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APRIL 1928

The American Horticultural Society

A Union of The National Horticultural Society and The American Horticultural Society, at Washington, D. C. Devoted to the popularizing of all phases of Horticulture: Ornamental Gardening, including Landscape Gardening and Amateur Flower Gardening; Professional Flower Gardening and Floriculture; Vegetable Gardening; Fruit Growing and all activities allied with Horticulture.

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The National Horticultural Magazine

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Contributing Editors

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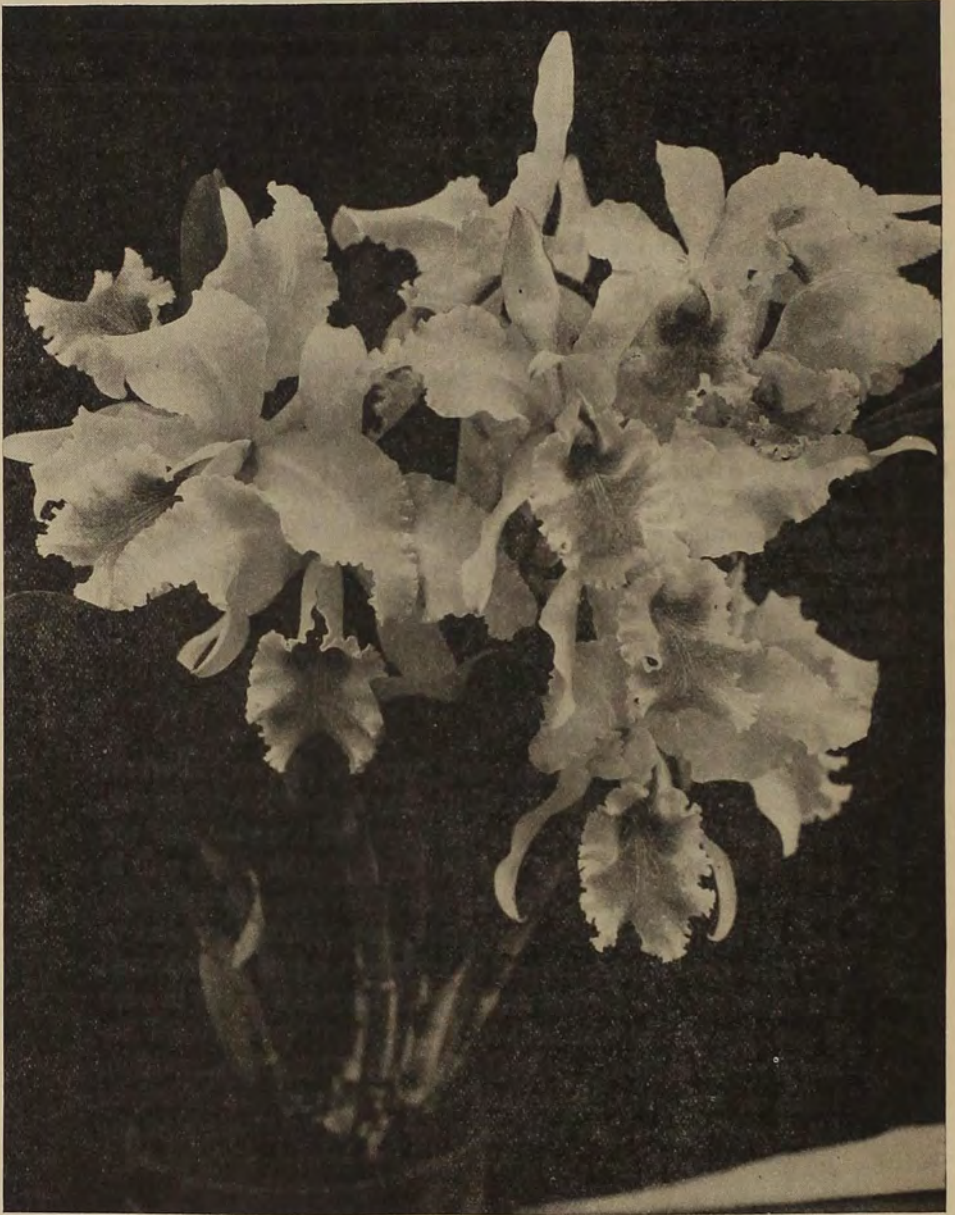
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In this number will be found mention of two important movements in American horticulture, the mention of the survey committee of United Horticulture and the report of the activity of the Federated Garden Clubs. The one is still in an early stage of its activity and the other has come well along past its beginnings. Each of these movements is related to our own society interests and should serve it just as we should serve them. No garden interest can remain isolated in such a country as our own and The American Horticultural Society, which is slowly making for itself an important position, looks on with very real regard for the progress and growth of all movements which will make for the beautification of the country through the real enlightenment of the people who are the garden makers.

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Armacost E. Royston

An American Grown Cattleya

[See page 52]

Tulips

BY SHERMAN R. DUFFY

Times and tastes change.

The tulip is a case in point. Where formerly the devotees of this brilliant bulbous plant of spring planted the early varieties in great masses, to-day the late or May flowering tulips have almost driven the early varieties out of gardens, and instead of the great masses of former years we find a tendency towards using them as hardy perennials in conjunction with other hardy plants of the garden. True, there is nothing more gorgeous or showy than large beds or borders of tulips, and if space permits, it is the most satisfactory display. But for those who do their own gardening, and this is by far the great majority of gardeners, such masses of tulips, gorgeous as they are, wear out their owners, and by and by the tasks ahead dull their admiration.

For best culture and success, tulips need to be dug each summer and to be replanted in the fall. If they succeed at all they multiply freely and the gardener is soon swamped by bulbs without number. The annual task of digging is a horror and the annual task of planting in weather, often cold and wet in the fall, is another horror. This has caused many tulip growers, who would not be without their annual display, to amend their time-honored plans and use tulips in smaller clumps and groups in beds and borders where, if there is no time, the arduous labor of annual lifting may go by for a season or two.

One of the great trials in digging tulips is the difficulty in locating the bulbs in the soil, once the foliage has yellowed and shrivelled. There has been a tradition in the past that lifting the bulbs before the foliage had matured was fatal or nearly so. It has been proved and it is the writer's experience that they can be lifted carefully and heeled in in some shady spot to mature with no damage, so that

their space may be utilized for later plantings of annuals.

Digging tulips after they have died down is not a job that can be entrusted to hired help. You will find the bed as thickly populated the next spring as it was at the start and the intruders will ruin any color plan for succeeding plantings of tulips in the same space.

The one thing a tulip bulb needs and demands is curing in summer warmth. In light sandy soils, the necessity for digging is not great. They may remain until overcrowded, but in cold, heavy soils, they require annual lifting. They should be stored in an attic or barn which is hot in summer, not in a cool cellar or basement. Tulip plantings are never as good the second year if they are not lifted. In fact, they are seldom as good under any circumstances as the newly imported and planted bulb. The reason is simple. The Hollanders grow tulips with only the production of the finest possible bulbs in mind. They are not concerned about the blossoms, which are removed as soon as they develop so that all the strength of the plant may go into the formation of a bulb for sale. If we wished to nip out buds for a season or two we could bring back the bulbs to their original strength, but no one wishes to do so.

The question of background is a very important one in tulip planting and one that has the greatest effect on their beauty. Evergreen or other dark foliage provides the ideal backgrounds for the brilliant colored tulips. The bright, young greens of other shrubs furnish admirable foils for the duller colors such as the lavenders, lilacs, browns, and purples.

A groundwork of green is also an admirable background and this is one of the reasons why groups of tulips from 6 to 25 to a group in the perennial border either with the foliage of

other plants or the bloom of early perennials make one of the happiest arrangements. The gray green foliage of the hardy pinks, the gray of the cerastium, the dark tones and snowy bloom of the hardy candytuft, the sheets of white of arabis, the blue of forgetmenots are now all utilized to give color either in harmony or contrast to the stately May flowering tulips.

The selection of tulips because of the great number of varieties is a puzzling problem. It is really a matter of individual taste. There are a few outstanding varieties that almost every one wants. If I had to be restricted to one Darwin, I think it would be Mr. Farncombe Sanders. If I were under the same sad limitation with the Cottage tulips I think it would be John Ruskin, and of the Breeders, Louis XIV.

For a glory of coloring, a mass of from 200 to 500 Farncombe Saanders can not be beaten. Pride of Haarlem and the brilliant Petrus Hondius are in the same class with their rose and carmine. In the lavender and mauve shades Valentin, Dream, Rev. Ewbank, Erguste, Electra and others give a delicate beauty much admired, ranging to the deep rich purples such as Godet Parfait, Jubilee, Faust, Bacchus, Velvet King, and Zulu.

There are a multitude of pinks and roses from which to select, and from the clear pinks with no hint of purple, Clara Butt is the usual choice. Flamingo, Gretchen, Suzon, and Baronne de Tonnaye give a fine selection and grouped with the lavenders and mauves are exceedingly fine.

New Cottage and Breeder types are rapidly gaining favor. Among these Scarlet Emperor, not really new but new in sales lists, is one of the most strikingly brilliant. The old *Gesneriana major* in rich crimson holds its own.

The Breeders seem to be gaining in popularity with each season, their soft colorings and interesting blends in association with the yellows making

admirable groupings. The brown tones are particularly well liked. Dom Pedro, a rich coffee color, St. James, Salomon, Bronze Queen, Golden Bronze, Plutarchus, and others coming into gardens in increasing numbers need the yellows such as Moonlight, Mrs. Moon, Ellen Willmott, Ixioides, Walter T. Ware, *Gesneriana lutea* and others to enhance and display their more sombre coloring.

The old-fashioned striped tulips, the Bizarres and Bybloems with their later relatives, the Rembrandts, are enjoying a revival. They are interesting in plantings by themselves but do not mingle well with the self colors. In this connection the subject of the "breaking" into stripes of the late tulips is arousing much discussion in scientific circles. Experiment stations and the Department of Agriculture have attributed the striping which seems to be the mature form of the tulip into which it will eventually break, with the exception of the yellows and whites, as the result of infection by the mosaic disease. This, it is said, is communicated by insects. This theory is scoffed at by English and Continental growers who declare that it has no solid foundation in fact and that the breaking occurs when spread from striped to self-colored tulips. The late Rev. Joseph Jacob, an authority on tulips, gave it as his opinion that a "Scotch verdict," not proven, fitted the case.

The breaking of tulips is a fascinating subject. While it is not at all unusual for flowers to come variegated, they start variegated and remain in that condition and reproduce themselves from seed. The habit of the tulip in breaking into stripes late in life, so far as the writer knows, is confined to this genus, as I have never seen any mention of breaking in other plants, or if they do break, as the Florentine iris does occasionally, it reverts to its original form in a season or so. While there are claims that seedling tulips have bloomed for the first time in striped form, there seems no accurate confirmation of it. It

is also claimed that broken forms go back to self-colors at times, yet the best tulip authorities question the evidence as to this.

It seems well established that they first bloom as selfs and that the breaking into stripes and splashes may come at any time, or perhaps never. Some of the striped forms have remained striped for at least a century, their offsets repeating the stripes. Other tulips seem to die out after they reach the broken stage, but there are other tulips more than one hundred years old which have never broken, according to authorities.

One explanation has been advanced that tulips of thin petalage such as the English florists' types, break much more readily than those of heavier substance. The heavy textured Darwins do not break as readily as the English tulips. Soil conditions, according to various tests, seem to make no difference.

While I have been growing tulips for many years, I have had only a few examples of breaking and these were limited to cottage and breeders in red shades with yellow bases which broke into red and yellow stripes. I have had as many as a patch of ten show striping at one time but with no others around them showing any signs. I have never seen a sign of breaking in the lavender or purple tulips nor in the Darwins.

Strangely enough the broken reds have disappeared. Either they died out or reverted to selfs. It is a matter of regret that I did not mark them to observe, for since I have been watching for breaks to separate them and study them, none have occurred.

We frequently read advice to change the position of tulips every year or two and that they should not be allowed to remain in the same soil. Not having sufficient area of soil to move the quantity of tulip bulbs that have grown up around me in the years I have had them, they always go into the same beds. They have occupied the same stretch of territory now for

thirty years that I can account for accurately and in some places have been in the ground longer. In the garden where they are scattered over the beds they have been there for fifteen years. Sometimes they are dug up in the process of making over the beds, in which case they are stuck back into the ground again and they appear faithfully. I rather like crowded clumps of a variety because of the variety of size and height.

For the most part these old clumps that are permitted to do as they like, go down so deep that it is impossible to disturb the bulbs in the ordinary digging. One clump I wished particularly to move which had been in its location for years. It was *Gesneriana spathulata major*. I went down 18 inches without finding the bulb and gave up. It reappears each year but does not show any increase in bulbs, merely one strong stem and fine flower. It is easy for them to burrow in light sandy soil such as I have. The bulbs form under the old ones each year and thus automatically sink themselves.

I have never bothered to fertilize tulips specially. They get the benefit of pulverized sheep manure, shredded cow manure, bone meal, or commercial fertilizers that I give annuals or perennials growing above them and seem to flourish under the treatment. My one long tulip border has had no fertilizer except an occasional dressing of bone meal every three or four years.

There are often questions asked as to the best ten or best dozen of the various tulip types. This is so much of a matter of individual likes and dislikes that no one can say definitely and positively, "These are the best." I have for some years kept a list offered by the late Rev. Joseph Jacob as his personal favorites as being as good an answer as any and a list with which I have no quarrel although I might substitute for some of them. In the Cottage and Breeder section he named the following: "*Gesneriana spathulata*, La Merville, Orange King, and Marksman for red shades." I

should add Lucifer and Scarlet Emperor and perhaps Grenadier. "Avis Kennicott, Inglescombe Yellow and Ellen Willmott as yellows." I should certainly want the beautiful oval Moonlight and the deeper Mrs. Moon. "Goudvink, Boadicea (Hammer Hales) and Golden Bronze as bronzy yellows; Inglescombe Pink, Picotee, and Mrs. Kerrell as pink and rose and white shades; and John Ruskin, Faerie Queen and Beauty of Bath as indescribable blends of beautiful and soft coloring; Dom Pedro and Velvet King for dark shades; with Golden Crown with its yellow petals deeply edged with red."

This is an excellent selection covering the range of form and color of the tulip.

"As some of my favorite Darwins," he continues, "I would name Mr. Farncombe Sanders, Prof. Francis Darwin, Pride of Haarlem and Louise de la Valliere for reddish shades; Ronald Gunn, Melicette, Valentine and Euterpe for pale purple or mauve; The Bishop, Moralis, Faust and Jubilee for dark varieties; with Clara Butt, Baronne de la Tonnaye, Flamingo, Suzon, Prince of the Netherlands and Sophrosyne as roses and pinks."

Tulip novelties percolate into the American trade very slowly. It is nothing unusual to see varieties 50 or 100 years old advertised as "new" in catalogues, and they are "new" in the sense that we don't know many of them. The most striking departure in tulips is an entirely new class which has not yet reached the American trade, known as the Mendel tulip, in honor of the famous monk who discovered a workable law of heredity in plants. These are said to be a cross between Darwins and early tulips and to give us an earlier flowering tulip than the Darwin with better stems and flowers. It remains to be seen just how good they are when they become available for our gardens.

Next in interest are reports of white Darwins, pure white, a number of them. To date there is no pure white Darwin in our trade lists, the pale

Wedding Veil and White Queen, each tinted, being the closest approach.

New tulips appear from time to time in foreign shows but few are offered. The development of a stock of bulbs is a long and tedious process at best, even if the newcomer proves to be prolific. It requires from six to eight years to get seedling tulips into bloom, so the incentive to breed them is not great for the amateur.

There is such an imposing list covering all possible color requirements now available that we need not be much concerned about novelties in tulips with the possible exception of a stately white Darwin. That would be a real addition to tulipdom.

Some of the newer and less well-known tulips that seem desirable additions:

DARWINS

Afterglow.—A distinct break in the Darwin class, an orange salmon with a salmon border, the first of the Darwins to show yellow in its composition. A very handsome and desirable variety.

Chant de Cygne.—This is a beautiful tulip and one of the latest to be offered in our trade lists. It is a good-sized flower but not of the largest, with a blending of scarlet and salmon rose.

Elephant.—A huge Darwin of dull lilac. Does not strike me as particularly attractive. Its size is its chief asset.

King George V.—An enormous dazzling scarlet tulip with a tall stem. Catches the eye at once.

Orange Perfection.—Another break in the Darwin class. A beautiful salmon rose and exceptionally fine.

Prince of Wales.—A fine early blooming orange red Darwin.

Princess Mary.—Another member of the royal family of tulips. A large-flowered brilliant rose and a very striking flower.

Venus.—A pure rose novelty of high price that does not seem to me to be worth the money.

BREEDERS

Annie McGregor.—A fine orange scarlet, unusually brilliant for a breeder.

Duke of Edinburgh.—A very fine dark purple of exceptional size.

Garibaldi.—Not new, but not well known. A brighter variant of Bronze Queen and desirable among the dull brown tones.

Jupiter.—One of the finest Breeders. Violet with rose tones towards the edge of the petal.

Louis Seize.—An exceptionally large tulip of an unusual blue tone.

Paladin.—Deserves to be better known although not new. A fine flower of old rose, apricot and buff with purple shadings. One of the most striking of the blended Breeders.

Pink Pearl.—A huge egg-shaped bloom, pink outside and lighter within. Very striking.

St. James.—One of the finest of the dark brown purples.

Willem de Swijger (William the Silent).—A perfectly formed, very dark purple.

COTTAGE

Artemis and Sirene.—Rose toned examples of the lily-flowered class with handsome reflexed petals.

Alaska.—A comparatively new and very handsome addition to the clear yellows. Golden yellow with a fine fragrance.

Dido.—A brilliant bit of color. Orange red shading to orange yellow towards the edges. Lighter inside with a striking black border about the yellow base. Very tall and very large flower.

Honeymoon.—A very fine, pale, soft yellow.

Marvel.—A peculiar mingling of rose, yellow and old gold. An unusual and attractive flower.

Walter T. Ware.—About the finest rich yellow.

Waterlily.—Seems about the finest available pure white until the new white Darwins reach us.

Zommerschoon.—An ancient tulip but always scarce. White, beautifully feathered with pink. Of slow increase.

Of the single early tulips, Gen. De Wet and Sarah Bernhardt or Hobbema seem to hold their own with the May flowering class. They are late members of the early class and lap over upon the May flowering time of bloom.

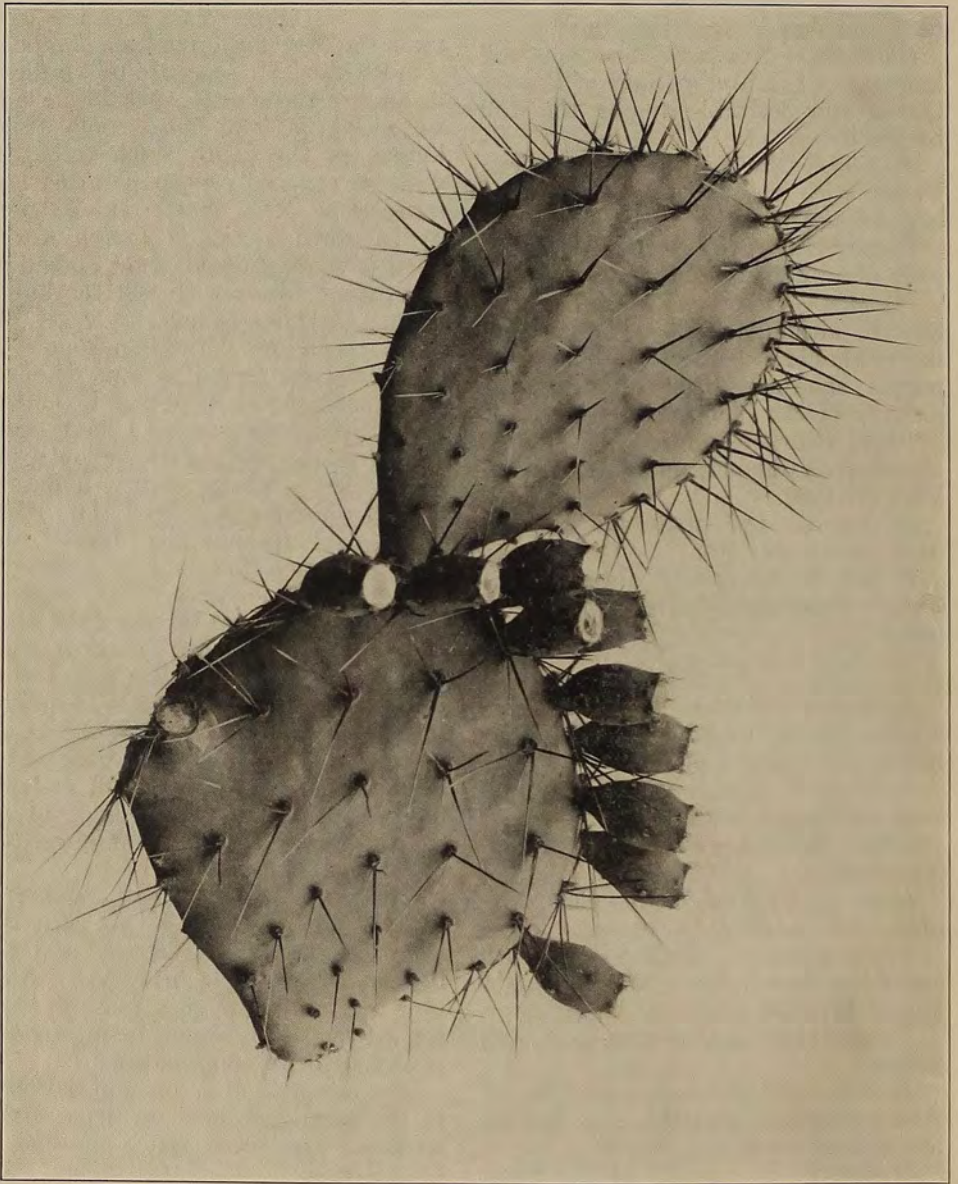
Rock gardening has aroused interest in some of the species, such as the lady tulip, *Tulipa Clusiana*, some times known as the candy stick tulip. It requires especially deep planting and protection. The most popular and easily-grown species is *Tulipa Kauffmanniana*, early and wide spreading in creamy white with red markings. It is sometimes called the water lily tulip. It is one of the handsomest of the early spring bulbs and deserves wide planting. I have had little luck with most of the species I have tried. *Sylvestris*, the pretty little yellow wood tulip, likes a shady corner, a dainty beauty. *Greigi* remained for some years with its speckled leaves and orange scarlet flowers but it showed practically no increase. *Tubergeniana* refused to come up and much the same luck confronted me with other rarities.

Pink *Scilla campanulata* with lavender tulips is a very pretty arrangement, and light brown tulips such as Bronze Queen, Golden Bronze, Plutarchus and others with dull yellows, browns, or purple in their makeup are well displayed above a groundwork of yellow polyanthus.

The tulip Bronze Queen seems specially made to order to go with the rich dark purple *Iris Kochii* and the lighter rosy purple iris, Mrs. Alan Gray. Picotee above a mass of Sutton's Royal Blue forget-me-nots is one of my favorite combinations.

The mingling of tulips and daffodils in the border or even in beds serves to make the same space produce a double crop of delightful bloom. Alternating clumps of the two down the length of the border give it character until the more sturdy perennials begin to do their duty. The tulips continue almost up to iris time.

Chicago, Illinois.



David Griffiths

Opuntia camanchica

Hardy Cacti

BY H. CORREVEON

Translated from "Les plantes des montagnes et des rochers," Geneva, 1914, by Bernard H. Lane; published by permission of M. Correveon.

For many centuries a little cactus with yellow flowers has haunted the arid rocks in Valais (Switzerland). It is the modest *Opuntia vulgaris*, which is found there lightly attached, flattened against the rocks and on the dry hot slope. It grows in the environs of Meran (southern Tyrol), above Domodossola, at the outlet of the gorges of Simplon (Ponte Crevola), in the environs of Como and Ivrea in north Italy.

How has this plant, which belongs to a strictly American family, become stranded on our rocks, and who or what could have brought it here? Mystery! One summer day in 1885, when I did the honors of the capital of Valais to the traveler Bonvalot, I took him to Valere, and there, showing him the *Opuntia*-decked slopes, I asked him if he thought that migratory birds had been able to carry the seeds of that species across the ocean. "Without any doubt," he said; "it would not, however, be migratory birds but lost birds. I have seen on the desolate heights of Thibet, at many different times, lost birds, brought there by violent winds with a dizzying rapidity." M. de Candolle, who was present, cited some facts which supported the theory of my traveler friend, and we were thus able to determine that very probably, at some time more or less remote, one or more stray birds had, unwittingly, carried seeds of cactus, either in their gizzards—for the fruit is sought by many birds, which do not digest the seeds but put them in the best possible condition for germination—or among their feathers or their claws (that is also possible, thanks to the hooked spikes with which the fruit is provided). (An Arctic tern banded by the U. S. Biological Survey in Labrador July 22, 1927, when it was

between 1 and 5 days old, was found near La Rochelle, France, at least 4,200 miles away, less than 3 months later. A common tern banded by the Biological Survey on the coast of Maine in 1913 was recovered four years later on the west coast of Africa.—B. H. L.)

However that may be, and even if it were admitted that there were cactus amateurs who, 200 or 300 years ago, had acclimated the plant in the valleys at the foot of the Alps, there is there a species that is European by acclimation, it must be acknowledged. This plant is hardy and resists the most severe cold, even in Berlin.

Apropos of *Opuntia vulgaris*, here is a note which we find in the Bulletin of the Association pour la protection des plantes (Geneva, 1901):

"The introduction of *Opuntia* into Australia and more particularly into Queensland has had effects quite as fatal to agriculture as that of rabbits. The American plant has invaded everything, and the colonial government has just issued an edict for the destruction of the pest. It offers £1,000 reward to any one who will find the means of ridding the country of this plant. The German consulate at Sydney has hastened to make this notice public in all the journals of the country beyond the Rhine, in the hope that some German subject will be found who will discover the remedy and capture the prize offered."

This species has been cultivated for a long time on our rocks, but it is only within about 30 years that, thanks to the voyages of the German botanist Purpus, other species which stand our winters equally well have been introduced. There had been, here and there, some plantings of *Opuntia camanchica*, *missouriensis*, and *rafinesquii* in gardens of rock plants, but

those were no more than timid experiments. Dr. Purpus, soon followed by a select group of American botanist travelers (among whom I should cite the founder of so many interesting species of Crassulaceae, Professor Rose, of the Smithsonian Institution, Washington, D. C.), devoted himself to the study of the cacti that could withstand the winters of our central Europe. He sent first to his brother, head of the botanic garden at Darmstadt, then to many horticulturists, a collection of species obtained at altitudes of 1600 to 2000 meters in the mountains of New Mexico, Arkansas, Texas, Colorado, and Arizona, and, in view of the richness of these new introductions, there was a chorus of praises and admiration. Besides several species and varieties of *Opuntia*, he discovered some of *Mammillaria*, *Cereus*, *Echinocactus*, and even *Agave*, mountain-growing and hardy. Then there was, in favor of the hardy cacti, a burst of enthusiasm which carried away the whole of our old Europe. They were bought at very high prices; then people wearied of these spiny objects, as they have wearied of so many other beautiful and interesting things. Fifteen or twenty years ago there was a veritable frenzy in Germany for the hardy cacti of Purpus, but that is greatly calmed.

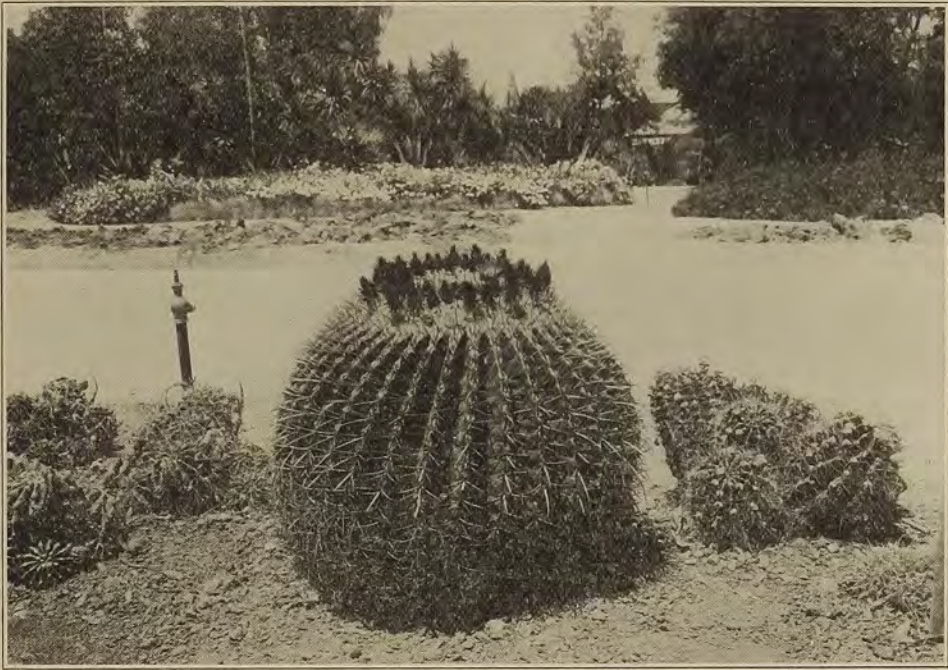
I have seen, in the botanic garden at Darmstadt, a garden picturesquely situated at the edge of a great woodland—the extensive German forest that shelters a botanic treasure, *Pyrola umbellata*—a very curious rockery which is devoted to hardy cacti and which M. Purpus barely covers in winter with boards to prevent the masses of snow from breaking the branches of the delicate species. This rockery is very picturesque and of the greatest interest. That was in 1904, and on returning home I had no rest till I had planted, on top of the wall at Floraire, the collection of cacti which we had kept until then in pots and jars. These cacti have profited admirably by this situation

and form at the present moment a superb and original decoration. Above them all rises *Opuntia arborescens*, a large species of loose form, with sprawling branches, more than a meter tall, and calling to mind the great candlebra-like cacti of Peru and Mexico; then come the enormous spiny tufts of the stout *Opuntia macrorhiza*, *gigantea*, etc., and those with delicate flowers of rose or carmine or amaranth, with their centers of stamens of gold, *Opuntia fulgens* and *rubra* or *xanthostemma elegans*.¹ And there is also the marvelous *Echinocereus phoeniceus*, with flowers of cardinal-red passing into purple, vermilion, or the most intense scarlet, with centers of golden stamens. In June and July the top of the wall at Floraire forms a harmonious ensemble because of all these spiny exotics, and it is a very real happiness which we experience in admiring this picture.²

It suffices, in order to succeed out of doors with these cacti of North America, to have a well-drained soil, rather heavy than too light, deep enough to permit their long roots to penetrate it, and a situation in full sun and well lighted. If these conditions are fulfilled, it matters little whether they are grown on a rockery or in a border. And one will have, during the summer months, brilliant blooms when most of the rock plants have finished their rôle. The most violent winds seem to benefit them, and evidently they prefer limy soil to one that is granitic and siliceous—

¹In April, 1926, I traveled through the Mohave Desert, on the way from Los Angeles to Santa Fe, and saw some bright-colored glowing magenta-flowering *Opuntia* which I ventured to identify with the *O. magenta* (Parrish) of the 'Californian flora' of Jepson. It was such a brilliant vision that every one of the travelers in the car admired it. But up to this day nobody has been able to supply me with seeds of that marvel.

²I must confess that at the present day we have them on a barren bed, because the top of our wall was quite invaded by them, and we could have nothing else; therefore we were obliged to put them elsewhere.



David Griffiths

Echinocactus gunsoni

therefore neither leaf mold nor heath soil. In winter, in humid countries and those where snow is abundant, it is well to erect at 1 meter above the ground a protective roof to shelter them from too much humidity or heavy falls of snow. Their multiplication is easy by means of seed (the seeds which they bear in abundance germinate like weeds), or by sectioning their joints (among the *Opuntias*), or finally by division of the tufts.

The species which we grow at Flo-
raire are the following:

Cereus viridiflorus, from the mountains of Texas; small species with flowers of greenish yellow and stalks in the form of little columns.

Echinocactus glaucus, from the high mountains of Colorado; a rare plant, of bluish tint, with flowers of a very beautiful rose; at Berlin it endures 25° of cold.

Echinocactus simpsoni, from the Utah and Colorado mountains (alti-

tude 2500 meters); likewise very hardy.

Echinocereus fendleri, from Colorado; an intense carmine red passing into violet; flowering in July and August.

Echinocereus phoeniceus, from the mountains of Colorado, etc.; brilliant flower of glowing red, a tufted and spiny plant of 25 centimeters at most, which can be divided.

Mammillaria missouriensis, from the Rocky Mountains (2000–2200 meters); small flower of 1° to 25 centimeters, with yellow flowers and scarlet fruit.

Mammillaria purpusi, from Colorado (2000–2500 meters); small bowl-shaped plant, very spiny, with flowers of a lively rose; very hardy.

Mammillaria radiosa, with greenish flowers having a rose center; July and August.

Mammillaria spaethiana, from Colorado (more than 2000 meters); differs from *purpusi* by its flattened orbicular form.

Mammillaria vivipara, small yellow-flowered species that attains 50° of north latitude and is the hardiest of all.

Opuntia albispina, a form of *camanchica* with very white spines; flowers brownish yellow.

Opuntia arborescens, from New Mexico; a shrubby plant, able to reach 10 meters in Mexico, with straight branches, not jointed, spiny and sprawling; flowers of a lively rose.

Opuntia arenaria, from Texas; a low plant, very spiny, with pale-yellow flowers.

Opuntia arkansana, from Arkansas; strong plant, very spiny, near *rafinesquii*, with clear yellow flowers, brownish in the center.

Opuntia brachyarthra, from the Rocky Mountains; low plant with clear yellow flowers.

Opuntia camanchica, from the Rocky Mountains; one of the old types; strong plant with thick, very spiny joints and large flowers of straw-yellow. There are a great many varieties of it, and it has the forms *major* and *minor*.

Opuntia cantabridgensis, very thick, strong plant which has sprung up in the botanic garden at Cambridge and whose history is unknown; there it is hardy and spreads at the foot of a greenhouse wall in full sun. We have received and planted this; it grows well but has not yet flowered here.

Opuntia cymochila, from the Rocky Mountains; variety of *rafinesquii*.

Opuntia engelmanni, from the Rocky Mountains; with flowers of greenish yellow, sulphur-colored in the interior.

Opuntia fragilis, from Colorado; low species, with globular joints (rounded at the two ends), yellow flowers with clear carmine stamens.

Opuntia fragilis var. *caespitosa*, low and tufted form of the preceding, with smaller joints.

Opuntia fulgida (*fulgens*), from Mexico and New Mexico; superb species with oblong joints, reddish green, large flowers of a beautiful red with yellow stamens.

Opuntia mesacantha, lower variety of *rafinesquii*.

Opuntia macrorhiza, variety of *rafinesquii* with thick stem and heavy joints.

Opuntia missouriensis, from Colorado; obovate joints, thick and of a bluish green; seeds with brown prickles; yellow flowers with stamens of the same color. This species is the northernmost of the genus and its area extends to 51° north latitude.

Opuntia ophiocarpa, from Kansas; a plant near *camanchica*.

Opuntia orbicularis, small form of *camanchica* with swollen orbicular joints.

Opuntia pachyarthra, from Colorado; prostrate plant with thick joints, sprawling over the soil; large flowers of clear yellow with yellow stamens.

Opuntia pachyarthra rosea, variety of the preceding with flowers of a lively rose.

Opuntia pachyclada, from Colorado; low species with small joints, many large flowers of a beautiful carmine rose with tints of dark orange.

Opuntia pachyclada spaethiana, from Colorado; yellow flowers verging toward brown.

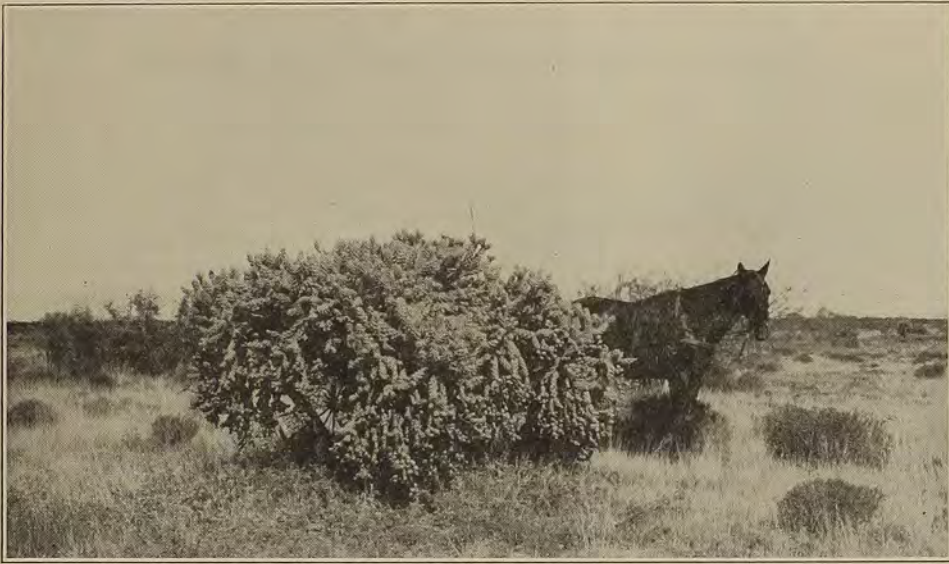
Opuntia phaeacantha, from New Mexico; flowers greenish on the outside, sulphur-yellow within.

Opuntia polyacantha, a very spiny variety of *missouriensis*.

Opuntia rafinesquii, from the Rocky Mountains; very strong plant with large obovate joints, of a dark green, armed with prickles only on the upper edge; large yellow flowers with brown streaks or spots in the center.

Opuntia rhodantha, passes for a variety of *missouriensis* with red flowers; superb plant, with large flowers of an intense carmine with carmined stamens and green style in the center. There are the varieties *brevispina*, *flavispina*, *pisciformis*, and *schumaniana*, all with flowers more or less rosy.

Opuntia rubra, from Colorado; a solidly built plant, with flowers of a somber cinnabar-red, carmined at the borders.



David Griffiths

Opuntia fulgida

Opuntia spinocentra, from New Mexico; with yellow flowers.

Opuntia vulgaris. This is our European plant, with low creeping branches, spread out at the edges, provided with few short prickles, yellow flowers of medium size.

Opuntia xanthostemma, from Colorado; near *rhodantha*, from which it is distinguished by the dark reddish-brown, more elongated joints and darker stamens. It has many varieties—*elegans*, with flowers having silky reflections, of a beautiful rose-carmine; *gracilis*, clear carmine; *orbicularis*, with rounded joints and clear carmine flowers; and *rosea*, of a beautiful carmined rose.

The Opuntias are also highly variable plants; they hybridize with the greatest ease, and there are many forms (it is the case with us) which one can not identify. The species with carmine flowers and with flowers of rose or salmon or brown alternate delightfully with those having yellow flowers, and it is a marvel to see them by hundreds, in the fine days of summer, enlivening the top of our wall.

Although not among the cacti, the

Agave utahensis and *virginica*, which are nevertheless succulent, grow under the same conditions and in the same soils and should be placed among the rocks with the hardy cacti. They are more delicate and require a covering in winter, or rather a roof to protect them against rains and snows.

It is greatly desirable that the number of amateurs in these beautiful and curious plants should be multiplied, especially in our continental climates, which are more favorable to them than those of maritime countries. The cacti do not need any care: scarcely should one water them, for their roots plunge very deeply into the soil, and their inflated stems (the leaves are represented by the spines, and the long joints, which are often taken for leaves, are only the stems) are filled with water and contain true reservoirs of humidity. Their flowering arrives at a moment when the rockeries are generally destitute of their most brilliant attractions, and these plants thus constitute an excellent decoration intermediate between the blooms of spring and those of September and October.

Orchids, the Royal Family of Plants

BY D. LUMSDEN

Many changes have taken place in the horticultural world during the last half century. Old methods of culture have given way to new. The patience and skill of the scientist and research worker, in introducing new methods, has entirely revolutionized the methods of these earlier periods. In none of the branches of horticulture, however, has more rapid progress been made than in the cultivation, propagation and hybridization of the Orchid.

This is true not alone as pertaining to the tropical and semi-tropical species which are grown in the greenhouse, but the culture of the hardy species indigenous to our northern United States is much better understood.

We are indebted to Frederic V. Coville and Edgar T. Wherry for their valuable contributions on Soil Reaction in Relation to Horticulture. I refer to Bulletins No. 1 and No. 4 of the American Horticultural Society. These bulletins explain the importance of making the home environment of the plants, i. e., the soil condition, suitable for their culture. In nearly all cases Orchidaceous plants require an acid soil. The importance of such a soil for many other of our important ornamental plants is discussed in the magazines mentioned.

The interest taken in Orchids was never greater than at the present time, and each year additional greenhouse structures are being erected in various parts of the country for the sole purpose of cultivating these interesting, fascinating and beautiful flowers.

Orchids hold one of the most important places in gardens, and such genera as *Cattleya*, *Laelia*, *Cypripedium*, *Dendrobium*, *Odontoglossum*, *Oncidium*, *Phalaenopsis*, *Vanda*, *Cymbidium* and their hybrids are so popular that they are cultivated on a very extensive scale. These genera are

grown not only by Orchid enthusiasts in private collections but also by amateurs and commercial growers. Several commercial florists are growing them by the tens of thousands expressly for the trade in cut flowers. The reasons for this popularity and for their more extensive culture is attributable mainly to the exquisite beauty of the flowers of many of the species, their choiceness, and their adaptability to all artistic floral arrangements in the making up of bouquets for weddings and other occasions, for corsage bouquets, and for dinner table and other decorations. The value of orchids as cut flowers is greatly enhanced by their excellent keeping qualities. Cut flowers of some of the species have remained in a state of perfection for more than three weeks, while those left on the plants have kept for a corresponding number of months.

Before dealing with my theme I wish to call your attention to a brief resumé of the botany of these wonderful plants.

The Natural Order Orchidaceae is the largest among monocotyledons, upwards of fifteen thousand species are at present known. These are very widely distributed throughout the world, having representatives in all climates except the coldest and driest.

Orchids are most abundant in tropical America, especially along the mountain ranges and on the Indo-Malay peninsula, where they are found in the higher altitudes. About 85% of the known species of Orchids occur in tropical and subtropical countries.

With regard to habitat, orchids are classified by the botanist as terrestrial, epiphytal, or saprophytic.

Practically all of the terrestrial species, *Cypripedium* as an example, are green plants which obtain their carbon supply from the carbon dioxide of the air, but a few forms are lacking in

chlorophyll or possess it in minute quantities too small for photosynthesis.

In the saprophytic orchids the subterranean part develops into a coral-like rhizome devoid of true roots (*Corallorhiza*), or a subterranean rootstock producing numerous fleshy roots (*Neottia*). The annular growth of these plants is yellowish brown without true leaves but bearing scales and a terminal inflorescence. Saprophytic orchids are not cultivated except occasionally in botanic gardens. In their mode of life they depend on organic matter for their carbon food. Saprophytic plants should not be spoken of as parasites. True parasites are not known among the Orchid family.

The epiphytic orchids exhibit most diversified forms. Their native habitat is confined to the tropics and subtropics, where they attach themselves to the stems and branches of trees and to the rocks. On account of unfavorable weather conditions during part of the year they have developed pseudo bulbs which act as supplies of food material to bridge the plants over throughout the unfavorable weather period.

In reference to growth, Professor Pfitzer, a prominent botanist and Orchidologist, classifies the Orchidaceae into two primary divisions, based on their vegetative structure:

I. MONOPODIAL ORCHIDS

Those which grow continuously in one direction only. Their stems lengthen indefinitely season after season and bear aerial (adventitious) roots often along their whole length. The inflorescence is always lateral and is produced from the axils of the leaves or opposite to them. Examples: *Vanda*, *Aerides*, *Angraecum* and *Phalaenopsis*. In all these genera the leaves are distichously arranged, that is to say, they are in two rows, one opposite the other, the leaves of one row alternating with those of the other.

II. SYMPODIAL ORCHIDS

Those in which the growth of the

main axis, stem or pseudo-bulb soon ceases, usually at the end of one season's growth, and a later growth is produced in the following season.

The Sympodial Orchids admit of a division into two groups:

A. Those bearing a lateral inflorescence.

B. Those bearing a terminal inflorescence.

The Sympodial Orchids constitute by far the largest division; all the terrestrial kinds, both tropical and temperate, all the pseudo-bulbous species, and all those whose stems are matured in one season are included in it. Examples: *Cattleya*, *Laelia*, *Dendrobium*, *Oncidium*, *Miltonia*, *Zygopetalum*, *Calanthe*, etc. In these Orchids new growth generally begins with the development of leaf-like scales which gradually pass into true leaves, so that it sometimes happens that between the first pair of leaf scales and the true leaves many intermediate forms occur. The old pseudo-bulbs and the old stems persist for some time after they have become effete, the terminal ones alone bearing flowers.

In the leaves of Orchids we have the component structures apparently arranged with reference to the conditions under which the plant grows naturally. Some grow in full sunshine, and are constructed accordingly. Some thrive in diffused light. Some bear a long period of drought uninjured, others could not endure the privation of water even for a few hours. Some are so constructed as to adapt themselves to varied conditions with little trouble, and these, of course, are the plants the gardener finds it easy to cultivate. In others the adjustment is so delicate that they can not suffer any change without inconvenience; these are the plants the gardener has a difficulty in keeping alive, and which, even in their native countries, are dying out, elbowed out by their more robust and less exacting brethren on the principle of the survival of the fittest.

MORPHOLOGY OF ORCHID FLOWERS

From a botanical standpoint the orchid furnishes varied and excellent material for study, as in structural formation the flowers differ entirely from those of other endogenous plants. It is in the floral structure that we find the features prominently characterizing the orchid.

The eminent botanist, Dr. Lindley, in the English Cyclopaedia on Orchidaceous Plants, writes thus of their morphology:

"There is no order of plants the structure of whose flowers is so anomalous as regards the relation borne by the parts of reproduction or so singular in respect to the form of the floral envelope. Unlike other endogenous plants, the calyx and corolla are not similar to each other in form, texture and color as in the lily, crocus, narcissus, amaryllis, etc., neither have they any similitude to the changes of outline that are met with in such irregular flowers as are produced in other families of the vegetable kingdom. On the contrary, by an excessive development and singular conformation of one of the petals called the labellum or lip, by irregularities either of form, size, or direction of the other sepals and petals, by the peculiar adhesion of those parts to each other, and by the occasional suppression of a portion of them, flowers are produced, so unusual and so grotesque in form that it is no longer with the vegetable kingdom that they can be compared, but we are forced to seek resemblances in the animal world."

MIMICRY IN ORCHIDS

Many well-known instances of mimicry occur among the Orchids, in particular those that are natives of Great Britain and the tropics. Prominent among these are the bee orchis (*Ophrys apifera*), the fly orchis (*Ophrys muscifera*), the frog orchis (*Habenaria viridis*), the birds' nest orchis (*Neottia nidus avis*), the butterfly orchid (*Oncidium papilio*), the dove orchid (*Peristeria elata*), the swan orchid (*Cynoches*

pentadactylon), the moth orchid (*Phalaenopsis schelleriana*).

FERTILIZATION

Not a whit less interesting than the mimicry just mentioned are the contrivances by which Orchids are fertilized. Darwin says, "They are almost as perfect as any of the most beautiful adaptations in the animal kingdom."

Most Orchid flowers are incapable of self-fertilization, owing to the position in which the reproductive organs are placed in the flower, as well as to the nature and texture of the pollen (pollinia). In Orchidaceous plants the pollen grains in waxy masses are united by excessively elastic thin threads, therefore, we infer that they have for their main object the fertilization of each flower, not by its own pollen, but by the pollen of another flower. This is accomplished through the agency of bees, moths and other insects that are native in the sections of the world where the Orchids abound.

The breeding and raising of seedling Orchids is one of the greatest of modern horticultural achievements. This important branch of Orchidology has created an entirely new interest and has made the fancier independent of the collector.

One great inducement to the cultivation of Orchids (epiphytal) is the length of time the flowers of most of the species continue in perfection after expansion. It is generally known with few exceptions, the cause of this duration is owing to their never becoming fertilized unless by some external agency; they thence retain their attractiveness day after day awaiting the event for which they were created, but which under the circumstances of their environment rarely takes place unless artificially effected by the hand of the hybridist, or if, perchance, a bee attracted by the scent or color of the flowers, enters the house in quest of honey, and alighting on the labellum, makes its way to the nectary, removes the pollinia from one flower and deposits them on the stigma of another.

The duration of some Orchid flowers is very remarkable. *Grammatophyllum multiflorum* retains its flowers with scarcely any perceptible change of color for nearly one-third of the year. The flowers of some of the Dendrobies with elongated spatulate petals (*D. stratoties*, *D. strebloceras*), to which may be added *D. dearei* and a few other Malaysian species, continue in perfection for upwards of three months; many *Cypripedes* persist for from six to eight weeks, according to the season of the year, while the leathery flowers of some *Vandas*, *Cymbidium* and of other genera last nearly as long; the wax-like flowers of *Aerides* and *Saccolabum* generally retain their beauty from three to four weeks, and in the cooler atmosphere of the *Odontoglossum* house, the *Odontoglossums*, *Oncidiums* and brilliant *Masdevallias* lose none of their gorgeous tints for a long period.

The duration of Orchid flowers apart from the absence of any fertilizing agent is, however, influenced by the texture of their perianth segments; the delicate sepals and petals of the labiate *Cattleyas*, *Thunia*, *Sobralia*, *Pleione*, some of *Phalaenopsis*, etc., succumb to the damp and heat of their environment sooner than those endowed with firmer texture. But whether the duration of the flowers be longer or shorter, the essential cause is the same.

LIVES OF HYBRIDISTS

John Dominy was born at Gittisham, Devon, in 1816, and early in life adopted gardening as a profession. In 1834, after completing his term of apprenticeship in a private garden, he entered the nursery of Messrs. Lucombe Pince & Co., of Exeter, where he stayed for two or three months. He then joined Messrs. Veitch, who at that time possessed only the Exeter establishment. Here Dominy remained until 1841, in which year he accepted an appointment as head gardener to J. P. Magor, of Redruth, with whom he stayed

nearly five years, after which again he entered the nursery at Exeter and continued with the firm both at Exeter and Chelsea till 1880, when failing strength compelled retirement. Dominy was an excellent cultivator of stove and greenhouse plants, but it was his skill as a hybridizer of Orchids and *Nepenthes* that won for him the high position his name holds in the list of practical horticulturists of the last century.

Dr. John Harris, a surgeon of Exeter, who possessed an acquaintance with botany, first suggested to Dominy the possibility of obtaining hybrid orchids, and explained to him the structure of the Orchid flower and the process of pollination. As soon as an opportunity presented itself, Dominy lost no time in turning the suggestion to practical account and *Calanthe x Domini*, which flowered in 1856, was the first of his successes. This resulted from crossing *Calanthe masuca* with the pollen of *C. furcata*, and the seedling took two years to flower and was considered a great cultural feat by the gardeners of the day. Botanists were less enthusiastic in welcoming the new plant, and the exclamation of Dr. Lindley, the leading botanist and systematist of his time, "You will drive the botanists mad," is well known and expressed the feelings of many scientists regarding hybrids, or as they were then called, "mules."

Calanthe Veitchii, *C. rosea* x *C. vestata*.

Laelio-cattleya exoniensis, *Laelia crispata* x *C. mossiae*.

Phaio-calanthe irrorata, *Phaius grandifolius* x *C. veseta*.

Cypripedium x vexillarium, *C. barbatum* x *C. Fairieanum*.

Laelio-cattleya dominiana, *C. dowiana* x *Laelio purpurata*.

On Mr. Dominy retiring from active life in 1880, the council of the R. H. S. presented the famous hybridizer with the gold Flora Medal "for his successful labors as a raiser of hybrid orchids, *Nepenthes* and other garden plants," and a few years later his friends presented him, through the president of

the society, Sir Trevor Lawrence, Bart, with a handsome gold watch and a purse of 200 guineas. After his retirement Dominy still retained an interest in horticultural pursuits and was a constant attendant at the meetings of the R. H. S. Floral and Orchid Committees of which he was a member.

HYBRIDIZING

Hybridizing is one of the most attractive and fascinating phases of Orchid culture. Every step is interesting—the selection of the parents, the pollination of the flower, the development of the capsule, the capsule's dehiscence, the gradual development of the innumerable seeds which are so beautifully cradled in the capsule from the tiniest atoms up to the time which the flower scapes are manifest on the seedlings, and finally the period when the first flower expands.

Every Orchid lover should raise at least a few seedlings. Some difficulties may be experienced during the initial stages, but once surmounted the rest is easy, and the pleasure derived from the later successes achieved will more than compensate for the disappointments.

What is the primary cause of the failure of Orchid seeds to germinate? On examination we find that chlorophyll may apparently be present; water may readily be absorbed; delicate absorbing hairs may be formed, all of which indicate complete permeability to salts and gases, and yet growth does not manifest itself. It appears likely that chlorophyll does not function because of the lack of some internal factor which is essential for the photosynthetic process. Briggs published his experimental researches on the development of photosynthetic activity during germination in the Proceedings Royal Society of London, 1920. He mentions the fact that the cotyledons of *Helianthus* after chlorophyll development do not show any delay in the photosynthetic process. This suggests that food materials are in-

involved. The fact that the Orchid seed has practically no reserve food, and that if germination proceeds to a certain state the embryo becomes independent of any outside food make the preceding hypothesis more plausible. During the year 1909 Bernard in France and Burgeff in Germany published the results of a careful study and experiment they had carried on for a series of years in their respective countries relative to the germination of Orchid seeds. Both men demonstrated that large numbers of Orchid seedlings were killed by fungi and insect pests. Both scientists agreed, however, that there was one particular type of fungus essential to Orchids in their germination and from the roots of the Orchid plants they succeeded in isolating a *Rhizoctonia* which they considered necessary for the infection of the embryo before germination would take place.

Dr. J. Ramsbottom, of London, England, working in cooperation with Mr. Joseph Charlesworth, of Haywards Heath, Sussex, started the work of raising Orchids commercially by the fungus method with phenomenal results. Genera such as *Cattleya*, *Laelia*, *Odontoglossum*, *Odontias* were raised in very large quantities by what was termed the "Pure culture method." Under the Charlesworth-Ramsbottom method, a peat mixture was first sterilized and inoculated with a fungus. After the fungus had permeated the compost the seed was sown.

This was apparently the first attempt to introduce scientific methods in the commercial production of Orchids. Dr. Lewis Knudson, of Cornell University, in 1922 announced his belief that fungus was not necessary for Orchid seed germination and that the primary cause of the difficulty of germinating Orchid seed was due to the inability of the Orchid embryo to manufacture its own food. The Orchid embryo is inadequately supplied with reserve food and for continued growth must get organic food from the outside. Dr. Knudson accom-

plished this by supplying the embryo with sugar in the absence of all fungi and other micro-organisms. These experiments which have been extended over a period of 8 years have proved that his theory regarding the value of the fungus with some genera of Orchids was correct. He has had excellent success in germination of Orchid seeds on certain culture media. Knudson's method has been adopted with marked success by some growers in this country and in Europe.

Methods of seed sowing:

- A. On a substratum not artificially inoculated with a fungus.
- B. In flasks containing a nutritive solution.
- C. In flasks containing peat mixture inoculated by a fungus.

The work of Burgeff, Bernard and Knudson demonstrates that death may be due to pathogenic fungi. A delicate balance between the host and the fungus apparently must be maintained in order to insure germination and also to prevent death of the embryo. In certain experiments Bernard succeeded in germinating seeds of *Cattleya* and *Laelia* without the intervention of the fungus. This was accomplished by using a more concentrated solution of Salep. Salep is the dry powder obtained by pulverizing tubers of certain Orchids and contains principally mucilage, 48 per cent; starch, 27 per cent; and proteins, 5 per cent. It probably contains also some sugar as well as soluble mineral matter.

The solution used by Dr. Knudson for his cultures was made up as follows:

SOLUTION B

Ca (NO ₃) ₂	1.00 gm.
K ₂ HPO ₄	0.25 gm.
MgSO ₄ NH ₂ O.....	0.25 gm.
F ₂ PO ₄	0.05 gm.
(NH ₄) ₂ SO ₄	0.50 gm.
Distilled H ₂ O.....	1000.00 cc.
Known as solution B of Burgeff.	

This was used by Burgeff as he con-

sidered that Orchid seeds utilized ammonium sulphate to better advantage than nitrate salt.

To this nutrient solution was added agar at the rate of 1.75 gm. for each 100 cc. and sugar or starch as the experiment required. The culture medium was heated to dissolve the agar and then 10 cc. of the solution added to each tube. The tubes were plugged with cotton, autoclaved at 15 pounds pressure for twenty minutes and then sloped. Each tube was capped. The seeds were sterilized by the use of calcium hypochlorite, using the filtered solution obtained by shaking 10 gm. of calcium in 150 cc. water. They were then placed in a small tube about 60 mm. x 6 mm. and the hypochlorite added. The tube was then shaken until each seed became moistened and after 5 or 10 minutes in this solution the seeds were sown by means of a looped platinum needle, employing the usual bacteriological technique to prevent contaminations.

DISCUSSION

The evidence presented by adherents to the symbiotic view of germination may be summarized as follows: (1) the roots of Orchids are generally infected by a characteristic fungus which is considered non-injurious; (2) different genera of Orchids may have different strains or species of this fungus; (3) seeds sown under pure culture on various culture media, especially those media containing starch or other insoluble organic material, do not germinate except when the fungus is present; (4) germination apparently is induced by some strains of the fungus and not by others; (5) then must be maintained a definite balance between fungus and host; (6) while it is recognized that germination of Orchid seeds may be obtained by the use of sugars in the culture medium, germination under these conditions is abnormal, and not, of course, common in nature.

Many Orchid growers of the old school still adhere to the method of raising their seedlings on a sub-

stratum not artificially inoculated with a fungus, with more or less success with their seedlings. The firm of George E. Baldwin & Co., Mamaroneck, N. Y., practices the method on a very large scale. Many thousands of seedlings may be seen in their establishment in stages from the germinating protocorm to the flowering plant.

We have the disciples of the Knudson method, their seedlings are being grown in flasks containing a nutritive solution. The firm of Armacost & Royston, Inc., Sawtelle, California, has adopted this method and is achieving immense success. This firm has now many hundreds of thousands of seedlings representing all stages of growth from the germinating seed to the flowering plant.

Other firms and hybridists both in this country and abroad are practicing the method as laid down by Bernard, Burgeff and Ramsbottom. The seeds are sown in flasks containing peat mixtures inoculated by a fungus. Notable among the adherents to this method of culture is Charlesworth & Co., Haywards Heath, Sussex, England. This firm is indeed successful with the raising of many hundreds of thousands of plants representing diversified genera, species and hybrids.

One of the obstacles experienced by the hybridist using the nutritive solution for the germination of the seeds is the difficulty experienced in the transplanting of the seedlings to other flasks or potting media. Great care must be exercised in the operation for the least injury imparted to the seedling may cause its death. The important matter also of gradually inuring the seedling from the flasks to the atmospheric conditions of the Orchid house must not be overlooked.

Additional discussion of the Orchid seedling problem may well await further investigation, and who may tell when investigation is completed there may not be discovered a quicker method of raising Orchid seedlings to the flowering stage which now under normal conditions takes from four to seven

years and upwards, according to the genera and species of the plant.

Washington, D. C.

UNITED HORTICULTURE

At the centenary banquet of the Pennsylvania Horticultural Society last November, Dr. J. Horace McFarland announced the development of the movement toward a union of all horticultural interests in this country under the name at the heading of this note. For somewhat over two years various persons interested in horticulture as a national movement have been making a survey which is now under the official guidance of Mr. Robert Pyle, Chairman; Mrs. Francis Crowninshield, Mr. Paul C. Stark, Prof. Alfred Hottes, Mr. David Burpee and Mr. J. C. Wister with Mr. E. L. D. Seymour as Executive Secretary. This committee is studying the field of the multitudinous horticultural activities in the country and hopes to discover some way of coordinating the decidedly overlapping activities of our many organizations in such a way that good will result for all. As to the exact result of their survey, no one dare prophesy at the present time nor need any one presume to decide whether their effort is likely to result in much more than a super-organization with a considerable mass of machinery to keep it in operation, but certainly every organization should lend its earnest support to the survey committee in the hope that their findings will actually be of importance to American horticulture, a factor of prime importance to us all.

After a season's trial of the "Early

GARDEN FEDERATIONS

The growth and spread of the garden club idea over our country in the last years has become the subject of remark in many quarters, and all who are sincerely interested in the horticultural advancement of our country watch the movement with friendly

concern. Through the courtesy of their officers we are able to present briefly for the interest of our readers some notes on the activities and interests of various State federations of garden clubs, group organizations which as yet have not had much more than State publicity. The American Horticultural Society looks on with keen appreciation of their work, every good wish for their advancement and a sincere desire to further their program.

While there are now about 46 garden clubs reported in Florida, only 10 have become affiliated with the federation up to the present time. As an organization, this group is most active in civic and State matters, as for example, legislation controlling the free range of cattle, burning over of forest areas and highway development. On the other hand they influence public opinion beyond their immediate groups in the conservation of native plants, especially Christmas greens. Mrs. Arthur G. Cummer (Jacksonville), a member of our society, is the president of the federation this year.

The Kansas Federation which came into being in September, 1926, has now 19 member clubs, according to Mr. Z. Wetmore (Wichita), president this year. This group publishes a local journal, holds an important 3-day annual meeting, provides 2 flower shows, and through the efforts of individuals promotes test gardens and special plantings.

After much preliminary planning and discussion, the Massachusetts Federation of Garden Clubs held an organization meeting in October, 1927, with 30 clubs represented. Mrs. Thomas Motley, Jr. (Hyde Park), as president, reports 17 clubs now definitely affiliated and others under consideration. The aim of the federation is to bring the many club interests into closer cooperation throughout the State.

The New Jersey Federation of Garden Clubs was started on its successful way by the late Mrs. Harold W. Hack in 1925. Now, under the able leader-

ship of Mrs. Frederic R. Kellogg (Morristown) the federation numbers 30 affiliated clubs with a total membership of about 4,000. This federation is one of the most active and successful, with many horticultural leaders in its membership. The first aim of the organization is the assistance in all garden club problems and activities, conservation of native flowers, encouragement of civic planting and the development of cottage gardening as in Great Britain. Their organization is most carefully developed and the operation is eminently successful.

The activity of the New York Federation, now reaching its sixth anniversary, has accomplished, under the able and enthusiastic leadership of Mrs. John W. Paris (Flushing), a most extraordinary success. The original 18 member clubs have grown to a total of 75 with about 10,000 members, men and women. Their influence through their committee activity on civic matters is most valuable. The organization, like that of the New Jersey Federation, is most successful, and through their directorate, their committees of Organization, Publicity, Exhibition, Legislation, Lectures, and Billboards, the federation is an important factor in New York State life. The federation is conspicuously represented each year in the International Flower Show in New York City, bringing to the exhibit amateur showing differing from, but quite as important, as the commercial and professional displays.

The Oregon Federation of Garden Clubs, organized in 1927 with Mrs. W. E. Anderson (Salem) as president, has about 20 member clubs and a total membership of about 1,000 men and women. In addition to the encouragement of local groups, the federation means to extend their activities to State fields of conservation and beautification.

The Garden Club of Virginia, of which Mrs. William R. Massie (Greenwood) is president, is the oldest of the State federations and has accomplished brilliant work in aiding mem-

ber clubs, conducting regional shows, fostering plant exchange and sales, and other local and State activities. To this organization, especially through the James River Garden Club, all Americans must be forever grateful for their historical survey of Virginia gardens where so much of early American garden lore and beauty was cradled.

The District of Columbia with nearby Maryland and Virginia has organized the National Capital Federation of Garden Clubs, of which Miss Margaret C. Lancaster (Takoma Park) is president, with 14 member clubs and about 1,500 members, both men and women. This federation has been chiefly concerned so far with the development of garden clubs in the area, aiding in their meetings and exhibitions, but looks forward not only to cooperative exhibitions with The American Horticultural Society but to active cooperation with all the State and federal agencies that are working for the beautification and development of Washington.

Various other reports have been received from Connecticut, Illinois, Iowa, Maryland, Ohio, Texas, North Carolina and Minnesota, none sufficiently detailed to warrant their inclusion at this time.

The American Horticultural Society looks upon the successful growth of these organizations with sincere admiration, since they are working to a common end. It hopes, as well, to have frequent news of their activities and to have them join with it, either as affiliated members or as individuals in the development and furthering of horticultural knowledge in this country.

GERMINATIONS

Among the interesting things that the frames where seeds are kept in pots over winter have revealed as warm weather has come on this spring is the fact that some of the species of wild onion which should have germinated in 1927 are germinating now after eighteen months of dormancy.

This is unlike the seed of the garden onions, which is inclined to be short-lived. Among the species that have yielded this tardy germination are *narcissiflorum*, *ostrowskyanum*, *karativiense* and *jesdianum*. Of these only *karativiense* is known to me and this I saw in a rock garden at Plymouth, Mass., many years ago, where it made a huge clump. Each bulb produces two wide leaves quite unlike those of the traditional onion, somewhat roughly veined and of a metallic bluish green color and a rather fat stalk with a crowded head of dull pinkish flowers which in no way come up to the beauty of the leaves. Perhaps if the plants were solitary the effect would not be so imposing, but in an established clump the effect is as striking as that of a broad-leaved funkia or one of the *Megasea saxifrages*, in a perennial border where the foliage masses are so likely to be monotonous in texture.

Another delayed germination is coming in the two-year pots of colchicum. The slender spears from these are so thread-like that one despairs that they will ever make the rather flabby plants that their adult parents must have been. Crocus on the other hand do not seem so frail when they first appear, for their solitary first leaves are good crocus leaves with a shining silvery midrib to boot.

Iris, of course, are famous for their delays in germination and other temperamental actions, but *Iris reticulata* gave an immediate scattering germination and followed with a good stand the second year. It is an astonishing thing to see the slender spears coming through with the same horny tip to each solitary leaf that characterizes the leaves of the mature bulbs. *Iris caucasica* has been more discreet and has waited modestly for a second spring to push up with something like a decent showing. The same is true for each lot of seed of *Iris chryso-graphes* which I have handled, a marked contrast with the prompt appearance of the other apogons of nearly related blood.

P. I.

Gladiolus Developments

BY CHARLES E. F. GERSDORFF

This paper will not deal with the culture of the beautiful flower which has been so aptly named the "Poor Man's Orchid," a plant that finds favor with flower lovers in all walks of life. What I really design is to record the vast improvements achieved by all the breeders of the universe, for they have been active, not only in this country and Europe, but in Australia and New Zealand.

I do not know if any are familiar with the little flower of our grandmother's day. I admit that I never saw any of them except as illustrations. But the improvements effected between that day and some twenty years ago when I started growing gladiolus are as nothing compared with what we see to-day. Twenty years ago it was uncommon to see a spike with 3½-inch blooms. Now it is rather common to see flowers 6 and 7 inches in diameter.

Size alone has not received attention. New forms and new colors have been derived by in-breeding with newly introduced wild species and by selective breeding among distinct breaks from the conventional forms. To-day we have the Grandiflorus, or large type; the Primulinus, a hooded or partly hooded type, developed by crossing the primulinus species (deep yellow with a drooping upper central petal) with the Grandiflorus type, producing new colors and various modifications of the species form without losing all its airy grace; the Ruffled Grandiflorus type, produced by A. E. Kunderd, who later developed the Ruffled Primulinus, and later still the Lacinatus type with distinctly lacinate or toothed petals; the Primulinus Grandiflorus type with flowers comparable in size to the Grandiflorus type but retaining the airy grace of the Primulinus race.

This last type seems to have been developed simultaneously by a number of breeders, including the writer, but

William Purple, who prefers to be known as Gladiolus Bill, has probably developed the greatest number. For want of a better classification, other hybrids having these characteristics are included here. This group includes the greatest variety of forms, many resembling giant butterflies, aeroplanes, birds in flight and beautiful orchids.

Practically all the colors of the spectrum are to be found, excepting pure blue, and breeders are ever striving to put this as yet elusive color into their creations, and as the years roll by it is gradually being approached. It may never be definitely attained, but even if the result is not quite a pure blue, will loss of interest occur? No. For though we fail in this, new intermediate shades and tints are being developed and new combinations which keep the flame of enthusiasm alive.

It seems in order now to give you something on the varieties worthy of a place in your garden. They are infinite in number. You can not grow them all, though some enthusiasts set out to do so. That was once my aim, but it could not be done. For the same reason I can not describe them all.

For some years I have been rating varieties on a percentage scale of points of my own, but during the past few seasons I have been using the Official Rating Scales of The American Gladiolus Society, which results in lower but much more equitable and lasting values. From these ratings I can heartily recommend the following for beginners.

Although this list includes a preponderance of Primulinus types, for they are of easiest growth and give most spikes of flowers per bulb, I do not wish to convey the thought that there is anything at all difficult in growing any type.

The following are either of Primulinus or Primulinus Grandiflorus types.

Adorable, a primulinus, pale shell pink tinted with buff. Alice Tiplady, rich orange. Annabelle, rich salmon. Betty, beautiful peach red. Cameo, named because of the way the pink tone is superimposed on white as in a true cameo. Golden Girl, very deep yellow. Souvenir, brighter and larger. Jewel, a blend of strawberry pink and light yellow. Rose Luisante, a delightful soft rose pink with a white throat. Maiden's Blush, of the color the name implies and many spikes per bulb. Salmonea, poorly named, for its color is more nearly that of burnt orange. Scarletta, a soft scarlet. (The last two are excellent in landscape work.) Sheila, a large, rich orange salmon. Topaz, beautifully blended yellow and orange salmon, very large for the type.

Of the larger flowered types, these are recommended: Albania, waxy white blooms. Anna Eberius in soft deep purple tones. Rose Ash, popular with ladies for its ashes of rose color. Byron L. Smith, lavender and cream. Charlemagne, from France, sunrise red. Costa Rica, from California, a fine orchid shade. Crimson Glow, distinctive, not large, but a tall, deep purple. Dr. R. T. Jackson, wine red. E. J. Shaylor, a ruffled beauty in rose pink. Flora, from Burbank, very large, a combination of pink, cream and red. Freda, a large pure pink. Golden Measure and Gold, medium large, stately yellows. Gretchen Zang, a fine, clear salmon pink. Helen Todd, a favorite of mine, orchid shades with deeper border. Mr. Mark, the nearest to a true light blue. Mrs. Dr. Norton, delicately colored. Muriel and Nora, blotched light violet blues, the latter more lilac. Sweet Lavender, a beauty, lavender with purple blotch. Pink and White Wonder, two very large sorts, the first a light rose pink. Vesuvius, noted for its brilliant red color.

For advanced growers, those who have had a few years' experience, and therefore feel they are qualified to go into gladiolus culture a little more extensively, I would recommend the following:

Alice May with its narrow petals in pale pink. Arabia, the Black Beauty. Arthur Lockwood, another fine pink. A. W. Hunt, for its brilliant orange red color. Beatrice, delightfully colored, a veining of pink all over a cream colored ground. Bertha Howard, a fine scarlet. Bubbles, in color like the iridescence in soap bubbles. Casa Verdugo, a rosy lavender pink with darker blotch. Chas. Berthier, with light purple color tones. Clea, the palest of pinks. A fine coral pink, Coral. Dr. A. C. Hanson, shrimp pink. Elizabeth Tabor, one of the earliest to flower, light pink. In geranium pink, Evelyn Miller. Kirchhoff Violet, deep violet with deeper blotches, and the New Violet, a redder violet and earlier. Hazel Page, salmon. J. A. Carbone, orange with many flowers open at one time. Juliana, yellow distinctly edged salmon pink. Wingold, deep yellow edged scarlet. Pennant, another of this new "Picotee" type, creamy white edged begonia rose. Los Angeles, a cut and come again sort with handsome salmon flowers. Marietta, the stately. Maurice Fuld, tall, large and fine. Pure Mauve, as its name implies. Mary Jane Coole, in shrimp pink tones. Orange Queen, almost pure orange. Peninsular Belle, salmon blotched light wine red with 7-inch blooms. Dr. F. E. Bennett, without which no collection is complete.

Of the novelties, I will name just a few:

Rozann, an even pure pink, a beauty. Lady Byng, a pure pale pink. Rose-Mulberry in coral pink flushed violet. Rosemary, white covered with hair lines of lavender rose. The Orchid, pale lavender, and truly of orchid form. California, deep apricot yellow. Le Cygne, pure white, a much improved Europa. Goldstone, a 7-inch rose pink with glistening golden sheen. Copper Queen, a blend of old rose and terra cotta. Evelyn L. Baer, cream white tipped and edged rose pink. Grandee, in coloring suggestive of the dress of Spanish grandees. Horizon, lavender

violet. Juniata, in white blending outward to La France pink. Liebestraum, in pure pink. Lilac Wonder, though but medium in size, an even toned pale lilac. De Luxe, white blended cameo pink. Oh Boy, very large and a spectrum red. Packard, a brownish lavender pastel shade, a favorite with many, though it will not appeal to all. Oregon Gold, deep yellow. Rose o'California, a deep rose. Rose Mist, a daphne red. Mrs. F. C. Hornberger, a very pure white. Norma Talmage, pure pale yellow. Veilchenblau, a tint lighter than Rood's violet, a beauty. Water Nymph, sea shell pink. White Orchid, of orchid form, white to cream, its tips twisted. Yellow King, a large one, deep yellow. Mrs. Maud Hayward, a delight in its pure lavender color.

A startling novelty is Peppermint Candy. I do not ordinarily care for striped sorts, but this one is not only startling, but the coloring is so harmonious that I could not pass it by. I named it for the originator.

Mother Machree. This proved to be the champion seedling at the Hartford show of the American Gladiolus Society. It is without any hesitancy on my part, a most wonderful creation from a comparatively new breeder. Almost a pure grey with a few electric flashes through the tips of the petals.

Washington, D. C.

A BOOK OR TWO

HEW TO THE LINE

The Life and Work of an English Landscape Architect, by Thomas Mawson. New York, Charles Scribner's Sons, 1927. 368 pages and 73 pages of illustrations.

Two classes of readers will enjoy Mr. Mawson's autobiography, for it is one of those rare books which equally delight the laity and the profession. Garden lovers will follow with interest the history of landscape architecture in England during the last half century, as revealed through Mr. Mawson's con-

tacts with it and services for his profession. First and last Mr. Mawson's passion has been landscape architecture. When, at the age of seven, he began his first garden, he planted potatoes in a straight line, one foot apart. There work by design was executed in its most elementary way and combined with the creative impulse; so was first given the chance to grow the genius which later led, both at home and abroad, to such extensive creation according to pattern. There were many difficulties en route. Mr. Mawson was often confronted with the practical problems of construction, and was worried with financial burdens. But, from the time he achieved his first client, while still a young nurseryman, to the time of writing some forty years later, Mr. Mawson never lost sight of his goal—landscape architecture. His has been a lifetime with one purpose, one increasing purpose. With hope he now looks forward to greater recognition and better educational facilities in England for his profession.

Readers with a keener interest in biography than in landscape architecture will enjoy the book as much as devotees of gardens and design. The man can not be considered apart from his work, nor the work apart from the man. Heredity, environment, training—all combined to determine his life and work. A gift of flowers was even the means of introducing him to his bride, the wife to whom the book is dedicated. His work—or more, his passion for it—is both steed and rider. It carried him from a subordinate position with a London firm to individual business, national fame, international renown; from London to the Lake district, to every part of England and Scotland, to near and remote parts of Europe, to the United States and Canada; from small private estates to larger ones, to planning villages, universities, towns, improvement of historic Athens, rebuilding of Salonika. But the passion was the rider with sharp spurs when it demanded so many thousands of miles of travel a year, separation from

home, family and friends. It is not strange that Mr. Mawson should borrow the expression that landscape architecture is the "mistress art."

The easy, familiar style of the book adds to the interest of incident. The reader laughs with the author at the young designer's first attempt at an aquatic table decoration which showered the client's dinner guests with more than good wishes. Years after the need of the funds had passed Mr. Mawson obtains ample vengeance upon the client who argues his bill instead of paying it, for, the author writes, this gentleman found his match in arguing the legality of a fare with a taxi driver. Anecdotes and bits of personal philosophy add to the narrative throughout. Perhaps some of the chronological details might have been omitted, and an American might protest against placing Baltimore in New England. But the wealth and interest of incident in the text and the excellent illustrations more than compensate for minor infelicities of presentation. These are the chips that fall where they may; Mr. Mawson's autobiography is a substantial record of what a man may do for himself and for his profession if he will hew to the line.

FLORENCE LUMSDEN.

The Pear and Its Culture, by H. B. Tukey. Orange Judd Pub. Co., New York, 1928.

The Farm and Garden Library has added another volume to its "Fruit and Flowers" series,—this time a book on *The Pear and its Culture*, by H. B. Tukey. Our American literature on the pear is so scanty that the appearance of a new volume concerning this fruit may attract attention when one on some other fruit subject would pass almost unnoticed as "just another book." This is a small book of one hundred and twenty-five pages, and is "designed for both amateur and commercial grower." The treatment is simple and elementary, which was the intent, and in keeping with the

earlier published volumes in the series. The author has succeeded remarkably well in condensing into small space a relatively large amount of information; and further, of the great mass of subject-matter material which he had to choose from, he has shown excellent judgment in the selections made for this purpose. Ten full-page illustrations, some of them with two figures each, accompany the text. Possibly rather more telling subjects could have been selected in some cases; and in one place an apparent slip makes the author say, in effect, that no pear variety has originated in this country. But on the whole there is very little to criticize and much that merits commendation. A very brief historical statement appears, followed by plain and concise directions for starting an orchard; pruning and other allied operations; topworking, including some of its limitations; the use of fertilizers; the setting of fruit, including information on self-sterility; dwarf pears, with some very pertinent points on congeniality; diseases and insects; varieties, including brief characterizations of and comments on about seventy-five different sorts which the grower will find especially helpful; and closing with a few suggestions on handling the fruit, and the future development of the pear industry. In other words, the book is made up of just such information as the reader with little experience is likely to need at any time in caring for his pear trees.

H. P. GOULD.

Muskmelon Production, by J. W. Lloyd. Orange Judd Co., New York, 1928. 126 pages, illustrated.

The author in his preface extends his appeal beyond his title to include consumers, a much larger list of possible buyers than the producers.

He is to be commended for his use of the word Muskmelon. It is too much the habit in state and national treatises to trail the commission merchants in the misuse of the word cantaloupe.

The chapters dealing with the geography of our melon industry with cultural and marketing problems and with the treatment of pests are quite full and are well written.

The chapter on history is too brief to carry much interest, and that on the botany of melons is not very clear, and is very incomplete.

The statements in seed dealers' literature are too implicitly used. The condemnation of the use of "cull" melons for seed, and of the marketing of early fruits from a seed field is too sweeping. The buyer expects to receive seed which is well matured, of satisfactory viability, and which carries desirable and uniform heredity. With proper handling the washing vat and fanning mill will assure maturity and viability whatever the source of the seed. There is every reason to believe that all the melons on any one vine carry the same heredity. There are "culls" from both the market and the seed standpoint, but there will be no cull seed melons on a vine which has produced melons of proper marketing quality. So if the market crop in any field has been uniform and of the proper type, the late melons would make as reliable seed as the early ones. The gathering of melons into piles in the field preparatory to selection and seed cutting does not give the best opportunity for selection, since it is the best vines rather than the best fruits which should be selected. There is no valid reason why melon "threshing machines" should not be used for seed which goes on the market, and they are doubtless yet so used.

The consumer portion of his readers will want to know how to "pick a good one" in the market, for they have come to believe that getting an edible melon is more a question of luck than betting on horse races.

The book has a six-page chapter on quality, but it is all taken up in telling how to determine if a melon is fit to eat after it is bought, carried home to the kitchen and cut open. Why not taste it and save six pages. It is re-

peatedly stated that full netting is a mark of high table quality. While it is apparently a mark of shipping quality, it is generally agreed that the old slightly netted type of Netted Gem is a better table melon than its present better shipping descendants.

The lower part of plate VII illustrates the most important reason why melons on our market stands are too often disappointing on the table. This illustration is supposed to show a "half-slip" melon, the most immature stage at which it is safe to pick a melon for long shipment. It is about useless for this purpose, but it does show this most immature melon clinging to a dead vine! Given that dead vine it is certain that no melon picked at any stage can be worth buying. Too many melons are shipped from dead vines, and carry the "outward and visible evidence of an inward and spiritual grace" which is entirely lacking. Possibly there is no way to tell a good melon on a market stall, but the consumer will be inclined to regard this book from his point of view as a "full-slip."

Finally, it is easier to see why an author and publisher should put out such a book than to excuse the reader for buying it. Its 126 pages contain the matter put into about 50 pages of State Experiment Station or Department of Agriculture Bulletins. All but 8 of his 54 references under his caption of Literature are official publications and all but five were printed for free distribution. Many of these are doubtless out of print, yet the grower in any important melon State can get fuller free information from those obtainable than he gets in this book.

D. N. SHOEMAKER.

If one is so fortunate as to have established clumps of *Primula japonica*, he will find that home-saved seed will germinate with freedom. There is a long period of germination, so that one may remove an entire crop from the seed flat and then later have another equally large. The seed must be sown promptly.



Dorothy Colvin

Iris watti

The Gardener's Pocketbook

RARE IRIS

Among the iris species of the Evansia Section, the tender *Iris watti* has lately come into cultivation in this country and has been reported as successful out-of-doors in California. This plant grown in a pot in the East has had cold treatment in an unheated pit until January, when it was moved into a greenhouse that is kept a little above freezing. The lowest temperature in the pit, about 16° F., was probably responsible for the killing of most of the lateral shoots of the flower stalks and the loss of most of the flowers. The flowers are very much like those of *Iris japonica* and somewhat like those of the familiar *Iris cristata* except that they are a tinted white in color.

B. Y. M.

"I HATE PACHYSANDRA"

This is a frequent murmur in Plant Materials classes when I am urging the use of Pachysandra as the one perfect evergreen groundcover. Perhaps I am not so fond of it myself, for while it has the vivid personality of a rubber doormat, even doormats have their place. What can be used as a permanent evergreen groundcover instead of Pachysandra, since this does not appeal to your esthetic garden sensibilities?

As this is my question, I do not have to answer it, but several statements may be made to help in the problem. We must be fair to Pachysandra. It is a perfect evergreen groundcover from the cultural point of view, always ready and willing in shade or sun, hardy and increasing readily, smothering out all weeds. It merely is dumb looking, and in some gardens we long for something as serviceable with more "character." There is nothing that quite takes its place for general utility, and it is easily propagated, yet so great is

the demand that it is still high in price. Evidently, not every garden builder hates it. The American *P. procumbens* is not evergreen, and its foliage is coarser and lighter in color—it is not in the trade.

Its predecessor in this rôle was Periwinkle (*Vinca minor*), of grandmother's day. You can't beat old Vinca yet as an evergreen cover in shady places. Big weeds do get into it, but picture daffodils waving above it. It is still sold in great quantity, for not all garden lovers have given their patronage wholly to Pachysandra. If its blue flowers do not please you against its green foliage, the white-flowered form with silver stars is very pleasing in dark places. The rose colored and double blue are little seen, and rightly so.

In sunny places too dry and sandy for Pachysandra the Thyme group is the first choice. Until I began to collect the species and kinds I had no idea of the great range in its effects. Some are an inch tall in solid mat, while others are heather-like bushes of a foot or more. The leaf color is the whole range of foliage, gray, blue, brown, reddish, golden, silvery, and the more normal greens. The flowers are red or purple to white in long season in midsummer. For cover on sunny banks they can not be equalled, and as evergreen shrubs they rival heather. Very hot sun, no rain, no food—all is well with Thyme.

In soil of fair garden value try *Pachistima canbyi*, a low native shrub now in the trade. It is a perfect evergreen rug of slender stems and narrow leaves, far more satisfying than its cousin *Euonymus*. Neither flowers nor fruit are of interest, but it will push Pachysandra out of the race on every count.

Under trees in certain soils the various *Epimediums* are a wonderful car-

pet, not wholly evergreen, but with foliage through late autumn until snow, and dancing elves of white, rose or yellow flowers in spring. Or try its sister *Vancouveria* from Oregon, with shining squared leaves. This is the best American woodland cover plant. The evergreen Wildgingers (*Asarum*) do make wonderful carpets in the woods of Virginia, but are not as readily established as *Pachysandra*. The European species (*A. europaeum*) seems to have dropped out of the lists, but its round shining evergreen leaves have great cover value. The species from the Oregon region are also evergreen, but the stringy roots are awkward to plant in quantity, yet the species seem hardy at Boston in woodland conditions.

There are many groups, as *Pentstemon*, *Phlox*, *Sedum*, *Saxifraga*, *Helianthemum* and *Veronica* with dwarf woody evergreen species. These seem more properly a part of a well-stocked rock garden, though they are good cover herbs in full sun. Many mints beside *Thyme* are little evergreen shrubs, but they won't withstand the abuse accorded to the usual groundcover.

The two Snakebeards (*Ophiopogon*) should be used extensively as evergreen groundcover. The foliage is fleshy, varnished, grassy, unchanged from day to day. The flowers are not much, but the blue berries are entertaining. *O. jaburan* has the wider leaves and is apparently perfectly hardy in woodland conditions in Cambridge. The smaller *O. japonicus* should be hardy here, but until the present plant can be divided for outdoor trial I can not be certain at this latitude. It would surely be safe south of New York City, and is less dumb in its foliage effect. Every berry everywhere should be picked and planted until both species are permanently in the trade for general use. Once planted, they require no care whatever.

STEPHEN F. HAMBLIN,
Harvard Botanic Garden,
Cambridge, Mass.

GLADIOLUS

The following table gives the time elapsing between planting and flowering of a collection of gladiolus at Woods Hole, Mass. All were planted on the fifth of May in ordinary soil and developed in a rather rainy season. The first figure after each name gives the number of bulbs planted and the second figures the month and day of bloom.

America	6	8/12
Albion	12	8/27
Baron Hulot	15	8/7
Byron L. Smith	11	8/1
Copper Head	6	7/28
Diana	8	8/9
Dorothy Wheeler	8	8/14
Dorrit	10	8/23
Empress of India	14	8/14
Elbarton	6	8/6
Europa	10	8/12
Freckles	15	8/10
Golden Gate	8	8/9
Golden Measure	8	8/8
Golden Tinge	10	8/13
Gov. Hanley	13	8/7
His Majesty	9	7/30
Jennie Lind	9	8/18
Jewel	8	8/7
Lacinatus	1	8/14
Los Angeles	6	8/1
Mary Pickford	15	7/30
Minnataka	12	8/15
Mrs. Francis King	6	8/20
Mrs. F. Pendelton	4	8/15
Muriel	7	8/5
Nancy Hanks	2	8/11
Niagara	6	8/21
Orange Glory	9	8/22
Perseus	8	8/11
Pink Glory	9	8/18
Pink Perfection	5	8/20
Pink Wonder	12	8/16
Prim Picotee	11	8/8
Primrose Beauty	3	8/2
Prince of Wales	12	8/4
Princes	5	8/6
Purple Glory	10	8/8
Red Copper	6	8/10
R. Diener	6	8/19
Rose Ash	10	8/18
Sans Pareil	4	8/24
Scarlet Princes	1	8/10
Schwaben	6	8/20
Silver Moon	4	8/1
Sirius	10	8/9
White Giant	7	8/16
White Glory	4	8/12
W. H. Phipps	7	8/28
Yellow Gem	3	8/12
Yellow Treasure	10	8/11

H. E. HOWE.

PHLOX ARGILLACEA

This phlox was collected and studied by Willard N. Clute, editor of the American Botanist, and J. H. Ferriss in 1911. They found it growing in both sand and clay soils in northern Michigan. The form selected by Mr. Clute was introduced by Messrs. Meehan and Sons in 1924.

It is described as silvery lavender with a darker tube, but I have a pure white as well as a lavender form and the white is the taller and more vigorous variety with me. It follows *Phlox divaricata* in time of bloom and is a charming perennial about a foot high. The loose heads of flowers look like bouquets of lavender and white among the iris clumps. The slender wiry stems branch toward the top and rise from a small woody crown. The leaves are harsh, dull green and in shape narrow and pointed, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, the largest perhaps $\frac{3}{16}$ inches wide at the base. They transplant readily, can be divided, and seed themselves. If the inconspicuous seedlings escape the hoe they will flower the following summer, the number of flowering stems increasing from year to year. I place them about a foot back from the edge of the border.

They are dainty and makes one think of an etching, fine and delicate but strong. GRACE STURTEVANT,
Wellesly Farms, Mass.

ADLAY, A NEW AND PROMISING GRAIN CROP

Cereals other than corn and rice can not be grown with satisfactory results in tropical countries such as West Africa. Having tried wheat and oats in particular, and failing to get the plants to fill out, the writer sought a substitute for these. Quite some time elapsed before he accidentally heard of a new grain crop called Job's tears, or adlay (*Coix lachryma-jobi*). Hard, shining, wild forms of this plant had been known and used for years as beads, and although certain soft hulled

varieties had been used as a food to a certain extent, especially in India, its native home, yet as such it had never been grown commercially.

Having heard of this wonderful new cereal, the writer secured, through the kindness of Dr. Stockdale, Director of the Agricultural Experimental Farms at the Botanical Gardens, Peradeniya, Ceylon, seed of a light and a dark hulled variety in the spring of 1924. These were first planted at the Elat Agricultural Institute, Ebolowa, Cameroun, West Africa, in the fall of the same year along with other imported seeds. From the start they were the subject of general interest by whites and blacks alike. They all wanted to know what the new plant was and asked in particular if man really ate the seeds.

In spite of the fact that no special care was given the plots or the growing crop, both varieties seemed to do equally well and made such a fine showing the first season that larger plots were put out the second one. These yielded so well that larger and larger plantings were made until finally several acres were planted to it. There was no difficulty in growing it. Only ordinary soil was used and no special treatment given except a thorough preparation of the soil and the keeping down of the weeds at the start. It did well in spite of the heavy rainfall. Neither did it suffer appreciably when the rainfall was a trifle below normal. However, good soil and plentiful rainfall seemed to give best results, providing the drainage was good.

For best yields the seed should be carefully selected from year to year. Especial attention should be given to earliness, evenness of ripening, and to productiveness.

Few are the pests of adlay. The insects which so quickly get into and destroy corn and rice grains in tropical lands did not seem to attack adlay noticeably for a long time. This was the case whether the seed was kept carefully enclosed in tins or left exposed in open receptacles.

However, after a few adlay plantings had been made a certain amount of smut was noticed in both varieties, but more especially in the darker hulled one. Every affected stool was pulled up and far removed from the field. The smut was found each successive season thereafter but seemed to be somewhat less, especially in the light hulled variety in the past season's plantings. Probably in order to completely control this disease the seed will need special treatment before planting.

Although adlay ratoons, and fairly remunerative returns may thus be secured for one season at least, probably it would not be advisable to do so were the smut present in any quantity at all. A ratoon crop would only be advisable where the soil was very good. On poor soil the returns would be too small to justify doing so.

Adlay is easier to grow than is rice, which requires lowland soil for best results. There are less weeds on upland and what there are are more easily killed. Providing the season is warm and long, adlay may be grown wherever corn is. No flooding or special preparation is needed as for rice. Any one who has planted corn profitably can also grow adlay successfully if he chooses the proper climatic conditions.

Not only is adlay easier to grow than is rice, but it is far more palatable and wholesome than that world food. It is even a better balanced food than is wheat, that most nourishing of all temperate climate cereals. The writer uses adlay in one way or another three times a day for 365 days in the year, so wonderful is it as a food. Rice is kept on the pantry shelf, but is never touched month after month until by accident the adlay runs out from constant use and distribution to friends. Rice is a poor substitute for adlay when one has become accustomed to this marvelous new cereal.

For breakfast I always have adlay porridge or adlay pancakes—sometimes both. The porridge is equal to

the best one can buy and surpasses many if not all of them in flavor. The pancakes are usually best made with part white flour, say one-third cup wheat flour to two-thirds adlay flour. The resulting pancakes are unquestionably better in flavor than all other kinds.

Adlay flour is a most valuable supplement to wheat flour not only in pancakes but also in muffins and bread. The resulting products are equal in appearance to wheat flour ones alone, and far surpass the latter in tastiness.

I have prepared adlay for the white and the black population of West Africa alike, and in every case they thought they were eating rice, so close is the resemblance between the two cereals when prepared for food. My garden boys, chiefs and whites alike, pronounced the new food a decided success and could not believe that they had been eating adlay when told what the ingredients in the dish were. They all began at once to ask for seed to plant and to know how to grow it.

Adlay is beyond the experimental stage. It has been tried by leading agriculturists in many tropical countries now and is recommended as a cereal with almost unlimited possibilities. Some enterprising young college graduate or other person with a little capital, has a promising field of endeavor awaiting him in adlay production. He needs to make a fairly large planting of it, building his mill while the crop is growing. After this, with a bit of attractive advertising and packing, he has but to present it to the public, which is always awaiting for something to appease its appetite, which is better than that they already have. The writer is confident that it will be demanded by the public once it learns of it, for it has much in its favor and nothing against it. In all tropical countries it should cut down the wheat flour importation by at least a half.

VICTOR M. BUCK,

Director, Elat Agricultural Institute, Ebolowa, Cameroun, West Africa.

HARDY CACTI

So many have the impression that there are no absolutely hardy Cacti that a few notes on our northern cacti may not be out of place as they lend themselves to many very charming effects when rightly placed in rock or wall gardens. All take very enthusiastically to cultivation and all will stand much abuse and neglect.

At the top of the list I would place Cactus *Opuntia polycantha*, or Prickly Pear. Unlike many of the Opuntias from the warmer sections of our country, this does not grow tall, instead it topples over and takes root wherever it touches the ground, forming huge mats several feet across that are made up of many sections, each section from two to four inches wide by from three to six inches in length. The whole plant is literally covered with a network of wicked thorns, some of these from one to two inches in length and varying from dark red in some plants to gleaming white in others like a giant porcupine. Interesting at all times and a sight wondrously beautiful when covered with its many great fluffy, fluted, China silk, lemon yellow blossoms from two to three inches across, each showing quantities of sparkling lightly poised anthers of a deeper shade of yellow, while other plants will have blossoms that range from yellow at the edge through peach and apricot to brilliant red at the center with red stamens and anthers.

Opuntia fragilis is built on a much smaller plan, as the sections are only about an inch wide by from one and a half to two inches in length, and so thickly produced as to overlap each other in a very pretty way. These have mostly dark reddish brown thorns and pale yellow blossoms sparingly produced.

Last summer I found a single plant that has sections slightly smaller than *Opuntia polycantha* that has almost no thorns or spines at all, and what few there are are only an eighth of an inch in length. This has not blossomed, so

I am unable to tell what variety it is. It is a welcomed addition and is being watched with much interest as it, too, is entirely hardy.

Then we have the two varieties of Mamillarias, *missouriensis* and *M. vivipara*, or Cactus *Coryphantha vivipara*, according to some authorities. These are called also by the common names of Ball, Pincushion, Nipple Cactus, and also Hen and Chickens. *Missouriensis* and *vivipara* are very similar in general appearance, and when not in blossom could readily pass for the same variety. *Vivipara* is the more desirable of the two, for it has surprisingly large bright pink blossoms with quantities of orange stamens and anthers, while *missouriensis* has blossoms a third smaller in size and of a pale straw color. Both have shiny orange scarlet berries one-half inch through that are edible if one wishes to sacrifice months of the pleasure of looking at them for the momentary pleasure of eating them (I much prefer the former), for the berries retain their bright color until the following spring.

For best results all Cacti are best planted by themselves with nothing to conceal their rugged outlines. Give them a sandy or gravelly soil and good drainage and a location where they will have direct sunshine for at least a part of the day. The more sunlight they get the more blossoms the grower will receive as a reward for this kindness. Mine are doing very nicely and bloom well, yet have open shade fully two-thirds of each day with the mid-day sun boiling down upon them.

Besides the above, *Opuntia humifusa* has stayed with me a couple of winters and is entirely hardy as far north as northern Nebraska. According to some, this and *Opuntia rafinesquii* are one and the same.

Opuntia vulgaris of the Eastern States refused to stay, even though I gave it a very sheltered position and had it in a very thrifty condition when winter set in.

There may be other varieties that are unknown to me that are hardy

anywhere in the United States except North Dakota. But oh! the number of plants that are listed as entirely hardy that will not stand it here; but the four above-mentioned Caeti will come smilingly through our very hardest winters when it goes down to 40 below zero and there is very little snow to cover them.

FANNIE MAHOOD HEATH,
R. 1, Grand Forks, N. D.

EARLY BULBS

Among the bulbs that flower with daring earliness in the East, often to their own discomfort, the little snowdrop from Mt. Taurus in Cilicia (*Galanthus cilicicus*) has been the most precocious this year, opening its first flowers about Thanksgiving time and blooming as it could whenever the sun warmed it through the winter. It is not unlike the common snowdrop except in its winter blooming, a habit which makes it very precious if it can be given a little protection, for like all other plants that insist on opening in our winter season, it suffers when we have a time of freezing and thawing with snow and sleet. Of course, Elwes' snowdrop and the common snowdrop follow quickly as soon as the weather permits in the earliest part of March.

Some American amateur, if he is willing to take the pains that he would have to take, should undertake the collecting of the snowdrops and their establishment in this country. In a recent note in the English "Gardening Illustrated" a list of 45 species and varieties was given for one amateur's collection with the expressed desire that others might be added. To be sure many of the differences of these plants may be so slight as to warrant the attention and interest only of the specialist, but happily we are coming to the time in this country when our amateurs are discovering the infinite delights of plant forms and flower patterns which are just as legitimate a garden pleasure as the more emotional

pleasures of color masses and garden designs.

Almost as precocious as the Cilician snowdrop is the charming *Crocus imperati* from Italy, with its delightful buff yellow outer segments and the clear lavender inner segments. This comes far ahead of the familiar Cloth of Gold (*Crocus susianus*) with its deep yellow and brown stained petals, and seems to be no more difficult.

Iris persica with its unbelievably lovely flowers comes into flower with a startling suddenness. One day there is nothing and almost the next day there are the butterfly-like flowers scattered over the bed, large, gracefully poised things of clearest pale green blues and lavenders with a patch of velvety blue purple on the fall and a fleck or two of yellow and orange. As the plants bloom like the crocus, with scarcely any leaves showing and close to the ground, they should have some low creeper to push through, so they will not be splattered by spring rains.

Iris reticulata with its horny tipped leaves comes almost at the same time together with the red purple *Iris krelagi* and the clear lavender blue Iris "Cantab." Unless one has once seen *Iris reticulata*, it is quite impossible to convey the idea of its color, the richness of the deep blue purple, the brilliance of the yellow and orange patch on the falls, the flecking of green on the back of the hafts, and the jewel-like intensity of the contrasts between the colors. In addition there is a delectable scent. As compared to *reticulata*, Cantab is a pale beauty, but its flowers are of a delightfully clear and tender lavender with a patch of white reticulations on the falls. Its flowers are smaller and shorter in stature than the type plants, but make a charming group when they open in the crisp March sunlight. If one can find seed of *reticulata* it will germinate as freely as any of the apogon species but the development into flowering bulbs is less rapid, being more comparable to the development of narcissus bulbs.

B. Y. M.

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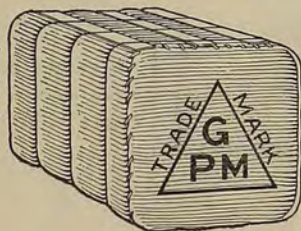
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