Here, in a garden of light sandy soil, they

can only be kept in health and vigour by frequent removal into fresh soil which has been manured and enriched for previous crops of another kind.

LONGIPETALA GROUP. IRIS ARIZONICA.

(" The Gardeners' Chronicle "-February 3rd, 1917.)
On the western side of the North American continent there occurs a group of irises, of which the best known is perhaps I. longipetala, and of which the members must present considerable difficulties to systematic botanists, who deal only with dried material.

The true I. longipetala is a strong, sturdy plant, confined in the wild state, I believe, to the coast of California, from San Francisco southwards to Monterey. Even in cultivation here it still shows the effect of the Californian climate by losing its leaves at the end of the summer and starting into growth again in early autumn, a habit which clearly indicates that its home is in a region where no hard winters occur.

Further inland there occurs another species, which I believe to be the true I. missouriensis of Nuttall, and which is to all intents and purposes merely an upland or mountain form of I. longipetala. When in flower, it agrees in almost all respects with that species, even to having the characteristically blunt, square-topped standards with a wide emargination or indentation in the centre, and only differs in being more slender in all its dimensions, and especially in its habit of not starting again into growth until the spring when once the leaves have died down in late summer. This is a characteristic which we should expect to find in a plant from mountainous districts with hard frost in winter.

A third and nearly allied species grows in close proximity to I. missouriensis, and, unfortunately, the nomenclature of these two species has become very confused. The name of tolmeiana has been applied at times to both species, and it seems, therefore, better to retain Nuttall's manuscript name of montana for this third species. In its habit of growth it closely resembles missouriensis, but differs in having pointed and not blunt standards, and in producing usually only two flowers on short pedicels in contrast to longipetala and missouriensis, which may each have as many as five flowers in a head on pedicels of varying lengths up to several inches.

All the characteristics which I have mentioned, including even the indentation in the standards of longipetala and missouriensis, have proved to be constant here in successive generations of seedlings, but it can easily be realised that, in cases where the standards of the flowers are either invisible or damaged it is extremely difficult to separate herbarium specimens with any degree of certainty.

A further difficulty arose when in 1902 a description was published in "Coulter's Botanical Gazette," xxxiii., p. 68, of an Iris pelogonus from Wyoming. It is said to resemble "missouriensis," but to be much smaller, though proportionately stouter. From the fact, however, that it has only one or two flowers on each stem, and that the spathes often reach half-way up the falls, it seems more probable that it is more closely allied to, if not a mere form of, the plant which I take to be montana and not missouriensis.

In 1911 I was looking through a number of herbarium specimens of this group of irises, and to one puzzling example from an altitude of eight thousand feet in Barfoot Park among the Chiricahua Mountains of Arizona there was attached a large packet of seeds. These had been in a museum for several years, but I could not resist the temptation of sowing half-a-dozen in the hope that they might yet germinate, and that the resultant plants might help to settle the difficulty that I felt in determining the identity of the specimen.

However, the result has been rather to increase than to decrease the difficulties presented by this puzzling group of plants, for this Arizona iris has proved after several years' cultivation in my garden to be quite distinct from either of the three or four species mentioned above.

The foliage, which grows to a height of two feet or a little more, with a maximum breadth of about three-quarters of an inch, is very dense, denser even than that of I. longipetala, and of a duller, yellower green, without the glaucous, grey tinge of the other species. Another point of difference becomes very obvious as summer passes into autumn, for the leaves of I. arizonica remain fresh and green long after those of the allied species have withered away. It is not, in fact, until late October or November that the leaves assume

a pale, sickly, yellow colour, and begin to collapse. It is curious that in this respect I. arizonica behaves exactly as do the various forms of the Asiatic I. ensata. Among Apogon Irises similarity of the seeds is always a sign of affinity in other respects among the plants, and the seeds of I. ensata are practically indistinguishable from those of the members of the longipetala group. In i t is hard to distinguish plants December arizonica from plants of I. ensata, though neither of these could be confused with I. longipetala or its other relatives.

The flower-stems of I. arizonica are about equal in length to the leaves, and bear a terminal head of three to five flowers on long pedicels of varying lengths up to 4 inches. A lateral head of one or two flowers is occasionally produced about six inches below the top of the stem, as in I. longipetala. The spathe valves are very narrow, two-three inches long, clinging closely to the pedicels and becoming scarious and of a silvery-grey colour at flowering-time. The three-sided ovary is a little more than half an inch long, while the perianth tube scarcely measures as much as one-quarter inch.

The flowers resemble those of I. longipetala, but are slightly smaller, and less conspicuously veined. Both species have, however, a central ridge of the haft of the falls, sprinkled with purple dots on a whitish ground. As the narrow haft expands gradually into the blade the white ground becomes veined with violetpurple and bears in the centre a yellow blotch. Beyond this the veins spread and the colour becomes a little paler and covers the whole surface. There is some variation in the shade of violet-purple. The length of the falls is a little more than two inches, and the blade measures a little less than an inch across. standards are narrow, oblanceolate, pointed, and not emarginate, about one and three-quarter inches long, violet-purple in colour. The styles are short with small triangular crests, and the stigma entire obscurely bilobed. The filaments and the anthers are both a pale mauve, while the pollen is cream-coloured.

The ripe capsules have thin membranous walls, like those of the other members of the group, taper slightly towards either end, and in section are roughly triangular, with slightly inflated sides. The seeds are dark brown, smooth, and pear-shaped, with a minute

whitish circle or aril at the upper end.

May I, in conclusion, ask any American gardeners and botanists who may chance to see these notes to be so good as to send me a few seeds of any irises of this group of which they may happen to possess plants from known localities, or which they find growing wild. It is, I am sure, only by growing all obtainable plants side by side and by comparing them as they grow that the species can be separated and described in such a way as to differentiate them satisfactorily one from another.

I. arizonica is not, perhaps so striking a garden plant as I. longipetala, but it is interesting as a link connecting that species and its American relatives with one of the most widely distributed of Asiatic irises, namely I. ensata.

IRIS BOISSIERI X TINGITANA.

("The Gardeners' Chronicle"—November 14th, 1914.)
In the early days of May it was a surprise to find an iris in flower that appeared to be a fine form of I. Boissieri. On looking up its number I found that so long ago as 1908 I crossed I. Boissieri with pollen of I. tingitana.

The foliage is weak and of a pale yellowish-green colour, which does not augur well for the constitution of the hybrid. However, five or six of the bulbs have flowered and shown little variation. The colour is an intense blue-purple, and the flowers are remarkable for their very flat outline and for the great breadth of the style branches.

The spathes are three inches long, keeled on both valves and scarious only at the tip. Each contains only one flower. The tube is slender and more than an inch in length. The blade of the falls is about an inch broad and bears a central line of. orange-yellow, on which, however, there is no trace of the hairs which distinguish the seed parent, I. Boissieri. The large standards are of the same shade of blue-purple as the falls and incline outwards, contrasting with the distinctly red-purple of the style branches.

My object in attempting this cross was to see whether the scanty beard of I. Boissieri would remain constant in its offspring. In this first generation there is certainly no trace of the hairs, but I had hoped to obtain seeds from the plants and to raise eventually a second generation. The beard should then have reappeared, if, as is not impossible, the character acts as a Mendelian recessive.

The plants have, however, proved to be sterile, for not one has set any sound seeds, though capsules were formed. This is in accordance with my experience of other hybrids between distinct species of iris. Sterility seems to be almost, if not entirely, absolute in every unless the species are closely allied. instance. crosses between new Chinese numerous o f the sibirica group, e.g., Forrestii, chrysographes, Bulleyana, have produced hybrids from which I have lately gathered abundant seed, while I. Wilsonii when crossed with the Californian I. tenax

gives absolutely sterile hybrids, and another Sino-Californian cross, I. chrysographes x I. Douglasiana, gives the same disappointing result.

CALIFORNIAN IRISES.

(" Irish Gardening "-February, 1913.)

the Pacific Coast and the Mountains there is found a well-marked group of irises which the name Californian may inconveniently applied. Its members are perhaps better suited to the climatic conditions of Ireland than those of any other division of the genus, for even in England the foliage of several of the species remains green throughout the winter, unless the frosts exceptionally severe. Moreover, the slender rhizomes do not seem to demand that baking by the sun in summer which is almost essential to the wellbeing of these species whose rhizomes are large and fleshy.

The reason why the irises that form this group seem to be comparatively little known lies in the fact do not lend themselves they easily The slender rhizomes send out few transplantation. and the plants are therefore establish themselves in new quarters. In addition to the paucity of the root-fibres, another difficulty lies in the shortness of the period during which they are If the plants are torn up in autumn, rootgrowth will be found to have entirely ceased, and the plants, making no attempt to establish themselves, invariably perish. Ιt is only while leaf-growth is between March and early September active transplantation has any chance of being successful.

Fortunately, all the species set seed readily, and young plants when put into the open ground in summer soon grow to flowering size. The soil should be light and relatively rich in humus, but care must be taken that it is free from any considerable proportion of lime.

With regard to the species that form the group, it is possible to recognise two sub-divisions, of which the best known examples are I. longipetala and I. Douglasiana. Of these, the former is only found along the Californian coast in the region of winter rain and heavy sea mists in summer. The stems rise to a height of two to three feet and usually bear only one head of flowers, from which, however, emerge in succession as many as four or five blooms. The large falls are

conspicuously veined with deep purple on a white ground, while the oblong standards are of a uniform pale purple colour. They are of a curious and characteristic shape, having a blunt upper end with a wide and deep indentation at the centre. The foliage is of a deep green, somewhat stiff and nearly as long as the stems. Moreover, the plants begin to grow in the autumn, sending up their new growths before the old leaves have withered entirely away. Accordingly, they are practically evergreen.

Differing from I. longipetala, chiefly in its habit of growth, there is a closely-allied species which occurs further inland and which behaves as a mountain species by losing its foliage entirely in the autumn and lying dormant until the spring. The leaves never attain the length of those of I. longipetala and are always considerably shorter than the stem. The flowers, however, except for being somewhat more slender, are indistinguishable from those of that species. This is the plant to which Nuttall gave the name missouriensis, and it is necessary to distinguish it carefully both from I. longipetala Of which apparently only a sub-species, and from another plant to which Nuttall gave the name of I. montana, although it is uncertain whether he ever actually published a description of the plant. Fortunately, his original specimens both of missouriensis and I. montana are still preserved in the British Museum and there seems little room for doubt as to their identity. I. montana differs from the two species already described by its lanceolate and not truncated standards and by the fact that the colouring of the falls is more uniform and less conspicuously veined. Moreover, the flowers bear a distinct yellow patch on the blade of the falls. The plant is sometimes to be obtained from the nurserymen under the name of I. tolmeiana or missouriensis, while the true missouriensis has been in cultivation I.longipetala var. montana.

The other group, of which I. Douglasiana is the most vigorous and the best known, contains a number of beautiful species well suited for cultivation in large rock gardens in warm aspects with rich, light soil. I. Douglasiana gives rise to innumerable colour varieties when it is raised from seed, which is by no means a difficult process, for the plants set seed abundantly, probably as the result of self-fertilisation, and the

seeds germinate as readily. The colour varies from a pale buff-yellow through pale mauve to deep violet-purple. The flower stems are numerous and strong plants produce spathes each containing three flowers, so that the display lasts for a considerable time. The foliage is striking, being at its best in late autumn, and then dying off gradually a bright red colour by the time the new growths push up in March. This iris only grows near the Pacific coast of California.

Further to the north, in Oregon, is found another beautiful and very floriferous species, I. tenax, which has probably suffered from a suggestion that was once made that it should be cultivated in half shade and in moist soil. These conditions do not suit it at all, for it requires a warm, light soil, and some sunshine. Then in June, the foliage is literally hidden by the flowers, varying in shade from a pale pearly grey, to the deepest claret-purple. Unfortunately, it is my experience that after two or three such lavish displays the plants tend to exhaust themselves. Since, however, seed is usually abundant, it is an easy matter to raise fresh batches of seedlings, from time to time. Probably too, a little care in removing dead flowers and so preventing the formation of seed would tend to prolong the life of the plants.

I. bracteata and I. Purdyi are an interesting pair of species. Both are, unfortunately, rare, since they object most strongly to any disturbance once the plants have reached maturity. In typical specimens of both species the flowers are yellow veined with crimson-purple. The deep green foliage is very scanty and tough, and the chief difference between the two is that in I. bracteata the perianth tube is quite short and funnel-shaped, while in I. Purdyi it is slender and about an inch in length.

I. macrosiphon, as its name implies, has a long perianth tube three inches in length. It is a very rare plant but one of the most beautiful; it is also very floriferous and produces endless colour forms. The foliage is very narrow and of a curiously glaucous bluish-green.

The somewhat insignificant plant that goes by the name of I Hartwegii has pale straw-coloured flowers of no great merit. It is possible that it is only a local

form of I. tenax; at any rate a purple-flowered form of it is said to grow in the San Bernardino mountains in Southern California, and I have failed so far to distinguish dried specimens of this from typical I. tenax.

The two remaining numbers of this group are I. tenuis and a hitherto unpublished species probably of little value as a garden plant. Neither has apparently been as yet in cultivation in England, although I hope that I have at last succeeded in obtaining seedlings from the latter.

SOME CALIFORNIAN IRISES.

(" The Gardeners' Chronicle "-July 23rd, 1910.) The various species of iris native of the Western States of America seem to be less well-known and less generally cultivated than they deserve to be. The chief reason for this neglect appears to be that they do not lend themselves to the nurseryman's habit of moving all herbaceous plants in the autumn. If the plants are uprooted then, the more delicate of these species invariably die. They are somewhat erratic in their behaviour at any time, but, if treated carefully, they may be moved with very reasonable success at any time from April till early September, though, by preference, I should choose the earlier part of this period for the operation. By careful treatment is meant that the young root-fibres must not be ruthlessly trimmed off after the neat fashion in which iris rhizomes arrive Holland, for the slender rhizomes send comparatively few of these fibres, and if these fibres are mangled, the plant stands little chance of reestablishing itself in new quarters. These irises are best suited in a light soil that is free from lime and rich in humus.

It is a curious fact that American irises seem to go in pairs, the individual members of which are, in most ways, identical, though their other characters are so distinct that we cannot group them together as one species. Of such pairs, I. bracteata and Purdyi, I. longipetala and missouriensis, I. Watsoniana and Douglasiana, I. hexagona and hexagona Lamancei are examples, though the two latter, are, of course, natives of the Eastern States.

I. bracteata is one of the most beautiful of all irises. It derives its name from the fact that its stem is clothed in short, leafy bracts, and its evergreen habit is certainly a point in its favour. The flowers are yellow, veined conspicuously and yet delicately with a colour that comes very near to crimson, while the deep-green, glossy leaves set off the flowers to great advantage. I. Purdyi is very similar. The leaves are rather narrower and shorter, but the flowers bear the same crimson veins on a yellow ground, although in this case the shade is a little lighter. In both species the pointed falls are held horizontally, and the only real difference lies in the fact that, in bracteata the

perianth tube is very short while in Purdyi it is nearly two inches in length. The plants are obviously different when growing side by side, and yet it would be very difficult accurately to define the difference between them if it were not for this distinct feature of the length of the tube.

I do not know of any record of any other hybrids of bracteata, but this year I have had in flower here a dwarf plant which bore six or seven stems of beautiful pink flowers of the characteristic shape of bracteata. The pollen parent I cannot give, as the seed parent would seem to have fertilised naturally. It was growing in close proximity to both Douglasiana and tenax, and I incline to think that, to judge from the dwarf, somewhat spreading habit of the foliage, the pollen must have been that of Douglasiana. However that may be, the hybrid is certainly far more floriferous than its mother anid a delightful plant for a sunny corner in a rock garden.

- I. Hartwegii is one of those species which catalogues describe as of botanical interest, meaning of course that they do not wish to be uncharitable to any plant. The small flowers are of a pale straw colour, and two or three are produced on a slender but wiry stem four or six inches long. My plants are growing where the seeds were sown in the open, and they are apparently quite hardy, at least in a light soil. They have flowered well, both last year and this, and I hope they will consent to give me a fresh stock of seeds before any evil fate overtakes them.
- I. chrysophylla, from Oregon, looks a picture of ill-health, and yet since it flowers annually, I am beginning to think that its yellow leaves are enough to distinguish it from macrosiphon, with which it agrees in many ways. The stem is short but the flowers are borne upon a long tube over two inches in length. They are of a creamy-white, with a few golden veins in the centre of the falls that seem to sparkle in the sun.

I. tenax is so called because of the wiry fibres of its leaves, which the Indians used to twist into twine of considerable strength. The stems rise well above the leaves, and bear comparatively large flowers, which may vary in colour from the palest pearly-grey, through delicate shades of mauve, to a deep, rich, claret tint. This really valuable plant suffers, I believe, from a note as to its cultivation in a certain popular book on the Iris, which describes it as thriving in peat kept moist with

sphagnum in partial shade. Under these conditions my plants certainly did not thrive, but in dry sand, in a sunny position, they thrive amazingly and flower well.

For some time, I have been trying hard to solve the mystery of the longipetala, missouriensis, tolmeiana group, but only become more and more puzzled and must obtain more material before coming to a definite conclusion. The examination of a large number of herbarium specimens, collected in different localities, has not thrown much light on the subject, but I incline to think that what was first described as longipetala has deep-green leaves of lax, almost evergreen habit, longer than the stem, which always bears more than two flowers on pedicels of unequal length, while missouriensis was applied to an earlier flowering plant with somewhat yellow-green leaves, which are more or less erect at flowering time and distinctly shorter than the stem, which bears only two flowers. This theory, however, received a shock this year when a batch of seedlings raised from Californian seed and having the foliage of missouriensis produced the inflorescence of longipetala. It is possible that the seed was from plants that had accidentally become cross-fertilised; unless this was the case it would seem almost impossible to keep up any distinction between the two species. I am endeavouring to raise a second generation from these plants, and the results ought ultimately to throw some light on the question of the validity of the two names.

Iris macrospihon I have never yet had in cultivation, but from all accounts, and to judge from herbarium specimens, it must be a desirable plant. It varies much in colour and is readily distinguished by the long (two to three inches) tube.

I. Douglasiana and Watsoniana are obviously very similar, not merely local forms of the same species. Both have practically evergreen leaves with pinkish base, that are at their best in winter, but while those of I. Douglasiana are narrow and lax, those of I. Watsoniana are broad and stiff, and spread in almost horizontal, fanshaped tufts. A number of seedlings that I have raised here from plants of uncertain origin seem to show that these characters in the foliage are transmitted unchanged, but the plants are in other respects so similar that they hardly deserve to rank as more than sub-species. The colour of the flowers is extremely variable. It may be a deep, rich violet with white veinings on the upper part of the blade of the fall, or these markings may be almost wholly absent. Other plants bear flowers of a pale lilac or lavender shade, and yellowish examples are not unknown. One fine, large-flowered seedling has almost white flowers, with a faint tinge of lilac, while another is heavily veined with violet on a silvery-white ground, producing a flower not unlike a small longipetala. Such seedlings flower in one or two years at the most from the time the seeds germinate, and it may be that this fact has only to be more widely known than it appears to

raising irises from seed.	I

Iris Carthusian.

(" The Flower Garden.")

It may be as well to put on record the parentage of this Iris as it is in some danger of being lost.

Twenty years or more ago now, some iris rhizomes were sent to a Charterhouse master by a brother from Mardin in Armenia. When the plants developed they proved to be I. Gatesii and a bearded iris, which I subsequently described as mesopotamica. The latter proved difficult to grow and only did well after a hot summer. Some of the plants were given to J. W. Marshall, another master, and he crossed a flower with pollen of pallida dalmatica and Carthusian is the result of the cross. In this country it has never done well except after a hot summer, and I have just had a letter from my old friend and colleague Mr. Marshall, who tells me that his plants have done better this year after the extraordinary baking they had last summer.

I Lop-tec. I. acutiloba x I. Korolkowi.

(" *The Gardeners' Chronicle "—June 18th,* 1910.) I. lop-tec.

When, in June 1908,I pollinated with pollen of Iris tectorum a flower or two of the dwarf I. pallida, which Sir Michael Foster obtained from Monte Loppio, I hardly expected to get any result, for experience has shown that among irises it is only members of the same group that hybridise at all readily. However, I obtained a pod of sound seed and from this seedlings were raised early in 1909. Of these, the strongest (Lop-tec) has just come into bloom for the first time, and it is obvious that tectorum pollen has had a very considerable influence.

The leaves attracted my attention from the first, for, although they are similar in shape to those of Loppio, in colour and substance they resemble those of tectorum. Of the inflorescence it is unwise to speak until the plant has had a chance of more complete development after another year or two's growth. The spathe valves are narrow, pointed and keeled, green at back and scarious at the edge, thus combining the characteristics of the two parents, the spathes of I. tectorum being green and pointed, and those of Loppio blunt and scarious. The perianth tube is short like that of I. Loppio, but of deep violet-purple colour as in I. tectorum.

The flower itself looks at first sight like an I. tectorum of somewhat sombre colouring. The segments are all approximately equal, and the standards are spread out at the same angle as the falls. The colour is a curious dull purplish-lilac found in I. Loppio, and the mottlings always found in I. tectorum are entirely absent. Before the bud opened my chief curiosity was to see whether the beard of Loppio or the crest of tectorum had prevailed, and I was not a little surprised to find that neither has really proved itself dominant over the other. The white, purple-mottled crest of tectorum is there on a reduced scale, and the beard of Loppio appears in the brownish-yellow hair-like processes, which crown the top Of the crest. The verdict of Mendelism on this result would appear to be that the beard and the crest do not form a pair ot Mendelian characters.

On the whole, I. tectorum, the pollen parent, has had a much more marked influence than I. pallida, the seed parent. It would no doubt be interesting to go on to the next generation by self-fertilising the present plant, but unfortunately the anthers contain no pollen, as I also found to be the case in another inter-group hybrid, namely I. olbiensis crossed with pollen of I. Korolkowi.

I. ACUTILOBA x I. KOROLKOWI.

The result of this cross is a group of particularly pleasing plants.

The seeds ripened in 1907 and germinated (freely for an Oncocyclus) in 1909. The young plants came well through last winter, quite unprotected, and several have recently flowered. In habit the plants resemble small specimens of I. Korolkowi, the brown-purple coloration at the base of the leaves being present in some cases. The stem, about twelve inches in height, bears a two-flowered spathe, and the flowers retain the characteristic shape of I. acutiloba, with connivent standards and almost horizontal falls. All the segments are pointed, as in acutiloba, and boldly veined with a warm shade of chocolate-brown on a white ground.

It is noteworthy that in this case the influence of the pollenparent has been strong enough to produce a two-flowered, instead of a one-flowered, spathe, and the theory that the Oncocyclus and Regelia group of irises are closely related would seem to be supported by the fact that hybrids between their members appear to be fertile.

CHINESE IRIS (THREE NEW).

I. WILSONI. I. FORRESTII. I. BULLEYANA.

(" The Gardeners' Chronicle "—June 25th, 1910.)

The richness of the Chinese flora is indeed extraordinary, and thanks to the enterprise of Mr. Wilson and Mr. Forrest, our gardens are rapidly being enriched of its treasure.

For some years I have been hoping that sooner or later we should obtain a yellow-flowered relative of Iris sibirica, for there appears to be considerable evidence that the blue-purple colouring matter of many irises is of very nearly the same composition as the yellow of others. I am told, and I can well believe, that the chemical question involved is extremely delicate and complicated, but its solution might be of great value.

In the " Kew Bulletin " for 1907, p. 321, Mr. C. H. Wright described Iris Wilsoni from specimens sent to him by Messrs. Veitch, of Chelsea. Last year this firm very kindly allowed us to have a plant of this iris, which, on June 7th, began to bloom freely. By a lucky chance another Chinese iris, collected by Mr. Forrest, and sent to me by Mr. A. K. Bulley, also came into flower on the same day, and this plant I propose to name I. Forrestii. Both these irises have yellow flowers, and they are both closely related to I. sibirica and I. Clarkei. They are distinguished, however, by the following characteristics. In I. Wilsoni the flowers are borne on long pedicels, as in the western forms of I. sibirica; in I. Forrestii the pedicels do not exceed an inch in length. In the former the styles are very narrow, and the standards spreading, as in I. Clarkei, with the edges of the blade curiously crimped, while in the latter the styles are broader than the haft of the falls, and the standards almost erect, with smooth blades. The foliage also of the two plants is quite distinct, that of I. Wilsoni resembling the growth of the Oriental forms of I. sibirica, while the leaves of I. Forrestii are narrow and grassy and, moreover, have the polished upper surface and glaucous under-surface, which are so marked features of I. Clarkei. Moreover, I. Wilsoni grows to twice the height of I. Forrestii.

IRIS WILSONI.

The hollow stems are about two feet in length, barely over-topping the leaves, bearing a reduced leaf usually below the centre, and a two-flowered spathe above the pointed green valves out of which the flowers rise on solid pedicels two to four inches long. The ovary is small, trigonal, dark green, with a shiny surface, and a tube of the usual sibirica shape, of about the same length as the ovary.

The falls have a broad haft much veined with red-brown on a bright yellow ground. This colouring extends in a semi-circular patch on to the oblong blade, which then becomes pale yellow, with faint purplish veins. The standards, which are poised at an angle of 45 degrees, have a very narrow, deeply channelled haft as long as the much crimped blade, the colour of which is pale yellow with faint purplish markings. The narrow styles are bright yellow, and the crests small, quadrate and overlapping.

IRIS FORRESTII.

The leaves are grassy, linear, about ten to twelve inches long by a quarter of an inch broad, with a smooth polished upper and a glaucous under surface. The numerous stems are about twelve inches in height, bearing one or two reduced leaves below the centre, and a single head of one or two flowers; they are hollow, but owing to the thickness of the walls the central space is much smaller than in its allies. The spathe valves are green, pointed, keeled, two to three inches long, containing one to two flowers on solid pedicels about one to one and a half inches long. The ovary is pale green, trigonal with markedly hollow sides, slightly longer than the broad many-sided tube.

The falls have a short (one inch) horizontal haft, bearing broken veins of dark red or purple-brown on a yellow ground. This colouring projects as in I. Wilsoni in a half-circle on to the oblong blade (one and a half inches long by one inch broad) which is separated from the haft by a sharp constriction. The blade drops perpendicularly, and is of a pale, lemon-yellow, sometimes slightly marked with faint purplish veins. The standards are erect, with channelled haft and oblanceolate, pale yellow blade. The styles are also pale yellow, somewhat discoloured with purple, broader than the hafts of the falls, much arched and bringing the broadly triangular stigma close down on to them. The crests are small, quadrate and overlapping.

IRIS BULLEYANA.

The third new Chinese species, to which I propose to give the above name, supplies a link between I. sibirica and I. Clarkei, for it has the hollow stem of I. sibirica, although in foliage and growth it is very similar to I. Clarkei.

The plant that I received from Mr. Bulley last autumn has not flowered, but he has very kindly sent me a flowering specimen. However, as the plant was uprooted some days before the bud opened, I hesitate to give its full description, and will merely describe it provisionally as an ally of I. Clarkei, with flowers of which the standards are blue-purple and the falls mottled with the same colour on a creamy ground.

As regards habitat I. Wilsoni was found by Wilson at Fang, in the Province of Hupeh, in Western China, I. Forrestii in open mountain meadows on the eastern flank of the Lichiang range in North-west Yunnan. At present I am unable to state the precise locality in which I.

Yunnan.		

Bulleyana was collected, although if my recollection is right it was in

MR. FARRER'S CHINESE IRISES.

I. FARRERI I. HENRYI. I. RUTHENICA. I. GONIOCARPA. I. FELINA.

(" The Gardeners' Chronicle "—April 3rd, 1915.)

By the kindness of Professor Bayley Balfour, I have recently had an opportunity of examining the dried specimens of the irises which Mr. Farrer collected last year in Western China, and described so enthusiastically in his letters already published in these columns.

I remember wondering, as I read the letters, what the irises could be that Mr. Farrer was describing. It was difficult to identify them with any confidence, and yet it seemed unlikely that any large proportion of them could be new and unknown species, in view of the fact that Western China has been fairly extensively explored by botanical collectors in recent years. The later collections sent home by Messrs. Forrest and Purdom have not contained any novelties among the Iris family, and it almost seemed as though even Western China no longer contained any botanical surprises.

As was only to be expected, Mr. Farrer encountered in South Kansu the ubiquitous Iris ensata (see "The Gardeners' Chronicle," October 26th, 1914, p. 213), which he described as giving, in some places, a blue tinge to the country side. His specimen, No. F. 29, shows that this iris there produces its flowers while the leaves are only four to six inches in length and therefore barely as tall as the flowers themselves. In England, it is rare that the climatic conditions allow I. ensata to flower in this way, though the plants do occasionally attempt to send up their flowers with the leaves. The attempt is usually disastrous, owing to late frosts, and the plants then learn wisdom and keep back their main display until the leaves have grown to a foot or more in length, and provided more shelter for the delicate flowers. In countries where the change from winter to spring is sharper and more decided than it is in these islands it is obvious that I. ensata is able to send up its flowers simultaneously with the leaves, instead of hiding them among the almost full-grown foliage.

IRIS FARRERI SP. NOV.

The only other iris to which Mr. Farrer gave a well-known name was I. graminea (see "The Gardeners' Chronicle," September 12th, 1914, p.185). "More generous is I. graminea, which abounds in the sere, fine herbage of high, hot downs, and now enriches their brown expanse with here and there a dainty spidery cup of amethystine blue, suggesting a crocus torn in strips, or I. reticulata, diminished and made anaemic." This was a puzzle, for I. graminea was not known to grow east of the Caucasus, and yet it seemed hardly possible that any other iris could have been mistaken for this well-known species, with its plum-scented flowers and curiously flattened stem, which at once distinguish it from

all others. Partly by the process of elimination and partly from the superficial resemblance of the plant and flowers to I. graminea, I feel that we may, with some confidence, identify No. F. 325 with the plant described above. The label on the sheet says: "Abundant by the upland tracks and in open places in the hill valleys of the Min S'an, not below nine thousand feet, nor above ten thousand. July 20th (lingering)." This iris, however, is not I. graminea, but an unknown species to which the name of Iris Farreri may perhaps not inappropriately be given. This species obviously belongs to the Spuria group, with the members of which it agrees in possessing the ovary with double ridges at each angle, the sharply two-pointed stigma, the orangered pollen, and the oval blade of the falls separated by a constriction from the long oval haft.

At first sight I. Farreri bears a far more striking resemblance to the Balkan I. Sintenisii than to I. graminea, from which it is separated at once by the stem, which is apparently not flattened, and by the long tapering neck to the ovary, a feature which is conspicuously absent in I. graminea. The foliage, too, as far as can be seen from the dried specimens, lacks the polished upper surface which is so marked in I. graminea. From I. Sintenisii and I. Urumovii it is less easy to separate this new iris. It differs chiefly, however, in the thin texture of the spathes, of which only the outer valve appears to be keeled and that but slightly, and in the narrow, slender, somewhat flimsy foliage. In I. Sintenisii the leaves are noticeably tough and leathery and in I. Urumovii they are very stiff, rigid, and glaucous. The character of the rhizome is not wholly apparent from the available specimens, but the fibrous remains of old leaves that sheathe the base of the growths suggest an affinity in habit to I. songarica, another Eastern and outlying member of the Spuria group. I. Farreri is distinguished from I. Kerneriana by its narrow leaves, by the rounded and not pointed blade to the falls, and probably by the character of the rhizome.

The stem of I. Farreri is about eight inches long, and bears a single head of two flowers. It is closely clothed in about three reduced leaves. The spathes are nearly four inches long, narrow tapering to a fine point, not at all scarious at floweringe time, and with a transparent margin in the upper paer. Only the outer valve seems to be slightly keeled. The pedicels are one and a half to two inches long, and the six-ribbed ovary has a tapering neck about half an inch long.

The flowers apparently bear a striking resemblance to those of I Sintenisii, as far at least as can be seen from the dried specimens. The panduriform fall is about one and three-quarters of an inch long, the small blade being separated from the haft by the constriction characteristic of the Spuria group. The blade is closely veined, and probably minutely dotted, with blue-purple on a grey white ground. The sides of the haft are veined, and the central portion dotted in the

same way. The narrow, oblanceolate standards are about as long as, or slightly shorter than, the falls, and of a slightly redder shade of purple. The styles also are of a redder purple, and the stigma consists of two sharply-pointed teeth, as in all members of the Spuria group, with which I. Farreri also agrees in having bright, orange-red pollen. The crests of the style are broadly triangular, and not long, narrow and tapering, as in I. songarica. The foliage is narrow, being barely three-eighths of an inch in width, but it overtops the stem, some leaves being as much as eighteen or twenty-four inches long. In their finely-ribbed texture, the leaves resemble those of I. humilis or I. Urumovii.

IRIS HENRYI.

We can now pass on to those irises to which Mr. Farrer either gave new, provisional names, or which he left unnamed. The first is that described on p. 258, October 17th, 1914, as a "little grassy-leaved, white iris, apparently of Pavonia relationship, the six segments being so rounded, and occasionally so equal, as to make almost the effect of a small and starry narcissus." The "relationship" to pavonia is somewhat misleading, because the so-called I. pavonia is not an iris at all, but a bulbous plant whose proper name appears to be Moraea pavonia. Mr. Farrer was thinking only of the markings on the falls and not of the habit of the plant. Of this iris the dried specimen is numbered F. 19, "pavonina," and accompanied by the following note:—" Abundant in the hot and very coarse turf at six thousand feet on the torrid hills opposite Kiai Chow, April 29th. Alas! we could not manage to secure either plants or seeds" This small iris has a slender, wide-running rhizome very similar to the underground stems of the couch grass. Each tuft of six or eight slender leaves produces a single stem, four-six inches in height, with a single, two-flowered spathe. The valves are entirely green when the flower is expanded, and though they are an inch or more in length, yet the pedicel is even longer, so that the ovary is exposed above the spathes. The tube is very short.

This is I. Henryi, Baker, of which hitherto there have only been available such dry herbarium specimens that it has been impossible to say even whether the flowers were yellow or lilac. Mr. Farrer's specimens, however, are so fresh that there is little doubt that the flowers are either creamy-white or pale yellow. Mr. Farrer tells us in his somewhat picturesque language that the falls have a "delicate peacock eye of gold, outlined with a rim of blue that sometimes faintly suffuses all the flower." Of these details there is, unfortunately, no trace left in the dried specimens. The similarity of the segments in shape to those of I. minuta is very striking, but there can be no excuse for confusing the two species, for in I. Henryi the pedicel is long and the tube very short, while in I. minuta the tube is longer than the pedicel.

Other details which these specimens add to our previous knowledge of I. Henryi are :—Styles, narrow, oblong, with a raised

central keel, pale creamy-white; stigma, triangular; filaments, apparently equal in length to the anthers; filaments, anthers and pollen all creamy-white.

IRIS RUTHENICA.

In " The Gardeners' Chronicle "—September 12th, 1914, p. 185) Mr. Farrer described an iris in the following terms:—" All the roadsides are carpeted with hassocky tufts of a little iris that never seems to flower over half the country, though very occasionally one comes upon isolated stretches of it where the low, wide cushions of broadish foliage are thickly set with seed capsules." This iris may perhaps be identified as I. ruthenica, which does produce low cushions of leaves, and some forms of which do appear to flower very shyly, while others, and especially the broad-leaved forms, flower abundantly. No. F. 55 is a specimen of I. ruthenica, and Mr. Farrer's note is as follows:—" Seen only once, May 3rd, at one point in the Dung Lu Ho Valley at about six thousand feet, straying about in fine grass and amid very scanty scrub, on a small level space by the wayside above the river." I. ruthenica is a very widely-distributed iris, for it is found as far west as Transylvania, and as far east as Manchuria, and it is also common in the Altai Mountains and in Western China. The free-flowering forms are very desirable, and probably would soon be better known than they are if the fact were once grasped that it is almost certainly fatal to attempt to move this iris in the autumn, although it may be moved with every cnance of success soon after the flowers have faded. It is equally easily raised from seed.

IRIS GONIOCARPA.

There remain to be considered the two irises to which Mr. Farrer introduced us at p. 318, November I4th, 1914. " One which occurs also at lower elevations is sturdier and stockier in growth than the other, with large flowers, and the falls brindled and mottled tabby-like, so that I think of her for the present as I. felina; more entrancing yet are the fairy-like elegance and the profuse wiry stems of the other, whose waxen snowy falls are hemmed and dotted with deep velvet spots of pure violet, till one can call it nothing else but I. pardalina." Mr. Farrer has sent home dried specimens of both these Irises, F. 90, I. "pardalina," and F. 124, I. "felina," and, after a careful examination of them, it seems impossible to look upon them as anything more than two local forms of Baker's I. goniocarpa, of which Maximowicz's name of I. gracilis is a synonym. This species is known in Sikkim and the Chumbi Valley; it is also found in Tibet and the Chinese provinces of Szechuan, Kansu and Shensi. The forms from these different localities vary in size and sturdiness, just as do Mr. Farrer's two forms, but mere size is hardly a sufficient reason for bestowing specific rank. Both sets of specimens show the features which are characteristic of the section of Pseudoregelia Irises, to which I. goniocarpa belongs. These are the curiously-mottled flowers found also in I. kumaonensis and in I. Hookeriana, which

are so abundant in the Alpine valleys of Kashmir and Kumaon, the oblong, blunt ended standards and the curious, membranous sheaths that clasp the bases of the tufts of leaves. Mr. Farrer's description of his I. "pardalina" as having "waxen, snowy falls "shows how difficult Tit is to convey a right impression of colour by mere words. The dries flowers of both this iris and of "felina" are practically of the same pale purple colour, with the conspicuous darker mottlings and blotches.

If we take a more familiar instance, we shall see at once how the same flower may be described in two totally different manners by looking at it from different points of view. I. histrio and I. histrioides are usually described as blue irises with some white markings, but it is equally true to describe them as having white falls almost wholly covered with blue blotches and veins. The possibility of describing the flowers in these two ways accounts for the description of I. " felina " as being " brindled and mottled tabby-like," while it is also shown in " *The Gardeners' Chronicle, " November 14th, 1914, fig. 128, as having " flowers white, with deep violet-coloured spots," the latter being precisely Mr. Farrer's description of I. " pardalina."*

It is interesting to notice that the difference in habit between these two forms of I. goniocarpa is precisely that which we should *a priori* expect from the different positions in which they grow. I. "felina," which comes from the open among limestone rocks, is usually found in the higher positions; it has fewer leaves, which are overtopped by the stems at flowering time, as is also the case with both I. kumaonensis and I. Hookeriana. It has also larger flowers than I. "pardalina," which grows lower down in "very much coarser, longer turf." Here the flower-stems develop more slowly, instead of rushing up immediately the snow melts, and the leaves are consequently as long as, or a little longer than, the stems, and the flowers are smaller.

IRIS CHRYSOGRAPHES.

(" The Gardeners' Chronicle "—June 10th, 1911.)

This new Chinese species is a member of the sibirica group, and very closely allied to I. Forrestii, which was described and illustrated in the columns of " *The Gardeners' Chronicle," June 25th,* 1910, *p.* 418, *fig.* 190. It differs from the latter in habit and in flower-colour, the tufts of leaves being much less closely set, and also in the fact that it flowers a week or more in advance of Forrestii. The flower of I. chrysographes is of the richest dark red-purple, very velvety in texture, and set off by the central and broken flanking lines of gold, which suggested the name of the species. The falls are very large and long (three inches) and the blade, which is twice as long as the haft, droops almost perpendicularly. The haft is flanked at the base by the curious flanges which are so characteristic of the sibirica group, and it is faintly marked with gold on a red-purple ground.

The style branches are much arched to bring the triangular tongue of the stigma down on the haft, and are also arched laterally and sharply keeled.

The standards are long and narrow, poised at an angle of about forty-five degrees, and point downwards, as in I. Clarkei and I. Delavayi.

The stem is about fifteen-eighteen inches long and bears one or two reduced leaves. It is not as hollow as are the stems of I sibirica or I. Delavayi; on the other hand it is not wholly filled with pith, but has a distinct channel running down the centre. The stem does not appear to branch, and bears only the terminal head of one or two flowers borne on long pedicels in long, narrow, green spathes, three inches or more in length.

The tube is short and thick, about half an inch or rather less in width and about fifteen-eighteen inches in height. The leaves are not, however, rigid, but curve gracefully outwards, so that the flowers rise well above them.

This iris was discovered by Wilson in 1908 in China, growing in thickets to the west of Kuan Hsien in West Szechuan, at a height of from seven to eleven thousand feet. Herbarium specimens bear the number 1,304.

My plants were raised from some seedlings given to me by Miss Willmott about two years ago, and do not show any marked variation except in the amount of golden veins and dashes on the blade of the fall. In some examples these are numerous, but in others they are reduced to little more than the conspicuous central golden line.

Dried herbarium specimens are seldom safe guides to the colour of irises, but from some of the specimens collected by Wilson, there is reason to believe that there are some forms of this species in which the ground-work of the falls is of a paler colour much blotched with a darker shade. It is doubtful, however, whether any colour-form of this sort could surpass in richness the brilliance of the deep purple type. It is one of the most richly coloured irises that we possess, and gives promise of proving an excellent garden plant.

It is, moreover, very floriferous, for several of the plants that are now flowering for the first time bear four or six flower stems. This number is not often exceeded in seedling irises, though one large pink-flowered seedling of I. bracteata has produced eleven stems at its first flowering, while a dwarf Pogoniris from the Balkans created a record by producing no less than thirteen flower spikes within thirteen months of the time when the seed germinated.

SOME HYBRIDS OF IRIS CHRYSOGRAPHES.

(" The Gardeners' Chronicle "—September 16th, 1916.)

Iris chrysographes is, without doubt, the most striking and beautiful of the group of new irises belonging to the sibirica section which has recently been introduced from Western China. It is unique in its rich royal-purple falls, on which the gold markings are always more or less apparent. In the poorer forms there is merely a central streak of gold, but in good specimens the veining is much more conspicuous, extensive and effective. Curiously enough, it seems to be the case that the amount of veining varies on the flowers produce by the same individual plant in successive years.

In matters of taste an individual opinion is of little value but I cannot refrain from recording my impression that, among irises at any rate, the general rule holds good that, as regards purity of colour and grace of bearing, the wild species are preferable to the hybrids raised from them, whatever gains the hybridiser may obtain from other points of view.

The first crosses of I. chrysographes to produce flowers were made between the species and the dwarf, yellow-flowered I. Forrestii. The resulting hybrids are practically indistinguishable. In both cases the flowers are of a duller, bluer shade of purple than I. chrysographes, and, though the falls are smaller and less conspicuously drooping, the gold veining at the throat is a conspicuous feature. Both hybrids are free-flowering and would, I think, in moist soil be more vigorous than either parent. A cross made in 1914 between I. Wilsoni and I. chrysographes has recently come into flower. The majority of the plants are flowering, though they were only planted out of the seed pots about a year ago, and they seem to be far more vigorous than some plants of I. orientalis x chrysographes, which, though of the same age, will not flower this year. This hybrid with I. Wilsoni is distinct and, to my mind, beautiful. The long, hanging fall of deep purple has more gold veining at the throat than even the best forms of I. chrysographes, and the fact that the style-branches are raised high above the falls makes the gold-veined haft of the falls also conspicuous. The colour of the style-branches is a curious dull reddish plum-purple, forming a contrast with the distinctly bluer falls and standards. The standards are narrow and lean outwards, as in I. Wilsoni.

Crosses made with pollen of I. chrysographes used on the typical blue, and on the white, form of I. sibirica have given interesting results, for the hybrids are easily distinguishable from one another. Both are vigorous and grow taller than I. chrysographes, though perhaps not so tall as the tallest sibiricas. In the cross with I. sibirica the blue-purple fall has an ill-defined central region of richer colour,

with irregular and inconspicuous white mottlings, which become faintly tinged with yellow at the throat. The style-branches are of the deepest blue-black, and the small standards slope outwards, as in I. chrysographes. On the contrary, the plants raised from the white sibirica have flowers of a rich blue-purple, on the falls of which there is a white central region veined with deep blue-purple. The style-branches are not nearly so dark, and are of a distinctly redder shade of blue, while the standards are large and broad, as in I. sibirica. The flower is slightly larger than the finest sibirica, except those which have arisen from crosses between that species and I. orientalis. There is no trace, even in the offspring of the white form of I. sibirica, of the rich red-purple falls of I. chrysographes, though the colour is apparent in the cross with I. Wilsoni.

The most striking of all the hybrids of I. chrysographes that I have raised came from a cross with a pale buff-coloured form of I. Douglasiana, I. chrysographes being the seed-parent. The plant is intermediate in growth between the two parents, and bears a lateral branch below the terminal head, a character that I have not so far noticed in the seed-parent. The spreading flowers are of a beautiful deep old-rose colour, and the falls bear a conspicuous patch of gold veining.

A curious point about these hybrids is that, although the perianth tube of I. chrysographes is of a dark red-purple, contrasting sharply with the green ovary, all the hybrids have greenish perianth tubes, except the sibirica crosses, in which they are darker than those of I. chrysographes, even though in I. sibirica the tube is green, faintly mottled with purple.

I. chrysographes has a small hollow space in the centre of its stem, about equal in diameter to the thickness of the walls. In the hybrids with I. Wilsoni and I. Forrestii the diameter of the hollow is only slightly increased, in those with I. sibirica the walls are about as thin and the opening is as broad as in that species, while in the cross with I. Douglasiana the influence of the pollen of the latter has been potent enough to close the opening entirely with pith of loose texture.

IRIS CLARKEI.

(" The Gardeners' Chronicle "—July 10th, 1909.)

An interesting point with regard to this iris has lately been cleared up. As described by Baker in his " *Handbook of the Irideae,* " this species possessed both beard and crest, and it was therefore classed in the group of Pseudevansia. Owing to this fact, I thought I was justified in giving in "*The Gardeners' Chronicle* " *for January 2nd and 16th,* 1909, a description of what appeared to be a new iris under the name of I. himalaica. However, after seeing the material in the Herbarium at Kew, and suspecting that the only evidence for the crest and beard was Sir Joseph Hooker's sketch at Kew, I recently sent more flowers, with the suggestion that they should be compared with the sketch. The keeper of the Herbarium, Dr. Stapf, now tells me that he has no doubt that the flowers are identical with the subject of the sketch. As it happened, Sir Joseph Hooker himself was at Kew, and, on seeing a flower, remembered collecting the plant for the first time on Tenglo sixty years ago!

The name of I. himalaica cannot therefore stand, and I. Clarkei must be removed from the Pseudevansia group and placed in the Apogon section near I. sibirica and I. Delavayi.

The plant is interesting from the fact that it appears to be in a state of mutation similar to that of the famous plants of Oenothera found by Prof. de Vries. I have already noticed wide differences in the standards and in the foliage. In imported plants the leaves have a curiously polished upper surface, but in seedling plants there is sometimes apparently bud variation, and plants occur with leaves that are distinctly glaucous on both sides, while some of the shoots on the same plants have leaves with the characteristic polished upper surface. In colour, too, there is considerable variation—to a much greater degree than I have found in growing seedlings of other species of iris.

IRIS CRISTATA.

(" The Flower Grower "—October, 1924.)

I was much interested to read Mr. Shreve's article on "Iris cristata," on *p.* 301 of your issue for August. I was, however, much astonished by his statement that the plants cannot be moved in the summer. My experience is that that is the time when it is easiest to move and multiply the plants. Anyone who grows this iris will know that each flowering shoot sends out from its base one, two, three, or even four new shoots which run horizontally for an inch or two and then rise erect. Anyone who will examine these new growths a week or two after the flowering period will find that new white roots are pushing out just at the point where the growth turns erect. My own practice has always been to cut off these growths directly the roots are beginning to push out and replant them at once, and keep them moist for a few days. Then each of these pieces will form a flowering plant by the following year.

I cannot help thinking that even in its native home this iris must behave in much the same way as it does in this country and send out its new growths which begin to root just after flowering time. Obviously it is better to transplant any iris when the roots are just about to push into the ground than when they have grown to some length and must necessarily be broken by transplantation.

One thing that always puzzled me about Iris cristata, was, that although I have on several occasions saved seeds from my plants, I have never yet induced a seed to germinate, and yet I think I am right in saying that it is the only iris of which I have failed to obtain germination of home-saved seeds. If anyone who grows this iris or can collect seeds from wild parts would be good enough to send me a few, especially if he can also give me directions as to how to germinate them, I shall he very grateful.

A white form of this iris has been in cultivation in this country for some years, but so far as I know we have none of the intermediate forms between white and fairly deep blue. A yellow variety sounds improbable, but it would be interesting if it did exist.

IRIS DOUGLASIANA.

("The Gardeners' Chronicle "—August 28th, 1020.)

Iris Douglasiana is one of the most vigorous and, therefore, the easiest to grow of the Californian group of American irises. It was named in honour of David Douglas, who collected plants in North America in 1823 and 1824, but it was not until about 1870 that it was brought into cultivation in this country. Even now it is not nearly so widely grown as it deserves to be, and yet there is considerable scope for the plant breeder within the wide ranges of colouring which occur in the flowers of this species. Indeed, one of its peculiarities is that hardly any two seedlings bear flowers of precisely the same colouring and marking and, moreover, they may vary from pale cream through mauve to a deep purple.

The reason why this plant is not as widely grown and appreciated as it should be probably lies in the fact that it is impatient of removal or rather does not lend itself to treatment by the rough-and-ready rule that all herbaceous plants may be moved in the autumn. The rhizomes are slender, and, therefore, cannot long survive unless the roots are active. The rhizomes of bearded irises are much stouter and can preserve their vitality throughout the winter even when transplantation has taken place so late in the year that root action does not begin again until the spring. If, however, plants of I. Douglasiana are moved in May, June or July they will soon establish themselves in their new home provided they are kept partially shaded and the soil is kept moist until the roots have been able to push their way into it.

Iris Douglasiana flowers in May, and as the stems branch and as each spathe contains two or three flowers that open in succession, the display lasts for a considerable time. The infinite variety to be found in a bed of seedlings is amazing and renders it very difficult to give any general definition of the flowers. They are almost invariably veined with a darker shade on a lighter or even white ground, but on the blade of the falls the veining usually disappears and the colour becomes uniform.

The foliage of Iris Douglasiana is very characteristic. It is rather thin and wiry in texture with a polished surface and usually tinged with pink at the base. The actual shade of green seems to vary with the intensity of the colouring of the flowers, and the curious dark, brick-red of the old and dying leaves is a colour that probably does not occur in any other species. The leaves remain green throughout the winter and only die away in the spring when the young growths develop rapidly together with the flowering stems.

I. Douglasiana seems to be happiest in a rich, light soil in which there is no great proportion of lime. Seeds should be sown in the early autumn in pots plunged in the open ground and left exposed to the effects of frost and snow. Early in the year the young seedlings will appear, and they then do all the better with the protection of a cold frame. It is important that they should grow rapidly and be planted out where they are to remain as soon as they have made four or six leaves. Then they will have time to make good growth during the summer and to become sturdy and well established plants before the winter. When treated in this way no difficulty will be found in getting them to flower in the following year, and after that each plant will soon develop into a large clump producing annually innumerable spikes of flowers.

IRIS FILIFOLIA.

(" The Gardeners' Chronicle "—September 23rd, 1911.)

For some years past an iris has been offered by dealers under the name of I. filifolia. It is a valuable garden plant, for it is about the first member of the Spanish Iris group to flower, and its blooms are large, with blue-purple standards and pale blue falls, set off with a golden central stripe. It grows about twelve or eighteen inches high and increases rapidly in rich, light soil. Like all Spanish Irises it is the better for an annual shift of quarters. This operation may be performed as soon as the foliage turns yellow—about the beginning of August. If it is not carried out, the struggle for existence ensues between the central flowering bulb and the four or six bulblets which cluster round its base, with the result that either the flowering bulb is deprived of some of the nutriment that it would otherwise obtain, or else the bulblets are unable to develop for the following years. In the wild state the latter is the usual result, and the empty husks of bulblets that have been unable to develop are commonly to be found among the withered coats of the old flowering bulbs, in which collected specimens are almost always enclosed.

Anyone who has the patience to wait four or five years for the flowers should cross this iris with pollen of I. lusitanica and the ordinary garden forms of I. xiphium. The result will be a series of varieties of the so-called Dutch Irises that have lately been introduced into commerce. The widely circulated statement that in obtaining these Dutch Irises all the known species of Spanish Irises were combined, seems to be erroneous for none of them shows any trace of perianth tube, which would almost certainly have appeared sooner or later if either tingitana, Boissieri or juncea had been among the parents. Moreover, the early-flowering habit of the seed-parent explains the precocity of the hybrids, which come into flower in the last week in May—usually a full fortnight before the first of the ordinary Spanish varieties.

How the name of Iris filifolia came to be applied to the iris in question is not apparent, for a reference to Boissier's description in "Voyage Bot. Esp.," p. 602, t. 170 (1839-45), shows clearly that the identification is wrong. Boissier's plant is distinguished at once from xiphium by the presence of a tube equal in length to half the length of the bud, while the filifolia of the trade has no tube, apart from the short funnel that separates the ovary from the base of the segments of the flower.

It is just possible that the confusion may have originated from the fact that both the true and the false filifolia are found in the neighbourhood of Gibraltar. The one may have been collected and reintroduced for the other. Thanks to the kindness of a correspondent, I have, this year, had the true filifolia in flower here, and the half-dozen

blooms that I had were enough to show how desirable an iris this is. The stem is about fifteen inches high, and bears one or two flowers of the richest red-purple, the falls being decorated with a broad central golden, oblong patch, surrounded by a blue halo. Thanks to the warm, dry weather, seed set in abundance, and the bulbs also have increased in number. It is to be hoped therefore, that the true Iris filifolia may soon be less rare in our gardens than it appears to be at present.

Curiously enough, I also received early this summer some iris flowers from the neighbourhood of Gibraltar, which, as far as could be seen from their somewhat withered state, were identical with the false filifolia. They are known to local botanists as I. Fontanesii, Godr., a name which, by the way, appears to be based upon a confusion and to have no validity. The name of I. xiphium *var.* praecox would seem to be the most appropriate.

IRIS FLAVESCENS.

(" The Gardeners' Chronicle "—August 6th, 1910.)
Mr. J. G. Baker, in his " Irideae, " places Iris sulphurea (Koch) and Iris imbricata, Lindi, under this species, and describes the habitats as Bosnia and the Caucasus and Armenia. It is classed among the tall, bearded irises, and is closely allied to Iris germanica. Like those of many other members of this group, the flowers are sweetly scented; they are produced in May. Of a deeper shade of colour, but not quite so pleasing nor as free in flowering, is the form known as I. flavescens var. leucantha. These irises prefer a rather dry

and sunny position, and good, loamy, but not freshly manured soil.

IRIS X FULVALA.

(" The Gardeners' Chronicle "—July 2nd, 1910.)

This iris, which was shown before the Royal Horticultural Society on June 2ist, and recommended for an Award of Merit by the Floral Committee, is interesting as being the first recorded hybrid of Iris fulva, a species from the swamps of the Southern United States distinguished by its remarkable terra-cotta colour and the drooping habit of its standards and falls. The fact that no other iris approaches it in colour has led to repeated attempts to increase the size of the flower by hybridisation, but, hitherto, apparently, these attempts have been fruitless.

The pollen parent of fulvala was the beautiful local species found by Lora La Mance in the mountains of Arkansas and usually known as hexagona Lamancei. This iris forms, with the true hexagona, one of the several curious pairs of American irises (of which another instance is bracteata and Purdyi), the flowers of which can scarcely be distinguished, although the structural details of the botanically important parts of the plants, such as the ovary, the tube and the spathes, show that they belong to two distinct species. The large blue-purple, flattish flowers of Lamancei are of considerable substance and great beauty, but the plant produces only a dwarf stem, and, therefore, hides its flowers low down among the leaves.

In the hybrid the tall stem of fulva is retained, and three to five flowers are borne in the axils of large leaves which decrease in size from the base upwards. The flower is of the shape of Lamancei, with spreading segments and somewhat Pointed falls. The colour of the specimens shown at the meeting was a rich velvety, reddish- almost crimson-purple, becoming yellow towards the centre of the flower, the falls bearing a central, deep yellow, slightly raised ridge, which is distinctly pubescent. This last feature is noticeable in Lamancei but not in fulva.

As far as I can tell at present the plant is more floriferous than fulva, which, in some years, fails to give me any flowers at all.

Besides the above plant, I have another which is very similar, but which bears flowers of a deep blue-violet. Both come from a pod of seed that ripened in 1907.

IRIS GRANT-DUFFII AND ITS ALLIES.

(" The Gardeners' Chronicle "—May 8th, 1909.)

Will any reader of " *The Gardeners' Chronicle*, "who has succeeded in inducing I. Grant-Duffii to flower give his experience? It was one of the very few irises that baffled the late Sir Michael Foster. I remember his telling me, as he gave me some roots, that he had grown them for twenty-five years from the time that General Grant Duff gave them to him, and that he had never had a flower. These plants I still have, and others imported from Palestine, but I have never yet seen a flower.

I. Aschersonii, however, is flowering freely this year with me, and I attribute this to the fact that I am growing it in moist, rich soil. I. Grant-Duffii, too, seems to be doing better under these conditions, and I hope to see flowers next year. A correspondent in Jaffa told me that these irises grow in swamps, which means, I take it, that the soil is moist in spring and yet parched in the height of summer. I. ochroleuca and I. Monnieri are found wild, I believe, in similar situations, and need moisture and rich feeding to flower well. It remains to be seen whether I. Grant-Duffii will respond to this treatment, or whether the secret of its needs has yet to be discovered.

The new Iris melanosticta is said to be a member of the same group, and a purple-flowered form, I. masia, is also in cultivation.

AN AUTUMN-FLOWERING IRIS.

(GÜLDENSTADTIANA.)

(" The Gardeners' Chronicle "-October 26th, 1918.)

The sketch reproduced in fig. 63 is of an iris which does not get much attention or praise when it flowers in June, for then it is overshadowed by finer forms of the Spuria section. When, however, it sends up its second show of spikes in mid-September, and when each spike has as many as three or four flowers open at once, it is a much more valuable plant.

Its real name is exceedingly hard, or indeed impossible, to discover, for it is one of a numerous company of Asiatic relatives of I. spuria, which seem to abound in every brackish marsh from Smyrna to oldest name Srinagar. The appears to be Pallas' salt-loving," halophila, others and Güldenstadtiana, sogdiana, and desertorum. It is difficult, if not impossible, to distinguish herbarium specimens of the various local forms, and further confusion has been caused by the fact that all seed exceedingly freely. The seeds germinate readily and the plants grow vigorously and easily oust any more delicate species near which they happen to have sprung up. Anyone who attempts to obtain a collection of iris species by raising plants from the seeds offered by botanic gardens and continental seedsmen will find that a large proportion of the most attractive names have been attached to seeds of some form of this iris.

The individual flowers are not large, for the blade of the fall is only about three-quarters of an inch in width, the whole flower measuring about three inches across. The colours vary, but usually consist of more or less faint purple veins on a pale mauve or cream ground, with a central yellow mark on the blade of the falls. One curious form which was sent to me as sogdiana by Mme. Fedtschenko has flowers of a peculiar shade of mauve-purple, which could only be matched among the pallidas, if, indeed, the exact tone ever comes even then.

The seeds of this iris are curious, and well adapted to the marshy habitat in which it grows in the wild state. For each is enveloped in a loose, but air-tight, parchment-like covering, which enables it to float in

water. On the surface it is either carried along by any current or blown by the wind until it strands on some bank, where it has more chance of germinating and growing into a plant than if it lacked this covering and sank to the bottom of the water, where the young plant would probably be drowned, even if the seed succeeded in germinating at all.

IRIS ROSENBACHIANA.

There seems to be no doubt that, as was suggested in an article in these columns some months ago, two distinct species are really concealed under the name of Iris Rosenbachiana. It was suggested that the two species could be separated by certain characteristics, visible in the dry bulbs, and the sketch reproduced in " The Gardeners' Chronicle, "October 26th, 1918, fig. 64, is an attempt to show bulbs of the two species. That on the right is slightly larger; the fleshy roots taper gradually and their colour is a light brown. On the contrary, the bulb on the left has roots which taper more abruptly, and they are always whiter in colour. It seems probable that the bulb on the right is that of the true I. Rosenbachiana. It flowers a fortnight to a month earlier than the other species when the bulbs are grown together under the same conditions. So far as my experience goes, the flowers of this earlyflowering species are always white, with crimson or reddish-purple markings and a conspicuous golden crest, whereas those of the other species are very various in colour, usually of some shade of blue or redpurple, but occasionally even of a pale yellow with faint purple veins. There is one difference in the flowers which seems to be constant, and that is that the pollen of the early-flowering form is always yellow, while that of the other is always white.

In her account of the irises of Turkestan in the "Journal Russe de Botanique," 1909, No. 5, p. 77, Mme. Fedtschenko says of I. Rosenbachiana: "Flowers large, of various and beautiful colour," and of I. baldshuanica: "Flowers smaller, yellow." This is barely a satisfactory diagnosis of the two species, and it is probable that some of the plants which she took to be Rosenbachiana should really be classified as specimens of baldshuanica. It is not yet certain whether these two plants breed true when raised from seed, and it is therefore impossible to say at present whether we must consider them as two good and

distinct species or merely as local forms of the same species. In the meanwhile it may be useful, at any rate for gardening purposes, to say that I. baldshuanica differs from I. Rosenbachiana in being slightly smaller and flowering later, in having white and not yellow pollen, and in having fleshy roots to the bulbs, which taper abruptly and not gradually.

Both these irises are easy to raise from seed, which should be sown in the late summer or early autumn. By the end of the first year the small bulbs will have no persistent rootlets. If the soil in the seedpots is made sufficiently rich, the small bulbs may be left in them until the end of their second year, when they will be found to have developed a root almost as large as, and in some cases even larger than, themselves. At the end of the second year the small bulbs should be planted out in a sheltered sunny corner, or preferably in a cold frame. A year, or at most two years, later the bulbs will begin to flower and, although in most cases propagation by offsets from bulbs is slow, it will be found that some individuals seem to increase fairly rapidly by this means. A strong bulb is capable of throwing up three or even four flowers in succession, so that the display lasts for a considerable time.

IRIS HIMALAICA.

("The Gardeners' Chronicle "—January 2nd, 1909.)
May I suggest the above as a name for a species of iris, hitherto, I believe, undescribed, which was sent to me from a locality within sight of Darjeeling in February, 1907? In the case of these plants the colour of the flower was a deep violet-blue, and I find that Mr. T. Smith, of Newry, grows a sky-blue form under the name of I. Clarkei and a purple variety under that of I. decora, both having been raised from seed received from the Himalayas. The true I. Clarkei and I. decora are, of course, quite distinct.

This iris has been thought by some to be a form of I. sibirica, but in reality it is far more closely related to the Chinese I. Delavayi than to any form of I. sibirica with which I am acquainted. Its falls are always blotched like those of I. Delavayi and not veined as in the case of I. sibirica, and the capsule and seeds closely resemble those of the former. It differs, however, from I. Delavayi and I. sibirica in having a solid stem at all stages of its growth, while the drooping leaves are also very characteristic, having a curiously smooth and polished upper surface, which contrasts strongly with the slightly glaucous undersurface.

My plants came into flower this year about the middle of June, having grown well under fairly moist conditions in a soil rich in humus. The blooms have the drooping appearance so characteristic of the Himalayan irises, such as Duthiei, kumaonensis, etc., and the style branches rise above the tips of the spreading standards. The markings of the falls consist of white blotches on a violet-blue ground, and the throat is tinged with yellow. There is no trace of either crest or beard, so that the plant belongs to the Apogon section and has nothing to do with I. Clarkei, the name under which it was sent from Darjeeling.

The following is a more detailed description:—I. himalaica, rhizome slender, wide-creeping; sheaths splitting into fine fibres. Leaves linear, moderately firm at first, but drooping when full grown, upper surface smooth and polished, under surface finely ribbed and slightly glaucous, two to three feet long, three-quarters of an inch broad. Stem slender, lozenge-

shaped rather than round in section, solid, two feet high, overtopping the leaves, branched, bearing three heads of flowers. Spathes two-flowered, valves yellowish-green, three inches long; pedicels three inches long. Perianth tube triangular, half an inch long; standards spreading, lanceolate, with deeply-channelled limb, one and a half inches long and three-quarters of an inch broad, violet-blue veined with a deeper shade; falls two inches long by one inch broad, obovate-cuneate, violet-blue blotched with white and yellow at the throat. Style-branches very broad, keeled and conspicuous, one and a half inches long; crests small, overlapping. Capsule two inches long, oblong, trigonous; seeds flat, circular, with dark centre and pale margin.

IRIS HOOGIANA (SP. NOVA*).

(" The Gardeners' Chronicle "-November 4th, 1916.) In the autumn of 1913 I received from the firm of Van Tubergen a number of shrivelled rhizomes of an iris which had been collected in Turkestan. The growth made in 1914 and 1915 confirmed my first impression that the iris belonged to the Regelia section, but it was not until this summer that the first flowers appeared, and showed at once that another magnificent iris has been added to the already long list of good garden plants that have been introduced from Turkestan. It is with considerable pleasure that I dedicate this new species to the brothers Hoog, who now, I believe, since the retirement of their uncle, Mr. C. G. Van Tubergen, junr., constitute the well-known Haarlem firm, and who, the one by his enterprise in introducing plants from foreign countries and the other by his skill as a hybridiser, have made so many valuable additions to the contents of our gardens.

Iris Hoogiana is remarkable for the fact that the flowers, unlike those of the other known members of the Regelia section, are of a uniform pale lavender set off by the brilliant orange beard of closely set hairs, which is broad along the haft but narrows to a sharp point on the blade. A beard also grows strongly up the inner side of the haft of the standards, a feature which is characteristic of the section. The exact shade of the lavender colour varies a little. I think, in individual plants, and Mr. Hoog tells me that a few of his produced pure white flowers. I noticed among my plants that the vast majority have their leaves strongly tinged with purple at the base, and this was certainly the case with all those that flowered. In some few the base of the leaves was green, and it will be no surprise if these produce white flowers.

During this recent summer I became convinced that it has been my own fault that I have had comparatively few flowers on my Regelia Irises, though the plants have increased considerably. For some years I have been in the habit of lifting the plants in June almost immediately after the flowers had faded. I did this owing to my anxiety to get the rhizomes out of the ground before the long root fibres had thrown out those lateral growths which anchor them into the ground and which, when once disturbed, never take

hold of the soil again. I had more than once been disappointed to find, when the time to replant arrived early in October, that the roots of my plants had withered to a large extent instead of remaining plump and firm, as were those on rhizomes that I received from Haarlem. This year I determined to wait longer before uprooting the plants, and was rewarded when I finally took them up in the middle of July by finding that the main root-fibres were much stouter and more mature than usual, and that the lateral rootlets had only developed in a very few cases.

The foliage of I. Hoogiana is very similar to that of I. Korolowi and I. stolonifera. The leaves grow about fifteen or eighteen inches long by about threequarters of an inch in breadth and are of a slightly The stem is about twenty inches in glaucous green. height, and bears a single head of two or three flowers. The sharply-keeled green spathes are from three to three and a half inches long by nearly three-quarters of an inch broad, and are slightly flushed with purple and membranous in the upper third. The pedicel is short, the ovary nearly an inch long, and the perianth tube slightly over an inch in length and striped with dark purple. The falls are three inches long by nearly one and a quarter inches broad, the blade not being separated by any constriction from the broad, strapshaped haft. The bright orange-yellow beard is not confined to the haft as in I. Korolkowi, but comes well on to the blade, where it ends in a sharp point. The standards are of the same uniform colour as the falls and grow gradually broader from the haft to a point near the apex. The haft is strongly bearded on the inner side. The style branches are of the same colour as the rest of the flower, the crests triangular and erect. The stigma is entire, the anthers are long, of the same colour as the filaments and the rest of the flower. The pollen is cream-coloured, and the seeds are of the usual Regelia and Oncocyclus type, namely, brown, wrinkled and pyriform with a conspicuous, large, cream-coloured aril. The capsule is long and narrow, with a tapering apex, and it dehisces below the apex as do those of the other Regelia Irises. The rhizomatous root-stock spreads rapidly by stolons which run freely in all directions, the new shoots often appearing at a distance of several inches from the parent growth. This feature is more marked in I. Hoogiana than in I. Korolkowi, but it is, I think, impossible to separate its

rhizomes from those of I. stolonifera, when in a dormant condition.

My experience of three years' cultivation of this fine new species shows that it is exceptionally vigorous, even for a Regelia Iris, and it is not improbable that the comparatively pale uniform colour of its flowers will combine in hybrids to give us results more pleasing than those which have so far resulted from crosses of the Regelia species. I am alluding, of course, not to the Regelio-cyclus hybrids, which stand apart by themselves, but to the few crosses which appear to have been successful between Regelia Irises and various Pogoniris. In these the colour is always either lurid or dingy, a result which is doubtless due to the presence of the numerous colour factors which go to make up the beauty of such species as Korolkowii and stolonifera.

I. Hoogiana seems to be one of the very few species of iris which can only be distinguished from its relatives by the colour of its flowers. As a general rule, colour has little value as a guide to specific rank among irises, but in this case the absence of conspicuous veining and the uniform tone of the whole flower seem amply sufficient to separate this iris from its nearest relatives, I. Korolkowi and I. stolonifera.

* Iris Hoogiana a sectione Regelia Iridibus Korolkowii et stoloniferae valde affinis sed floribus concoloribus aut lilacinis aut albis nec venosis facile distinguitur.

IRIS HOOGIANA.

(" The Gardeners' Chronicle "-June 7th, 1919.) This recent introduction was discovered, I believe, in Turkestan in 1913 by a collector working on behalf of the firm of Van Tubergen, of Haarlem, and is, to my mind, by far the best addition that has been made for many years to the known species of the genus. It is obviously a member of the Regelia section, and therefore closely allied to I. Korolkowi and I. stolonifera, though it is curious to find a species with flowers of such pure colour in a section which is otherwise remarkable for the veining and contrasting colours of its flowers. The rhizome, with its slender, running stolons, is characteristic of a Regelia Iris, and, if it differs at all from those of the other species, the difference lies chiefly in the fact that it remains dormant in spring until several weeks after the shoots of the other species have appeared above the surface. Then, however, it grows so fast that, with the exception of the rare I. Suwarowi, which is seldom seen in cultivation, it is the first Regelia Iris to come into flower, though its stems grow nearly three feet in height and thus overtop the others.

Each stem bears either two or sometimes three flowers, which open in succession. The colour is apt to vary a little in each individual plant. In some it is the very faint blue of the sky on a sunny summer day, but in others it is many shades darker, and sometimes there is a distinct tinge of reddish-purple. Perhaps it may help to say that the colour varies as it does in Iris pallida. The pale colour of I. pallida dalmatica is approximately that of the palest I. Hoogiana, though I can hardly say that any I. Hoogiana has yet appeared with flowers as dark as those of my darkest pallida seedlings. As we might have expected, a white form appeared among the collected plants, so Mr. Hoogtells me, though it is weaker than the purple-flowered No example of it was, unfortunately, among those that I received, and I have not yet seen a flower. Of white pallidas I have now at least three seedling forms, even if I have lost, as I am afraid may be the case, the piece of the wild white pallida of which I found a flowering plant on the hills near Ragusa on the Dalmatian coast.

The beard of I. Hoogiana is remarkably thick

behind, and then narrows gradually to a sharp point in front on the blade of the fall. It consists of closely-set golden hairs, which in the darker forms are sometimes slightly tipped with a colour so dark as to be almost brown. The standards are strongly bearded on the inner side.

This iris was originally described in " The Gardeners' Chronicle, "November 4th, 1916, p. 216, as closely allied to I. Korolkowi and I. stolonifera, and this is undoubtedly the case. Its rhizome is that of the latter, and not that of I. Korolkowi, which is more compact, but I am inclined to think that herbarium specimens of I. stolonifera and I. Hoogiana in which the flowers were badly crushed and had lost their colour, would be indistinguishable. This is one of the few cases, apart from the Oncocyclus group, in which two closely-allied species of iris cannot be readily distinguished by some structural feature. Of course, we may take the absence of veining in the flowers as a structural difference, and this is certainly remarkable, but only, I think, at first sight, for on closer inspection it will be seen that the veins are there but so faint as to be practically invisible. One of the features of I. stolonifera is the way in which the blue colour is suffused over the brown-purple ground. In I. Hoogiana in some cases there is a delightful suffusion of opalescent tints of green and brighter blue over the central portion of the falls and on the outer side of the standards.

Yet in spite of the close resemblance—apart from colour—between the two species, I am quite convinced that I. Hoogiana is a good and distinct species, for which there should be a great future in store, if only those who grow it will take up their plants about the middle of July and replant them early in October. For years I have been in the habit of taking up Regelia Irises early in June, but now I am sure that the new growths were not then mature. Consequently they did not flower well in the following season. Now, however, that I leave my plants untouched till July, I am rewarded with crowded flower stems. Last year I was pleased when I counted thirty-six stems of I. Hoogiana, but this year there are over two hundred, and these have come from a small patch of collected rhizomes which filled in 1914 about one square yard of bed. Now I am overrun with I. Hoogiana, and have no

hesitation in recommending it not only as one of the most striking of all iris species, but also as one with an excellent constitution.

TWO NEW IRISES.

I. HOOGIANA. I. TURKOMAN.

(" The Garden "-June 7th, 1919.)

Iris Hoogiana was a great disappointment to me when I saw it in the tent at Chelsea on the afternoon of May 20th. Here in the sunshine of the garden it is a magnificent iris, indeed, I am inclined to think it is one of the most beautiful of all. In the open daylight, the colour is a pale, or slightly darker blue, but under canvas the yellowish light made the flowers look almost mauve. Some of the most beautiful of all the forms have a trace of green up the centre of the back of the standards and near the end of the beard on the falls, and in those cases, the blue of the whole flower is almost the colour of the sky on these bright days. This iris was collected for Mr. C. G. Van Tubergen of Haarlem in Turkestan in 1913, and is the strongest grower of all the Regelia Irises. I received a number of small pieces of shrivelled rhizome, which occupied perhaps two square feet or three square feet when planted in a bed. This year the plants that I have grown from them fill a bed containing about two hundred square feet, and the flower spikes number over two hundred. It was a pleasure to me to be able to name this fine species after Mr. John Hoog and his brother, who now, since their uncle's death, constitute the firm of Van Tubergen. They have done so much to fill our gardens with new species of iris and tulip and to give us hybrids of them, that it was only fitting that their name would be commemorated in this way.

It is surprising to find a species of Regelia Iris with flowers so uniform in colour as those of Hoogiana, when all the others are remarkable for the veining, which covers all the segments. Korolkowi, stolonifera and Suwarowi are probably the only species now in cultivation, but all are conspicuous for their veining. Mr. Hoog tells me that there is a white form of Hoogiana which is rather more delicate than the type, but I am sorry to say it has not appeared among my plants. I. Hoogiana grows to a height of two feet six inches or three feet and each stem produces two or three flowers. It agrees with the other Regelia Irises in having its standards strongly bearded on the inner side. On the falls, the beard is very broad and close behind, but narrows to a sharp point in front.

IRIS TURKOMAN (KOROLKOWI X STOLONIFERA).

This is an interesting hybrid between two Turkestan species in which the blue beard of stolonifera has combined with the dark beard of Korolkowi to form the conspicuous beard of blue that is electric. The shape of the flower is that of Korolkowi, rather than that of stolonifera. The colour of the flower is difficult to describe, but results from the combination of brown and blue-purple. The greyish-white ground is almost wholly obscured, except at the edges of the lower part of both standards and falls, by diffused veins of brown, which become more and more blue as they approach the centre of the fall or standards. This hybrid is a good grower and flowers freely. My patch of it covers a square yard and has over sixty stems. There are other hybrids from the same cross, one of which has a dark brown beard instead of the blue of Turkoman, while another has a beard of even deeper blue, and is more richly coloured, but it is a younger brother and has yet to grow up before it can be introduced to the public.

THE JUNO IRISES.

(" The Gardeners' Chronicle "-December 17th, 1910.) The name Juno was applied to a certain section of the Iris family, apparently for no better reason than that in ancient mythology Iris, the messenger from gods to men, was sometimes represented as being more particularly attached to Juno than to the other deities. The application was scarcely apt, for Iris was in any case subordinate to Juno, and the names are now used in opposite relation. However, this may be, the name Juno stands for a very clearly marked section bulbous irises, distinguished by the fact that the bulb in its resting state has attached to its base a number of fleshy roots, which quickly branching rootlets when growth begins again in the autumn. The leaves too, are unlike those of any other irises, and in the larger species at any rate, closely resemble those of the Maize (Zea Mays). The flowers are produced from the axils of the leaves, and may be either solitary in the smaller species or as many as eight or nine in number in well-grown plants of I. bucharica or I. Willmottiana. The Juno Irises are also remarkable in that they are the only species which have spherical pollen grains. Another peculiarity of the group is that the inner perianth segments, which in other species are commonly and conveniently known as standards, are here much reduced in size, so as to be far shorter and narrower than the falls. Moreover, they usually extend horizontally, and are even in some cases depressed and droop down to touch the perianth tube. In fact the words "fall" and "standard" are singularly inappropriate to the outer and inner segments of these irises.

Hitherto, it has been usual, apparently, to make sub-division in this section. but increasing familiarity with the plants has shown that there are at least two well-marked divisions comprised within it. It is characteristic of many species of this group that the haft of the fall bears large projecting wings—hence the name of the well-known species, alata-which tend to curl over and meet above the branches of the style. Moreover, it is a curious fact that all the known species which possess these winged falls have also globular seeds, while all those of which the sides of the falls are parallel have seeds of distinct types. The majority of them are roughly cubical, the minority comprise only the rare species Rosenbachiana, and drepanophylla, and possibly another species, as yet unpublished, from Bokhara.

first group, those with winged falls globular seeds, comprises the following species: Willmottiana, fumosa, and Stocksii. Even among these there is a well-marked line dividing off from the rest the two winter-flowering species, namely: -alata and palaestina. In both (and to some extent also in persica, which is the next to flower in order of time), the ovary remains for protection below the ground level until it is nearly ripe and the flowers are raised on long perianth tubes. Another peculiarity of these two irises is that they— and they alone of all the species at present in cultivation— have pollen grains that are covered with minute spines. It has been suggested that spines may afford some protection moisture in the atmosphere, which would not penetrate among the close-lying points unless it were present in very large quantities. All iris pollen grains swell up and burst at once if immersed in water, and it may be that the Provision of spines on the pollen grains has enabled this species to propagate their kind, even in winter months. The other main sub-group, consisting of plants with strap-shaped falls, comprises orchioides, bucharica, Warleyensis, Fosteriana, which all cubical seed, and Rosenbachiana, of which the seeds have a conspicuous cream-coloured seam or rhaphe extending all down one side from top to bottom, and are consequently readily distinguishable from those of any other known iris, unless it be drepanophylla, which is only imperfectly known from dried specimens. It might be thought that the flat sides of this group were produced by pressure of the grains against each other in the capsule, but the experience of several years has shown that even when only a few seeds ripen in the capsule, they are still compressed with flattened sides, while seeds of the species of the other group never become flattened, however closely crowded they may be.

The home of the Juno Irises is a comparatively narrow belt of country stretching from the western shores of the Mediterranean to the Punjab in the east. Alata is found in Spain, especially in the neighbourhood of Cordova, where its time of flowering varies with the elevation and in Algeria and in Sicily,

where it is abundant near streams on the slopes of Etna. Palestina, a near relative, is a native of Syria, while persica, in eastern Asia Minor and North Persia, has many local colour varieties, of which stenophylla and Tauri are best known. The home of caucasica is sufficiently indicated by its name, and so is that of sindjarensis, if one happens to remember that Sindjar is a mountain in Mesopotamia. Bokhara is the home of a number of the more recently introduced species, while Stocksii and Fosteriana are found further east in Afghanistan, and, lastly, Aitchisonii occurs in the Salt Hills of the Punjab.

As regards cultivation, the Juno Irises cannot be said to be difficult, provided that they are given a sunny, well-drained position. It is curious that the species that has probably been longest in cultivation in England, namely, persica, should be on the whole the least easy of the group, but the explanation probably lies in the fact that it seems to prefer a good stiff loam a very sandy soil. Unfortunately, it is impossible to lift these bulbs, with their attached, fleshy roots, intact, from a heavy soil that cakes hard in summer. Consequently, the bulbs of I. persica supplied by the trade are usually without their roots. They make a feeble attempt, perhaps, to flower in their first season, but fail to form a good bulb for the following year. When once established therefore they are best left alone, or very carefully lifted when they have become too crowded.

The larger species seem less fastidious in their demand for heavy soil, and thrive amazingly in a well-drained bed, well enriched with old leaf soil and manure. Flowering as they do in the early months of the year, they are a most welcome addition to our hardy bulbs, and if the bed cannot be placed in a sheltered corner a temporary frame will preserve the flowers from the weather. Each plant of the taller species, such as bucharica, will remain in flower for two or three weeks, since the blooms open in succession from the top of the stem downwards.

There is a delightful range of colours in the flowers of these irises. Alata is usually a deep blue, with a central orange-coloured ridge, though pure white examples are known. Palestina varies from deep blue, through pale blue and bluish-green to a distinctly

yellow-green. Persica is a wonderful combination of white, sea-green and brown-purple set off with a central streak of orange. Of its varieties stenophylla has large flowers of grey-blue, blotched with indigo, and Tauri is mainly red-purple striped with gold. yellow is supplied by orchioides, bucharica has flowers of a milk-white colour, tipped with brilliant vellow on the blades of the falls. Fosteriana is distinguished by the olive-green coats of its bulbs, and by the contrast of its yellow falls with its dull purple standards. Perhaps the most brilliantlycoloured of all is Rosenbachiana, of which no two seedlings appear to be alike. The prevailing colours are red-purple, white and gold, but of late years some forms have been imported that have primrose-yellow flowers, slightly veined with purple. These are said to come from a locality that rejoices in the name of Tabidara Bolo, but repeated enquiries and searches of maps have failed to establish the whereabouts of this place, beyond the fact that it is somewhere in Central Asia. Anyone who has once grown Rosenbachiana and seen the gaudy flowers develop at an amazing pace in a few sunny days in March will never wish to be without it again, and it is much to be hoped that it will not remain as rare and expensive as it unfortunately is at present. Seed is freely produced in some years, and a single capsule has been known to contain between eighty and ninety seeds, but the process of raising flowering bulbs from seed is somewhat tedious and slow, and takes at least four or five years from the time the seedlings appear, which is sometimes two or three years after the seeds are sown.

THE JUNO SECTION.

(" The Garden "-June 1st, 1918.)

The Juno Irises form a very distinct section of the genus, their characteristics being the broad channelled leaves, not unlike those of the maize, and the curious fleshy roots that are attached to the bulb in its resting state. Another feature is to be found in the fact that the inner perianth segments, which in other irises are held erect and therefore called " standards," either stand out horizontally or hang vertically downwards. One species, I. alata, is found near the shores of the Western Mediterranean, while the others are confined Minor, Mesopotamia and the districts Central Asia in and around Turkestan. There are at and possibly more, groups of species three. within the section, which differ in their seeds and in the shape of the falls or outer perianth segments of the flowers.

The most numerous and most widely distributed of these groups is that of which I. alata is typical. The name alata, or winged, was given to this iris because the haft of the falls bears large wings which arch over and clasp the style branch above it. The seeds are spherical, and the plant will rarely succeed except in heavy loam. It is, however, valuable for its habit of flowering in the late autumn, though for this very reason it rarely becomes established, being unable properly to complete and ripen its growth in the depths of winter and in early spring in our climate. The flowers are large for the size of the plant, and usually of a rich blue colour, though an albino form sometimes occurs. In Syria this iris is represented by the slightly smaller I. palestina, of which the flowers vary from blue to greenish-yellow. It needs a microscope to separate this species botanically from alata, for the only difference is to be found in the spherical knobs that top the minute hair-like processes along the haft of the falls.

In Asia Minor there are a number of species known as forms of I. persica. The type is very beautiful with flowers of a kind of opalescent blue and brown-purple. Stenophylla or Heldreichi has flowers of two shades of blue-purple, while those of Tauri are red-purple with golden markings.

All these irises are difficult to establish, because they will only succeed in heavy, tenacious soil, from which it is almost impossible to extract the bulbs with the fragile store roots intact. However, those that do establish themselves live on and flower from year to year in a sheltered, sunny and well-drained corner.

Further north there grows I. caucasica, with flowers of a somewhat transparent yellow, and further east, in the hills of Northern Mesopotamia, the large and beautiful I. sindjarensis with pale blue flowers.

Several hybrids have been raised between these species, which have more vigour than their parents and which do well in good loam. The best is I. sindpers with flowers of a beautiful blue approaching that of a turquoise, set off by the central golden ridge, which it inherits from I. persica.

I. Willmottiana from Turkestan belongs to this group, as also does I. Tubergeniana. The former has beautiful flowers of blue-purple and white and very broad, glossy foliage, and the latter is one of the few bulbous irises that can boast of a beard. It has yellow flowers.

Some years of experience of the cultivation of these irises has shown that they have no vigour in light soil, and those gardeners who cannot give them loam must try to content themselves with the second group, which is confined to Turkestan and which is distinguished from the former by the wingless falls and by the cubical and not spherical seeds.

The finest member of the group is the white and yellow bucharica, which produces as many as seven or eight flowers, one above the other, in the axils of the leaves, and of which a large bed is a fine sight in April. Wholly yellow forms may be obtained by crossing it with orchioides, which has smaller flowers of a deep yellow, though there is a pale yellow form, sulphurea, and a white form with green veinings. Very beautiful and delicate pale lemon forms of bucharica can also be obtained among seedlings, and it is also possible to introduce into hybrids a certain amount of the purple from the richly-coloured warleyensis. This has flowers of a rich purple, with a golden central ridge in its typical form, but seedlings have given me yellow, or

even white. The so-called orchioides coerulea, is, I believe, a hybrid, because it has hitherto always failed to set seeds, though growing under the same conditions as the other plants, of which practically every flower gives rise to a capsule of seeds.

I. Fosteriana from the borders of Afghanistan is an extraordinary plant with an olive green bulb, and flowers of which the outer segments are yellow and the inner a rich purple. Unfortunately, it does not appear to be easy to grow and though I have succeeded in raising seedlings of it, I have never yet contrived to nurse them on to flowering strength.

THE JAPANESE IRIS.

(" The Garden "-January 12th, 1913.)

May I enter a protest against the note on " The Japanese Iris," on p. 337 of last week's issue? Iris totally distinct laevigata is species Kaempferi, from which all the so-called Japanese hybrids have arisen. Both species grow, apparently in proximity, in the Amur district of Manchuria, but they are easily differentiated by the fact that the leaves of I. Kaempferi have a distinct mid-rib, while those of I. laevigata are smooth. The capsules and seeds also are very different. I. laevigata is still a very rare plant although a quasi-albino form of it has long been known under the name of I. albo-purpurea. The typical plant has an unbranched stem, and a head of three or four flowers which open in succession. The colour is an intense blue-purple, and in its best forms this iris is, to my mind, the best of all blue-flowered irises. I have this year had a number of seedling plants in flower. which showed very little variation except in the exact shade of blue. Colour alone cannot, of course, be relied upon as a specific character, but so far as I have been able to discover, wild I. Kaempferi is always of a redpurple colour.

IRIS LAEVIGATA AND IRIS KAEMPFERI.

(" The Gardeners' Chronicle "—July 9th, 1910.)
May I once more revert to this subject, the interest in which is renewed by the recent exhibition of a variety of the so-called albo-purpurea?

As far as I have been able to discover, the truth of the matter seems to be that in the marshy ground on the banks of the River Amur there grow two irises, one with somewhat narrow leaves, with a distinct mid-ribto use a convenient, but inaccurate term—and the other with much broader yellow-green leaves, which have a very slight (if any) trace of thickening along the centre. Of these, the former is apparently the I. Kaempferi of Siebold, and the latter the I. laevigata of Fischer and Meyer, but not of Regel. (The latter is a synonym of Iris Kaempferi.) I. Kaempferi has deep redpurple flowers, relieved by a golden central ridge on the falls, whilst I. laevigata is the best blue iris that I have ever seen. I incline to think that these two irises Kaempferi hybrids, parents of the extensively grown in Japan.

Of I. laevigata there are certain garden forms, apparently from Japan, of which the first to be noticed in England was Mr. Baker's albo-purpurea, a plant with white falls dotted with pale blue. The plant which Messrs. R. Wallace & Co. exhibited on June 21st (see " The Gardeners' Chronicle," •vol. xlvii., p. 231) was a deep-blue form of this, and I am sorry to say that at least two double monstrosities are also to be obtained from Japan, one with six fall-like petals of a deep indigo-blue colour, and the other of a dingy grey colour of similar shape. All of these are, however, vastly inferior, to my mind, to the type, with its large flowers of a glorious deep-blue colour. Both this and Kaempferi are now in flower together here, and I am inclined to wonder whether the Japanese really prefer their double monstrosities, or whether they simply palm off such freaks on us and keep the type to themselves. At any rate, the type seems extremely difficult to obtain, although I hope, in a year or two, to be in a position to distribute some of the many seedlings, both of the type, and of the beautiful form of albo-purpurea that are growing here.

If my view is adopted the proper nomenclature

will be :— I. laevigata, Regel, a deep blue single flower; I. laevigata, Rgl., var. albo-purpurea Baker, for the original Kew plant, which is still growing by the side of the new water-lily tank there; and I. laevigata, Rgl., var albo-purpurea Colchesterensis, for the plant that Messrs. R. Wallace & Co. showed. In view of the length of this latter title, it would surely be better to give some English name to this garden form, especially as it seems more convenient to reserve Latin names for wild species.

IRIS LAEVIGATA, FISCHER.

("The Gardeners' Chronicle "—June 5th, 1920.)
This fine iris has only come into cultivation in this country in comparatively recent years, but, now that it is at last available, no bog or water garden should be without it, for the blue-purple of its flowers is of a shade that occurs in no other iris. The plant is of easy growth and flourishes in rich, light soil where the

water supply in summer is abundant.

That I. laevigata is not well-known is partly due to the fact that the botanists have long confused it with I. Kaempferi, from which, however, it is entirely distinct. The most obvious point of difference in the growing plants lies in the leaves. Those of I. laevigata are smooth and broad, while those of I. Kaempferi are comparatively narrow and have also a very conspicuous raised mid-rib. Moreover, the capsules and seeds of the two species are very dissimilar, the seeds of I. laevigata being large, flattened and smooth, very like those of our native I. pseudacorus.

Difference of colour in the flower is, of course, no certain indication of specific difference in plants, but, however, the wild I. Kaempferi always apparently bears red-purple flowers, while those of I. laevigata are always blue-purple. The whole flower is of the same shade of colour, except for a narrow streak of palegreenish yellow that runs along the haft of the falls and out on to the blade. There is also in cultivation a pure white form, while another, in which the falls are blotched with blue-purple on a white ground, was described in " The Botanical Magazine," t. 7.511, as a species, so long ago as 1896. This last form probably arose in cultivation in Japan, where there is also grown a monstrosity with double flowers. A curious fact is that the albo-purpurea form comes true from seed, in so far as all the seedlings bear flowers mottled with blue-purple on a white ground, although the amount of mottling and the shade of the purple colour vary considerably.

The confusion between I. laevigata and I. Kaempferi probably arose because the two species both come from the same districts. They are found in swampy places near Lake Baikal and from there eastwards through Manchuria and Northern China.

They also occur in Corea and probably also in Japan, though it is a little difficult to feel certain that they are really wild in the latter country. I. laevigata was first discovered by Pallas in his journey through certain provinces of the Russian Empire about 1770. His specimen is now in the Herbarium of the Linnaean Society at Burlington House and was collected in the swamps near Lake Baikal. In 1829 Turczaninow found the plant growing there very freely, and it was from his specimens that it was described as I. laevigata, by Fischer in 1837.

IRIS LAEVIGATA, REGEL.

("The Gardeners' Chronicle "-November 27th, 1909.)
The plant described by "Regel, Gartenflora,"
1864, p. 198, t. 442, and figured again in the "
Botanical Magazine," t. 6132, evidently differs from
the laevigata of Fischer and Meyer, and I incline to
think that I have specimens of it now growing here.

In June of this year there flowered here several plants raised from seed and received as that of I. sikkimensis, an apparently undescribed species, said to come from the Himalayas. Of the truth of this I am not sure, but the fact remains that the flowers are extremely beautiful, of a rich, velvety, dark reddishviolet, set off with a golden signal patch. The falls are comparatively large, and sharply reflexed, while the tips of the standards and of the stigmatic crests rise to about the same level. There was no variation among the plants that flowered, and this points to the fact that we are dealing with a wild species. The capsule both characteristic. but seeds are information on these points is, unfortunately, lacking in the " Botanical Magazine " (t. 6132), where the figure of I. laevigata apparently represents my plants.

One reason that makes me hesitate to decide whether my plants are I. laevigata or an undescribed species, is the fact that there exists at Kew an iris leaf or two, which Dr. Stapf sorted out from among the specimens of I. Clarkei collected on Tonglo by Sir Joseph Hooker. These leaves are distinguished by the prominent mid-rib, which occurs in my plants, and Dr. Stapf tells me that they agree in section also.

There, I think, the question must remain until some authentic, living specimens or seeds of wild laevigata are obtainable from Japan or Eastern Asia.

IRIS LACUSTRIS.

("The Gardeners' Chronicle "-January 25th, 1919.)
This interesting little plant belongs to the Evansia section of the genus, being a rhizomatous species with crested falls. It is local in its distribution, and is apparently only found near the southern shores of the great lakes Superior and Huron, where it grows in moist, gravelly soil in half-shady spots near streams.

Specimens sent in November, 1918, by Mr. T. Smith, Newry, show peculiar arrangement of the ridges on the falls. There is a central, crinkled white crest, tipped with orange, and this is flanked by two lateral ridges. The colour is a deep purple, with a certain amount of white and paler lilac-purple in the region surrounding the ridges on the falls. The standards are usually more spreading and less erect than those depicted in the sketch.

The slender, greenish-brown rhizome spreads rapidly, and is capable of flowering at any time from May till October, if the conditions are to its liking, and if there is plenty of food in the shape of humus within its reach.

In order to obtain seeds, artificial cross-fertilisation is usually necessary in this country, and even then the small capsules do not contain a large number. The seeds are peculiar, for each has an attachment which is actually longer than its own diameter.

This peculiarity is only shared by I. cristata, and it seems better to look upon I. lacustris as merely a local form or sub-species of cristata. It is true that I. lacustris, when raised from seeds here, retains its dwarfer habit and the deeper colour in its flowers. Seeds of I. cristata have always refused to germinate here, and it is, I think, the only species the seeds of which, when ripened here and sown at once, have always failed to produce seedlings. My impression is that the colour of I. cristata is apt to vary from lavender to purple, and there is certainly a white form.

If therefore, we are unable to separate cristata and lacustris except by size and possibly colour, it is probably wiser to refuse specific rank to the latter.

As a garden plant it grows well in conditions approximating to those in which it grows wild. Here, in the dry sand of my garden, I give it old decayed leaf-mould and fine gravel in a position only reached by the late afternoon sun. Every two, or at most three, years I re-make the bed and replant the strongest young shoots immediately the flowers are over. Then root-growth is active, but it ceases altogether in autumn, a period, consequently, at which transplantation is usually fatal.

IRIS LISBONENSIS.

(" The Gardeners' Chronicle "—March 5th, 1910.) Inability to manufacture a euphonious adjective out of Olisipo, the ancient name of Lisbon, has led me to suggest the above somewhat mongrel title for an iris which grows in the immediate vicinity of that city, and which has not been previously described, I believe.

This new species has come to light in the course of an attempt to straighten out the tangle that has long surrounded the Linnaean species biflora and aphylla. By the former, Linnaeus may have meant to describe Portuguese plant, which Clusius found Coimbra and called biflora, when he saw it in bloom in November, and heard that it also flowered in spring. Unfortunately, Linnaeus confused matters by referring to a figure in the " Hortus Eystattensis " called I. which undoubtedly represents the Central aphylla. and his herbarium Ι. possession of the Linnaean Society contains a similar plant. Owing to this confusion it would seem necessary to drop the Linnaean name of I. biflora, and then (" name of sub-biflora lusitanica I., " p. 50, 1804) will stand for the Coimbra plant.

While going through the Portuguese specimens of this iris in the Kew Herbarium I found one plant that differed from I. sub-biflora in several ways, and which was collected on Monsanto. The chief difference lies in the fact that, whereas in sub-biflora the stem bears several small bract-like leaves and has small purplestained spathes, the Monsanto plant has a naked stem, and remarkably long and broad, green spathe valves.

Not content to base a new species on this one specimen, I made enquiries in Portugal, and fortune favoured me, for it happened that my friend, the Baron de Soutellinho, formerly Mr. W. Tait, was able to send me a flowering specimen of what he believed to be I. sub-biflora, gathered by his brother on Mont Estoril, a hill in close proximity to Monsanto, on the outskirts of Lisbon. This plant, however, turned out to be identical with the Kew specimen from Monsanto, and I heard also from Professor Henriques, of Coimbra, that he knows the plant from a herbarium specimen as growing with Iris sub-biflora near Lisbon. Moreover, I find that

a specimen was sent by Maw to Sir Michael Foster from the neighbourhood of Lisbon, and all these indications combine to show that the Kew specimen is no isolated abnormality, but really representative of a distinct species, which has hitherto remained unseparated from Brotero's sub-biflora.

In this new iris the leaves are of a somewhat yellowish green, about eight inches long at flowering time by three-quarters of an inch wide, the innermost pair almost hiding the bare stem. The spathes bear apparently one flower, and are two and a half to three inches long, somewhat inflated, and quite green at flowering time. There is no pedicel, but the tube is from one and a half to two inches long, greenish with purple stripes in the line of the standards. The falls are of a fine dark red, almost black-purple, the beard being bluish in front, then white, tipped with blue, and finally at the base beneath the styles inconspicuously tipped with brown or yellow. standards are of a somewhat lighter shade than the falls, with darker veins, and narrow gradually to the haft, which is veined with red-brown on a colourless ground.

IRIS LOP-TEC.

(" The Garden "-June 15th, 1918.)

This is one of the few hybrids between a bearded and a crested iris. It resulted from fertilising the Iris Cengialti with pollen of I. form of tectorum. This latter, as is well-known, belongs to the the members o f Evansia section. distinguished by having a linear crest on the falls in place of the beard of several rows of hairs of the Pogoniris section. In the hybrid there is a distinct linear crest which splits up into a number of hairs, which, however, are still arranged in a single row. The shape of the flower is almost exactly that of the pollen parent, I. tectorum, of which both falls and standards are flat and spreading. The colour is a uniform dark purple and the spathe valves are scarious and brown, as in all forms of I. pallida, of which I. Cengialti is in reality only a dwarf local form. The spathes of I. tectorum remain green even when the flowers have expanded, but of this there is no trace in the hybrid.

The stem is about a foot or fifteen inches in height, and bears two flowers at the apex, and sometimes a lateral bud lower down. The plants are not very robust, but have lived on here for six or eight years, and have flowered well this year. The foliage is intermediate between that of the two parents, and the plants appear to be absolutely sterile, as I have failed to obtain seeds either by self-pollination or by using the pollen of either of the parents.

IRIS MASIA.

("The Gardeners' Chronicle "—March 5th, 1910.) This new iris should be called I. masia and not I. Masiae, the name by which it was known to Sir Michael Foster; for as Dr. Stapf has very kindly pointed out to me, the ancient name of its habitat, the Karadja Dagh, was Mons Masins. Foster was evidently unaware of the origin of the name, which, in itself, contains further proof of the identity of the plant he received from Leichtlin with Sintenis's specimen in the Kew Herbarium.

IRIS MELAINA.

(BAKERIANA X RETICULATA.)

(" The Gardeners' Chronicle "-February 15th, 1919.) Iris Bakeriana is a delicate little species from the hills in Northern Mesopotamia, and though it lived and flowered here for some years with a glass roof over its head, I am afraid it has now succumbed to lack of attention during the war. It is, therefore. consolation to find that this hybrid, of which Max Leichtlin sent me a single bulb some ten or twelve years, ago, is able to hold its own in the open, and thus to atone - to some extent for the loss of one of its parents. For, although it usually goes by the name of I. Bakeriana melaina, it is really a hybrid between I. Bakeriana and I. reticulata. This, I think, I have proved by making the cross and obtaining a range of forms, of which one or two were practically identical with Leichtlin's plant. The foliage of the hybrids is interesting, for, while the leaves of I. Bakeriana are cylindrical, with eight projecting ribs and those of I. reticulata are four-sided, those of the hybrids have six ribs.

Leichtlin's name of melaina, or black, is very appropriate, for the tips of the falls are of the most intense, velvety, dark reddish black-purple. The central portion is white with a number of irregular linear blotches of the same colour. It is interesting to note that, although all the members of my present little colony of bulbs have sprung as offsets from one original bulb, yet the markings are never exactly similar on any two flowers. Differences, at any rate in colour, can therefore arise in individuals that have originated in vegetative, as opposed to sexual, methods of increase.

IRIS MELLITA.

(" The Gardeners' Chronicle "-September, 1913.) This species was described by Mr. J. G. Baker in "The Gardeners' Chronicle," December 2nd, 1876, p. 709. The plant apparently has a large habitat, for although forms from different regions have been regarded by some as species, they are considered as being synonymous. The leaves are densely tufted; the flowers are borne on short stems, usually in pairs. The has greenish tube blotched with perianth a upwards, whilst the limb varies; sometimes it is purple and sometimes yellow with longitudinal, reddish veins along the base. Iris mellita is considered to be synonymous with I. rubro-marginata of Baker ("The Gardeners' Chronicle," 1875, vol. III, p. 524), and I. straussii Dykes (" The Gardeners' Chronicle, 1909, vol. xlv., p. 391).

IRIS MELLITA VAR. RUBRO-MARGINATA.

(" The Garden "-November 2nd, 1918.)

Any iris that will flower in mid-October in such an autumn as the present is a treasure, and though this little plant does not always give me flowers at this time, it has done so on more than one occasion. At present each tuft of leaves either has sent up or is about to send up its bud, and my impression is that if the plants are replanted in rather rich soil immediately after the normal flowering season in May, a second crop of flowers may be confidently expected in the autumn. The flowers are of a curiously smoky shade of purple, and the beard of closely-set white hairs tipped with violet stands out conspicuously on the sharply reflexed fall.

Iris mellita is the Balkan representative of the Austro-Hungarian Iris pumila, from which it differs chiefly in having a sharp, rigid keel to the spathes. In I. pumila the spathes are almost membranous, and so flimsy as to have no definite shape, while those of mellita are quite firm and rigid. As in I. pumila, the perianth tube of I. mellita is always one inch or two inches in length, while the stem is practically nonthe Ι. mellita grows on Philippopolis, and is there apparently always purple, though in western Asia Minor, where the species also purple and yellow forms are found occurs, both growing together. In the variety rubro-marginata the young leaves, and particularly the spathes, are edged with red, but otherwise this form differs in no way from typical examples of the species. It was found originally by Barbey, a son-in-law of Boissier, growing near Scutari, on the Asiatic side of the Bosphorus, and I believe that my specimens, which came to me from M. Corrévon, a good many years ago now, are descendants of Barbey's plants.

IRIS MINUTA, IRIS KUMAONENSIS CAULESCENS AND THE CULTURE OF ONCOCYCLUS IRISES.

(" The Gardeners' Chronicle "—June 20th, 1908.)
IRIS MINUTA

The yellow variety of this iris, which is noticed by Baker in his handbook of the Irideae, flowered here for the first time on May 4th. It agrees with the type in all respects, except in colour, which is a bright yellow. The falls are marked with fine brown dots and lines down the haft and centre of the blade, and the edges of the standards are also brown. The plants were imported from Japan.

IRIS KUMAONENSIS CAULESCENS.

A few months ago I received from Messrs. Barr & Sons a small piece of the root-stock of an iris, with a note to the effect that it came from the Sikkim Himalaya. In appearance the root-stock resembled that of I. Duthiei, and I therefore planted it in a stony soil rich in humus, adding a little peat. The first flower opened on May 11th, and proved that the iris was a variety of kumaonensis distinguished from the type by having a stem nearly six inches long. The standards, of a pale mauve-lilac, are not held erect, but incline outwards, giving the flower a likeness in shape to I. tectorum. The falls are of a deep purple-lilac, mottled with a still deeper shade, while the deep orange tips to the fine white hairs of the beard are a distinct feature. The flower, unfortunately, only lasts for twelve hours, but thirty-six hours after it fades the second flower is following expanded. The is description: -Rhizome slender, short-creeping; tufts crowded; outer sheaths splitting up into fine fibres. Leaves linear, pale green, rigid, four to six inches long by one-third of an inch broad at flowering time. Peduncle four inches long, one-headed. Spathes twoflowered; valve lanceolate, pale green, two inches long; pedicles very short. Perianth tube one and a half inches long, dark purple; falls obovate-cuneate, two inches long, the outer one and a quarter inches reflexed, one inch broad, dark purple-lilac mottled in the centre of the blade with a darker shade; beard of fine white hairs tipped deep orange, arising from a white crest; standards spreading, oblong-unguiculate, two inches long and three-quarters of an inch broad,

pale mauve-lilac; crests deltoid.

THE CULTURE OF ONCOCYCLUS IRISES.

Everyone who has ever grown these beautiful irises knows the difficulties under which they are cultivated. The chief of these perhaps arises from the fact that whether the rhizomes are in or out of the ground, they develop shoots in October. to Thev therefore, be planted in the autumn, and our variable winters play sad havoc with the young leaves, and the percentage of losses among a number of these plants is often high. In their homes in Central Asia these irises are frozen hard all through the winter, and cannot grow until the snow melts in spring. In order to reproduce these conditions as nearly as possible, I packed up a number of rhizomes last August in dry moss in a wooden box, and sent it up to the Imperial Cold Stores Co., at South Tottenham. There the box remained in a temperature of twenty-eight degrees to thirty degrees until the first week in March. On opening the box then the roots were precisely as they had been in August. I planted the rhizomes on March 9th, and the plants soon made healthy growth in warm, sandy soil, with a layer of old cow manure a foot beneath the surface. The buds are now showing, and the plants apparently in the best of health.

IRIS NEPALENSIS AND ITS NEIGHBOURS.

(" The Gardeners' Chronicle "-October ~1st. 1910.) The name nepalensis was apparently first applied to an Iris by D. Don in his " Prodromus Florae Nepalensis," which was published in London in 1825, and the description there given of the root-stock as resembling that of a hemerocallis leaves little doubt as to the identity of the plant described. Confusion, has, however, arisen with regard to the name because it seems to have been given by Wallich to a fine form of I. germanica with concolour blackish-red flowers. which is also a native of Nepal. The latter has been sent to me direct from that country, and is obviously identical, except in colour, with the common European type of I. germanica. Further confusion has been brought about within the last two or three years by the action of an Indian botanical garden, which distributed, under the name of nepalensis, some plants of Iris tectorum, which were obtained from the Shan Hills of Burma, in mistake for a species akin to I. nepalensis, to which reference will be made later.

The root-stock of the true plant in its resting state consists merely of a bud or growing point surrounded by the fibrous remains of old leaves, and having attached to its base about half-a-dozen whitish, tuberous roots, which are usually cylindrical, of about the diameter of a goose-quill. Sometimes, however, these roots are swollen towards their lower ends, but whether this peculiarity is the mark of a local variety or merely the effect of the nature of the soil in which this plant has been growing, is still a matter of conjecture. At any rate, these swellings are conspicuous on the roots of a number of plants, which I received from a Nepal valley to the north of Katmandu, whereas there is no sign of them either on a root from the neighbourhood of Simla or on the thirty or forty seedlings that I have raised from the Simla plant. My original plant has now survived four seasons here and has flowered regularly for the last three years. I have found it best to lift the plants when the leaves wither in October and store them for the winter under cover in dry sand. At the beginning of March they are planted out in a soil of peat, leaf-mould and old cow manure in a somewhat sunken position, where watering can be done easily if there is drought.

Iris nepalensis is peculiar in many ways. It is by far the latest of all to appear above the ground for there is no sign of it until about the beginning of June. Once, however, the slender point of the leaves is through, the ground growth is so rapid that the flowers open about the middle of July. The colour is a pale lavender produced by light violet veins on a whitish ground. All the six segments are of a delicate texture. and droop at about the same angle. The falls bear a yellow crest, which is divided up into hair-like points, and it is a pity that the individual flowers are so fugitive that they open and fade in the course of the same day. In respect of the seeds also, I. nepalensis stands by itself. The seed proper, which is more or less spherical, has attached to it along one side and projecting at each end a kind of wing-like appendage of much lighter colour than itself. The seed, I find, germinates very readily about the time when the mature plants begin to make visible growth. At the end of their first season, the young plants consist of two or three small whitish tubers attached together at the apex.

The home of this iris is on the southern slopes of the Himalayas, at any rate from Simla to Nepal, and its range appears to be continued far to the east, for it is abundant in Western Yunnan, where it has been collected in recent years by the Abbe Ducloux and also by Messrs. Forrest and Wilson. The curious appearance of the tuberous roots in the dried herbarium specimens collected by the first-named misled a French botanist into describing this iris as I. Yunnanensis of the Hermodactylus section of which the Southern European I. tuberosa is the only representative. But this new name can only rank as a synonym for nepalensis. The roots are in no way similar to the tubers of I. tuberosa, which are rather rhizomes than roots in the strict sense.

Reference has already been made to a Burmese iris. This is a plant of the same nature as the type I. nepalensis, differing chiefly by the fact that the flowers are practically sessile, while the stem of nepalensis is six-twelve inches in length. The dwarf plant is also much more floriferous and was named Collettii, after the discoverer, Sir Henry Collett. It appears to be identical with Sir Michael Foster's Letha variety of nepalensis, which came from the Letha range

in the Shan Hills. Curiously enough, this plant also occurs in Yunnan, where it has been collected by the same three botanists. It has also been re-baptised in France as I. Duclouxii, and also wrongly described as a hermodactylus. Unfortunately, this plant is not apparently in cultivation, but it was Foster's experience that it was vastly easier to manage than I. nepalensis itself, and as it is very floriferous, its reintroduction is certainly to be desired.

At first sight these two irises appear to stand quite apart from all others, with no connecting links which might represent stages in the transition to another group. There exists however, in Western China and Tibet a small class of three irises—tigridia (Bunge), pandurata (Maxim) and Potanini (Maxim)—not one of which, unfortunately, is known to be in cultivation, so that we have to fall back for information on herbarium specimens, which, in the case of irises and other monocotyledons, are seldom entirely satisfactory. All these three species agree in having roots of a special type intermediate between those of an ordinary bearded iris and the tubers of nepalensis. This feature separates them at once from the western species, which they, in other respects, most closely resemble, namely, pumila, rubro-marginata (mellita) and chamaeiris. It is just possible that this small group does really represent an intermediate stage between nepalensis and Collettii and the ordinary pogoniris.

I. pandurata is only differentiated by Maximowicz from I. tigridia by the fact that its spathes are two-flowered, but specimens from the natural habitat show that both one and two-flowered stems are borne by the same individual plants, and it seems probable that it is really only a strong-growing local variety of I. tigridia. The latter has a stem of some four inches in length and purple flowers with a variegated beard. I. Potanini is stemless, with a lengthy, tapering tube, as in the true I. pumila, and the flowers are usually, if not always, yellow.

I. Potanini on the contrary is probably entitled to the distinction of being the species that has reached the greatest elevation of the whole genus, for it grows on the tops of passes in Central Tibet at the height of 16,300-17,800 feet. The flowers of Thorold's specimens, gathered in 1891, were so imperfect that a new iris Thoroldii, of the Apogon section, was published by Baker in Hooker's "Icones Plantarum," No. 2,302, but others gathered in 1892 by Rockhill show the beard quite clearly and appear identical with Potanin's specimens from Kansu and Przewaldski's from Northern Tibet. Among the latter there occurs the purple-flowered form which seems always to be found sooner or later among those species of irises in which yellow flowers predominate.

If these species are eventually brought into cultivation it may well be that fuller knowledge of them will show their affinity to I. nepalensis is not as close as dried herbarium specimens seem to indicate, and now that so many new plants from Western China are making their way into our gardens we may hope to obtain these interesting irises.

IRIS OCHROLEUCA.

(" The Gardeners' Chronicle "-November 6th, 1920.) In a recent note on this fine species, it was stated that it must be called I. orientalis and not I. ochroleuca. It is perfectly true that Miller's name of orientalis is older than that of ochroleuca, but we are relieved from the necessity of retaining it by the fact that his text gives the iris a beard (" corollis barbatis"). Moreover, he supports this mistake by a figure which shows a curious transverse beard running across the falls. Miller is probably also mistaken in saying that I. ochroleuca comes from Carniola, for it seems certain that it is a native of Asia Minor, not of Europe.

I. ochroleuca is well-named, for it is preeminently the white and yellow iris and, as it happens, it is most convenient that this name should stand instead of orientalis, for the latter is needed for the eastern ally of I. sibirica. The curious fact about I. sibirica is that there appears to be no evidence that it grows anywhere east of the Ural Mountains. It is a native of Central Europe and is found in Germany, Switzerland, Hungary, North Italy and Central Russia. Between the Urals and Corea there is, I believe, no recorded trace of any specimens of I. sibirica or of closely-allied species. In Corea, however, there occurs a form which is in some ways intermediate between sibirica and orientalis, and it is readily distinguished by the green ground colour that underlies the purple veining on the throat and haft of the falls. Typical I. sibirica has comparatively small flowers raised high above the foliage, and large flat seeds, in shape like a capital D. The capsule is broad and rounded. I. orientalis, on the contrary, comes from the extreme east, namely, from Japan, and has relatively larger flowers. The stems are approximately equal in length to the foliage, but the latter droops and so allows the flowers just to stand clear of the leaves. Other characteristic features are found in the small cubical seeds and in the narrower, sharply three-cornered capsules.

The well-known Snow Queen has thus nothing whatever to do with Iris sibirica, but is an albino form of the Japanese Iris orientalis. Indeed, it probably arose under cultivation in Japan and can easily be

distinguished from the white forms of European species. In these the flowers are much smaller and usually veined, and often tinged with lilac or purple. For garden purposes the most decorative plants result from crossing the two species, for the hybrids usually have the large flowers of I. orientalis on the tall stems of I. sibirica. Variations in colour may easily be obtained in either species by crossing the white and the blue forms, and this method is capable of producing a colour that is near to a real sky-blue.

ONCOCYCLUS IRISES FROM SEED.

(" The Gardeners' Chronicle "-May 5th. 1906.) Mr. Jenkins' remarks on raising Oncocyclus Irises from seed have tempted me to say a few words. I have for many years past raised these irises from seed, and have carried some kinds through three or four generations. Without these seedlings some kinds would have disappeared from my garden much more rapidly than they have done, but I cannot say that I have been able to observe any distinct adaptation to the demands of our unfavourable English conditions. A seedling is nearly always, for a certain length of time, more vigorous than a plant grown from an offset. If allowance be made for this, the plants raised from seed are as difficult to rear successfully as are other plants. The Palestine Oncocycli, for instance, raised from seed are just as troublesome as imported ones.

Both Oncocyclus and Regelia Irises go to seed very freely with me, and this leads me to suspect that even in their native homes they may be short-lived, reproducing themselves largely from seed. There is no trouble about getting seed; the difficulty lies in raising plants from seed. The seeds are very slow and uncertain in germination. Those sown in the open sprout more freely than those sown in pots. But, on the other hand, the seeds sown in pots are much more under command than those sown in the open. The top soil in a pot can be sifted at any time; the seeds being large and easily handled, can be picked out and sown again. A gathering of seed can be kept under observation for many years, and this is desirable, for. as I have said, germination is very slow and very uncertain.

When a pod of seed, containing about forty seeds, is sown as soon as ripe, say in July, in a pot, and left to itself, the next spring there may appear one or two plants, or very rarely a good many more, frequently none at all. The second year the same varied results may be obtained, and so in succeeding years. The pot, however, may remain several years without further germination taking place in it, and then in another year or two, or even several, plants may appear. I have, therefore, been led to keep my seed-pots for many years, so long indeed as any sound hard seed remained in the pot. I have thus raised plants from seed which

had been sown fifteen years previously, and the plants thus obtained were as vigorous as those which came from seed which had germinated quickly. I imagine that if I live I shall find the period during which the seed remains alive and capable of germination to be even longer than the fifteen years which I have now actually observed.

Some years ago I made a number of experiments with a view to getting more command over germination. I subjected the seed to various conditions, but I got no satisfactory results, and since then I have adopted the practice of leaving the pots in the open, rarely, if ever, watering them, not protecting them at all, but simply allowing them to get such good or harm as they might from rain or drought, frost or sun.

When the seeds are sown, not in pots, but in the open border, in prepared seed beds, they germinate, as I have said, more freely, but it is almost impossible to keep such beds under inspection and free from weeds, etc., for a sufficiently long time. But I have seen enough to convince me that, even in the open, seeds may germinate after many years. I find myself each year hesitating between sowing seeds in the open bed or in the pot, each method having its own advantages.

But the difficulties are not over when the seed germinates. The young Oncocyclus (or Regelia) Iris grows very, very slowly, and I lose many of the seedlings in the first year. Some, especially the kinds from Palestine and the hybrids from these, are very apt to germinate in late autumn, and great care is then needed to carry them through the following winter, for these tender seedlings cannot withstand frost.

I take the seedlings from the pot and re-pot them almost as soon as they appear, and then grow them singly in pots until they are large enough to be planted out. This process retards their growth. Those sown in the open grow more rapidly and strongly, but, when left in the bed, many of them succumb in the winter unless most attentively watched; they are thrown up out of the soil by the frost, and if left exposed are killed. Those, however, which survive come to flowering estate earlier than those nurtured in pots.

After the first year the difficulties are less. During the second year some succumb, and that whether the resting period is secured by taking them up or putting lights over them, but many grow up into good strong plants, flowering the third, fourth or some later year.

The difficulties on which I have dwelt are mainly with the Oncocyclus Irises and their hybrids. The Regelia Irises are much more easily dealt with, for these will often flourish without lifting or drying off with lights when planted in good rich soil in dry, open sunny situations. The seed of plants which have not been hybridised I sow in the open and leave the seedlings, without taking any special care of them, in the seed-bed until the summer of the second year. I then take them up, " dry them off," and re-plant them in late autumn. There is no difficulty in thus obtaining a large number of flowering plants. The seed-bed, after the removal of the seedlings, should still be watched as a seed-bed, for many seedlings will appear in subsequent years.

With the seed obtained by crossing a Regelia Iris with an Oncocyclus Iris (and I have had many crosses of this kind) I am naturally more careful, sowing the seed in pots, or, if I sow it in the open, I give them special attention. But the seedlings are much more vigorous, much more easily dealt with than seedlings coming from crosses of Oncocyclus Irises among themselves. The greater robustness of the Regelian parent, whether father or mother, makes itself most distinctly felt in the offspring. All these Regelian hybrids are more or less beautiful, some of them exceedingly so, and I find myself leaning more and more towards them; they give a far better return for one's labour than do the wayward, fugitive Oncocycli.

I have also raised a large number of crosses between irises of the Oncocyclus and Regelia sections with the bearded irises, I. pallida and others. The seed of these germinates slowly and uncertainly; the seedlings grow for the most part slowly at first, though some show from the very outset considerable vigour. The plants thus raised have the advantage of not needing any summer rest. They flourish quite well when left to themselves. Some are very robust, increasing rapidly and rarely "go off"; others do not do so well, increasing slowly, and showing a tendency

to decay in the root stock. As a rule, moreover, they do not flower freely, but I find that in this respect they improve if left undisturbed for several years. Unfortunately none of them possesses the rare and delicate beauty of the pure Oncocyclus or Regelia type, though some of them come near to this. Many are grotesque, some even absolutely ugly, and have to be destroyed. All of them are very sterile, whereas the Regelio-cyclus hybrids bear seed freely. In the course of many years I have only succeeded, in spite of active pollination, in getting a score or less of sound seeds from a large number of blooms, and very few of these have germinated, so that I see little chance of taking advantage of the Mendelian law in respect to them.

IRIS PUMILA.

(" The Garden "-May 16th, 1914.)

The true I. pumila has practically no stem, but a perianth tube of two inches or three inches in length. I. pumila is in many localities even more variable in colour than I. chamaeiris, which in some districts is all yellow, in other all purple, while in others, again, many colour varieties are found growing together. Unfortunately, the true I. pumila is comparatively rare in cultivation.

IRIS PUMILA.

(" The Gardeners' Chronicle "-May 6th, 1911.) Great as is the confusion in iris nomenclature no name is probably so frequently misused as that of I. pumila. It occurs in every nurseryman's catalogue, but it is extremely rare to find a specimen of the plant in their gardens, except in the shape of I. pumila coerulea, which is a true pumila. Of this, there are in commerce at least two forms, one of which is slightly larger than the other and vastly more vigorous and floriferous. I. pumila is indeed one of the most floriferous of all irises. In most species it is only the central growth at the end of the rhizome that produces a bud, but in I. pumila as many as three or four of the growths on either side are also capable of flowering, so that each small rhizome may produce as many as nine flowers.

The home of the species ends in the west of the hills near Vienna, where it grows abundantly in many colour forms, red-purple, blue-white, and yellow. The plant can there be traced eastward down the Danube, round the Black Sea by Odessa and the Crimea to the Volga, beyond which it does not apparently extend.

The features of the true plant are firstly, the absence of stem, secondly, the long (two inches or more) perianth tube, thirdly, the loosely-wrapping and, as it were, shapeless spathe valves, and, lastly, its early flowering habit, for the true I. pumila is always the first of the bearded irises to flower. The plants with which it is confused are forms and hybrids of the French and Italian irises, to which the names lutescens, chamaeiris, olbiensis, and italica have been given.

In these the stem is always obvious, although often only an inch or two in length, the perianth tube is not much more than an inch in length, the spathe valves are keeled, and their outline is better defined, and the flowering time is a week or two later than that of I. pumila.

IRIS PALLIDA DALMATICA.

(" The Garden "-July 6th, 1918.)

This is a good example of one of the finest of the older garden irises. The strong growth of the glaucous grey-green leaves and the large flowers of good substance on sturdy, upright stems combine to make the plant conspicuous in the border in early June. The colour of the flower is a uniform pale grey-lavender, and the beard is a deep yellow.

Whether the plant has any real claim to the name of dalmatica, which it has borne for so long, is at least doubtful. My own impression is that it has no claim whatever to come from Dalmatia, and this was confirmed by all I could ascertain from local botanists when I tramped about the Dalmatian coast in 1912. Iris pallida in one form or another is widely distributed over the eastern coast of the Adriatic. I found it on Monte Spaccato, which is merely one edge of the plateaux which rise rapidly behind Trieste. There it is a slender plant some eighteen inches in height, closely resembling the Loppio form of I. Cengialti. I found similar forms at Bollunz and Poppecchio in Istria, and others on Mount Veljun at the head of the valley which ends at Zengg on the Croatian coast.

Further to the south, on the Velebit Mountains Carlopago, at an elevation of nearly four thousand feet above the sea, I found some very dwarf forms, barely a foot in height, but it was not until I got to the neighbourhood of Ragusa that I found anything like what is usually known as I. pallida in our gardens. There, however, I found a cliff covered with thousands of plants of every shade of blue-purple and red-purple, but in every case the build was slender and the stems were inclined to be flexuous and to bear their flowers rather crowded together at the top than set well apart, as is the case in pallida dalmatica. It is possible that still further south—in Albania, for instance, may bе pallidas like the dalmatica, but there is no herbarium evidence of their existence, and, on the other hand, I have obtained from the neighbourhood of Bozen in the Tyrol plants which differ much less from " dalmatica " than those of the Dalmatian coast. The stem is stiffer and the flowers are of more substance, even if they have not the widely spreading falls which are so conspicuous a feature of "dalmatica." The latter may be a seedling or even a hybrid form of the Tyrolean pallida, a supposition which is perhaps confirmed by the scantiness of its pollen and by the fact that it seldom produces fertile seeds. The few seedlings of this iris that I have succeeded in raising have not inherited its characteristics, but have rather resembled what is known as typical pallida, being more slender in growth and with less substance in the segments of the flower.

I. pallida is almost certainly one of the species that underlie the majority of our garden bearded irises, and with its purple shades in combination with the yellow of I. variegata we have at once most of the colour elements that go to make up their flowers. At the same time it is surprising how large a range of forms as regards both colour and habit can be found among the pallidas alone. They always seem to keep their uniform colour throughout the whole flower and their free-flowering habit, which are perhaps their most valuable points as garden flowers.

IRIS PARADOXA VAR. CHOSCHAB.

(" The Gardeners' Chronicle"—June 4th, 1921.)

Iris paradoxa was rightly named "the unexpected," for it is entirely unlike any other species. Its home is in the mountains in Talisch and Northern Persia, which surround the south end of the Caspian Sea. The firstdiscovered specimens were of the form which has been more frequently in cultivation, and which has the groundwork of the standards of a blue colour instead of silvery white of the form illustrated supplementary coloured plate. This was Choschab, after a locality from which Mr. C. G. Van Tubergen, of Haarlem, obtained a supply of plants. A further supply of this form was obtained, and I considered myself fortunate when six plants gave me six flowers of this magnificent iris. The leaves are narrow, inclined to be falcate, and of a pale, glaucous grey, distinctly paler than the spathe valves, which are very long and somewhat inflated. The stems are about four to eight inches high, and, unfortunately, in common with all Oncocyclus Irises, produce only one flower each. When the flower has been open for about twenty-four hours, the standards lean outwards and then show two rows of dark violet hairs on the lower part of the haft.

The most remarkable feature is, of course, the appearance of the falls, which resemble rather the back of a large bee than any part of an iris. The edges of the haft bear thick blackish veins on a dull pink ground, while the whole of the rest of the surface is covered with short, thick-set black hairs, which stand so closely together as to give the effect of velvet both to the eye and to the touch. The ground colour is a pale pink, which appears in a narrow crescent or chevronshaped patch at the end of the beard, only to be almost entirely obscured again by the velvety black colour of the tip of the small blade, which is not separated by any constriction from the broad haft.

The standards are very flimsy in texture and bear dotted, blue-purple veins on a silvery white ground. The haft is narrow and veined with brown-purple at the base, just above which it bears two central lines of dark violet hairs, one on each side of the central channel.

The styles are yellow, closely veined and dotted with red-brown, and the small reflexed crests are of the same colour.

THE RETICULATA GROUP.

(" The Gardeners' Chronicle "-February 28th, 1914.) The first sight of the confused fragments of a puzzle which have to be fitted together is apt to be disheartening. Scarcely any two pieces seem to belong together, and the majority, indeed, appear to be so detached from the rest as to be quite meaningless. Such has hitherto been my feeling with regard to the disconnected facts that have constituted our knowledge of the group of early-flowering bulbous irises, of which I. reticulata is the best-known example. It cannot be pretended that all the fragments can yet be made to fit together into a complete picture, but it is, perhaps, possible to suggest some definite arrangement and to ask whether facts within the knowledge of others who are interested in the group seem to them to fall into their places in the scheme.

The chief difficulty lies, of course, in obtaining specimens of wild plants from known localities. Importers and collectors are only too inclined, perhaps not unnaturally, to be reticent as to the precise localities from which their supplies come, and herbarium material is not always sufficiently carefully prepared to enable us to see clearly the somewhat minute points of difference.

Anyone who has grown I. reticulata, I. histrio and I. histrioides must have noticed that there are marked differences in the methods of increase of these plants. Flowering bulbs of the two latter species form round their bases a cluster of as many as twenty or thirty small bulblets, no bigger than, and not unlike in outline to, grains of wheat. I. reticulata, on the other hand, forms a much smaller number of relatively large bulbs differing considerably in size one from another. The smallest, however, is usually three or four times the size of the bulblets formed by the other two species. As far as my information goes, I reticulata is confined to the Caucasus region, and it is only there that irises are found which increase in the same way. All the other members of the group form the innumerable bulblets already mentioned, and come from further south. The only exception is I. Bakeriana, which is easily distinguished by the character of its foliage, as we shall see later.

There can, I think, be little doubt that the deep violet-blue I. reticulata of our gardens is not the commonest form of that species in its native home. Indeed, I have so far failed to find any scrap of evidence to prove that it is not merely a colour form of garden origin. Bieberstein's original figure (" Cent. Plant. Rar. Taur. Cauc., " I.t.II, 1810) does not even justify the assumption that this is his type. On the contrary, his drawing represents much more faithfully the red-purple flowers, which have always been the product of any bulbs which I have received direct from the Caucasus, and also of those plants that I have raised from seeds from the same source. The actual shade of red-purple is apt to vary and the blade of the falls is usually more or less conspicuously veined, the style-branches are broader than the haft of the falls, and the standards, also, are broad and tend to curve inwards to meet each other instead of pointing outwards at nearly the same angle as the stylebranches as do those of I. reticulata.

The view that a red-purple flower is the common wild form is supported by the fact that self-fertilised seed of the type has never given me anything but red-purple forms. This has also apparently been the experience of others, and yet it is a result which no Mendelian theory seems able to explain.

There is yet another tone of colour, which is found among the forms of this Caucasian iris. It is a peculiar slaty-blue, sometimes quite dark, and sometimes so pale that one sturdy example has even received the name of Cantab.

As we leave the Caucasus region and go further south, we come to the home of I. histrioides in the neighbourhood of Amasia or Amas. Its habit suggests that it is an inhabitant of mountainous districts where the winters are severe, for the flowers come up almost simultaneously with, and sometimes even before, the leaves. The flowers are flatter and less funnel-shaped than those of the Caucasus group, and of a vivid blue colour, except in the upper part of the blade of the falls, where there occurs a triangular white patch veined and dotted with blue. All these characteristics are found in home-raised seedlings of this species, and, as has been already observed, it differs sharply from the Caucasus plants by its method of increase.

With I. histrioides I am inclined to connect somewhat closely the plant to which Michael Foster gave the name of sophenensis, in memory of the fact that it came to him from the neighbourhood of Kharput, a district which in ancient times bore the name of Sophene. This iris has flowers of the same shape as those of I. histrioides, but smaller. In neither does the central ridge on the falls fade away, as in I. reticulata; in both it is carried all along the haft, as was also the case in Leichtlin's purpurea. The latter does not now seem to be in cultivation, but this feature and its short leaves are perhaps enough to justify us in assigning it to this group of plants. We seem also to have lost the colour-forms of sophenensis, which Foster tells us (" Bulbous Irises." p. 7) may vary from red-purple to a lightish blue. The only form which I know, and which comes true from seed, is of a pale blue colour, with a lemon-yellow central ridge, much resembling a rather small pale histrioides. Among seedlings of the latter, variation in the exact shade of colour occurs both in the flowers as a whole and in the yellow ridge on the falls.

Going still further south, we come to the region where I. histrio is native. Our difficulty here lies in the fact that it is no longer possible to say with certainty to which of two distinct plants the name was originally given. It is, perhaps, rather more probable that it was bestowed on a plant with upright standards and very conspicuously blotched falls, which seems to be confined to Palestine, if not indeed to Lebanon. This iris has been distinguished as histrio orthopetala, and it is evidently closely allied to the form with divergent standards and less conspicuously blotched falls, which is common in the neighbourhood of Marash, and which is now commonly supplied by the trade for the more showy orthopetala. Both produce numbers of minute bulblets, but they differ from the two groups we have already considered by the fact that their foliage, though longer, is more slender and less erect. It is far less rigid, and seems always to begin to curve as soon as it emerges from the soil. The prevailing colour of the flowers is a blue-purple, and the falls are either dotted or veined more or less distinctly.

It is interesting to notice that of this iris, too, there is now known a red-purple form, atropurpurea.

As reticulata and Krelagei only differ in colour, so does this plant resemble what is probably the northern form of histrio in every respect but that of colour, except that the central ridge is here non-existent, though the black tubercles that dot the low ridge in histrio are here conspicuous as raised points along the central line of the haft of the falls.

Further south still, we come to I. Vartani, which is hardly more than another development of I. histrio. It is distinguished by the length of its style-crests, and for us in the north by its inability to survive our climate for more than a year or two at the most. Of the white form of I. Vartani, some examples are beautifully spotted with blue, and we can only regret that this iris has such a poor constitution.

There remain two outlying species, which are easily separated. To the west, in Asia Minor, occurs I. Danfordiae, which is distinguished by its minute bristle-like standards and by its yellow colour, while to the east is found I. Bakeriana whose eight-ribbed leaves divide it at once from all the other irises we have considered. That I. Danfordiae has been described under more than one name is due not to the variation of the olive-green markings which sometimes occur on the blade of the falls and on the backs of the stylebranches, but to the fact that the first-described herbarium specimens have lost their outer bulb-coats. with the result that the description did not mention their reticulated structure. Baker was thus led to class this iris among the Junos on account of its minute standards, and it was only when the plant was rediscovered by Bornmuller that Haussknecht, seeing the reticulated bulb-coats, thought he was describing a new species under the name of I. Bornmulleri.

Definite dates for the flowering of these plants are most misleading. This year I. reticulata is in full flower in the middle of February, while I have known it so late as the last days of March. And yet, if, as seems not improbable, all our stock of I. reticulata has arisen by division from a single bulb, we might reasonably expect it to be much more constant in its time of flowering than any other of these species, where seedlings are innumerable and differ considerably in their time of flowering. For instance, this season I had some I. Krelagei in flower in the last days of

November, though this is no doubt exceptional, while others have yet to open their buds at the end of February. Much depends, I believe, on the date at which the growth of the previous year was ripened off, and on the weather during the late autumn and early winter. The embryo flower is already in the bulb when we plant it in the autumn, and it is not difficult to imagine that external conditions have great influence on the flowering-time of bulbs which develop their flowers with such amazing rapidity as do these small irises. My experience is that imported bulbs and those that have been lifted flower earlier than those left in the ground, and this is probably to be explained by the fact that the ripening has been more complete.

There is one other point that may be of some interest. I. Bakeriana is admittedly of poor constitution, and apparently nowhere in England does it do really well. For several years now I have grown it side by side with a beautiful hybrid form, of which the late Max Leichtlin sent me a single bulb under the name of Bakeriana melaina. The latter increases regularly by offsets, and this year there have appeared ten flowers, though the type has been flowerless. Melaina has six-ribbed leaves and is probably a hybrid of Bakeriana and some reticulata iris. Its falls are of the richest velvety-violet, and the interest of the plant is that there are now considerable differences among the flowers produced by the different bulbs in the extent of the triangular white patch at the throat and of the arrangement and number of the dark-violet blotches upon it. Seeing that such differences, small though they are, do undoubtedly arise among the individuals obtained by vegetative increase, we can form some idea of the possibilities of variation among the forms of these irises which nature has evolved by sexual reproduction.