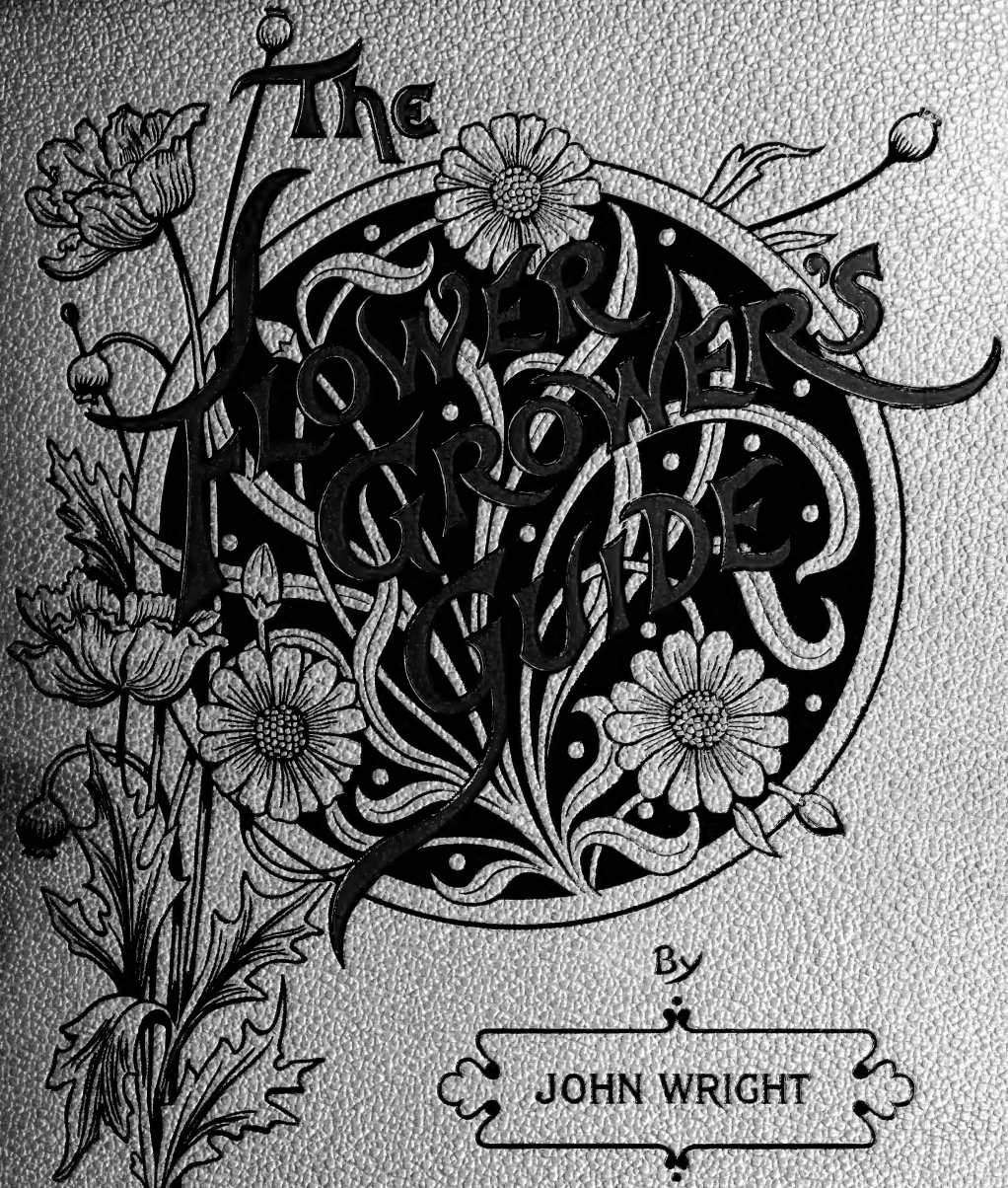
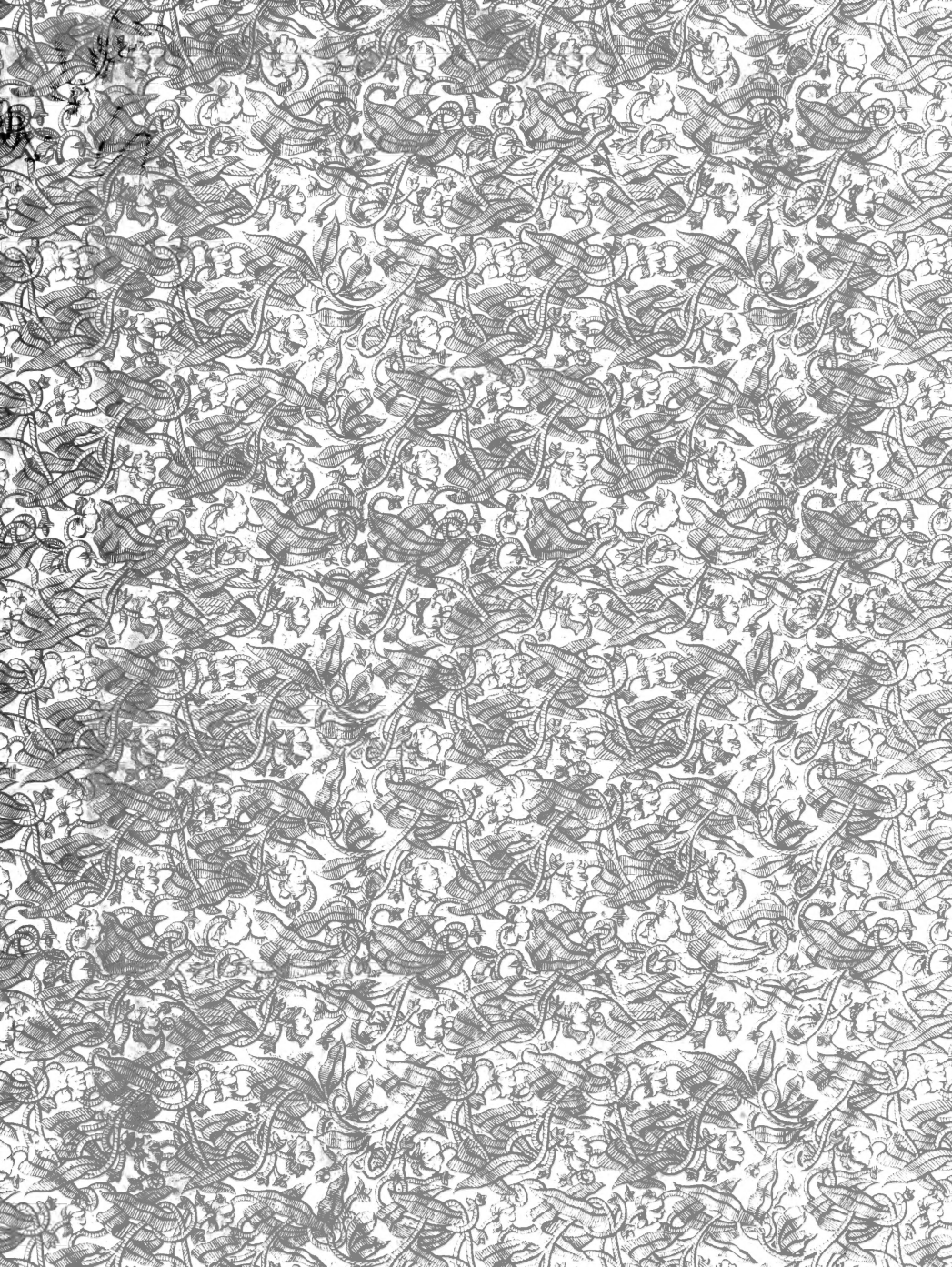


By

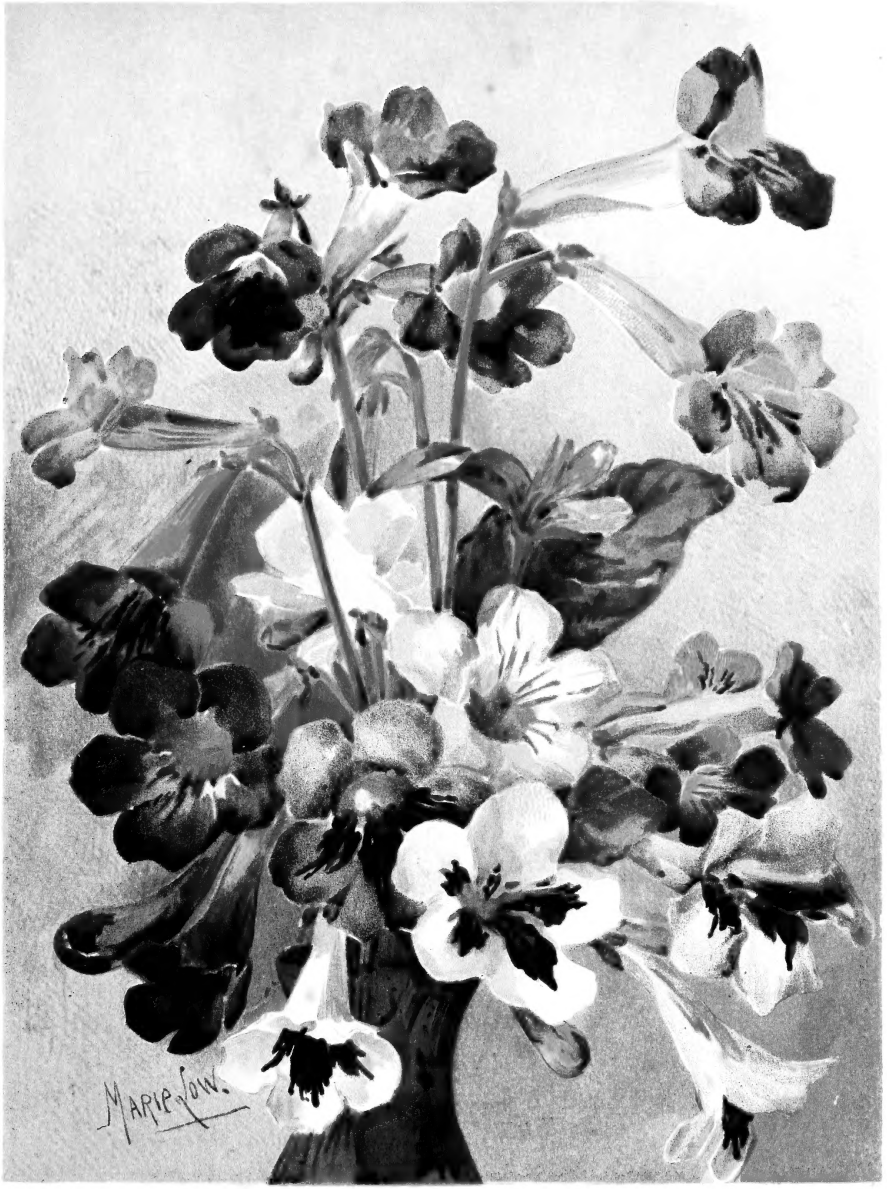
JOHN WRIGHT



CYCLAMENS (from Seeds).

AZALEAS.

1. Königin de Weissen. 2. Souvenir de Prince Albert. 3. Roi Leopold.



STREPTOCARPUS (from Seeds).

SEEDLING TUBEROUS ROOTED BEGONIAS

PRIMULA SINENSIS.

ANTHURIUMS.

1. A. Scherzerianum. 2. A. S. Rothschildianum. 3. A. S. parisiense. 4. A. Andreanum album. 5. A. A. atropurpureum

IRISES.

1. I. aphylla Madame Chereau. 2. I. germanica Purple King. 3. I. pallida. 4. I. hispanica Cantab. 5. I. hispanica Queen Isabella.

THE

FLOWER GROWER'S GUIDE

BY

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With Coloured Illustrations

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AND

NUMEROUS ILLUSTRATIVE DIAGRAMS BY F. W. BURBIDGE, F.L.S., GEORGE SHAYLER, F.R.H.S.
AND MISS MAY IGGULDEN

DIV. III.

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294, CITY ROAD

THE FLOWER GROWER'S GUIDE.

VARIETIES OF CHRYSANTHEMUMS.

HAVING referred to the propagation and culture of these extremely popular flowers, and pointed out approved methods of producing both trained specimen plants and particularly plants for affording exhibition blooms—which are grown in countless thousands yearly—there remains the question of varieties that at the present time are regarded as the most suitable for the object in view—exhibiting. These rank also among the more effective, whether for arranging in imposing groups at home, or cutting for vase decoration, for the adornment of rooms. There are other varieties, however, not so much valued for the merits of their blooms individually, as for the floriferousness of the plants, and their consequent suitability for the embellishment of conservatories, as well as for affording bunches of flowers for sale. These will be duly referred to under their proper headings in Vol. III., the varieties now to be named being those which possess the properties and characteristics set forth in Vol. I. pp. 332-3.

As will be seen, they are arranged under their prevailing colours, omitting the blending of tints and shading of hues, which may be found in catalogues. The relative heights are indicated, as of importance in choosing varieties for grouping; and their natural disposition to flower early, mid-season, or late, this being of vital moment in the selection of buds for the development of blooms at the time required. Further, in the two great sections, the large Japanese chrysanthemums, also in the large incurved (Chinese race), the names of the raisers of the varieties are given, with the years of their introduction, so far as could be ascertained, as at once just to the several raisers and a record of historic value. This is not done in what may be termed, without deprecation, the minor sections, first because of their smaller relative importance, and

secondly, because the information, in respect to many of the varieties, was practically unattainable.

What is at once striking and suggestive is the extreme youthfulness of the selected Japanese varieties. Out of the hundred enumerated, only three of them were distributed amongst British cultivators in the "eighties," the remaining ninety-seven belonging to the present decade. This shows a remarkable advance, and the register will afford a means for measuring from it in future years the progress of further improvement. The present position has been attained primarily by judgment in the selection of parent varieties, and skill in fertilisation, *plus* the great floral enterprise that is characteristic of the brightest period in the era of the chrysanthemum.

But though the selected varieties in the Japanese section are so "young," it is worthy of record that the oldest of them all, Edwin Molyneux, introduced by Mr. Cannell in 1886, was in a recent election of chrysanthemums, conducted by 105 expert cultivators in various parts of the kingdom, placed at the top of the poll—a pre-eminence that has not been maintained anything like so long by any other variety in its section. In colour it is rich chestnut crimson, with a character all its own, or it would have been swept into oblivion long ago, as have scores of other once-famed varieties. It was named by Mr. Cannell after the most successful grower of blooms during the period of his exhibiting career, Mr. Edwin Molyneux, who is now admittedly one of the best authorities on the chrysanthemum in the kingdom; and the selections now given will not be regarded as the less fairly representative, at the time of their compilation, (April 1897), when it is stated that he has obligingly revised the lists, but not these prefatory observations.

Improvements, as will be apparent, have been very considerable in the Chinese incurved section during recent years. Still, many old favourites hold their own, including the stately veteran with its Royal name, so well deserved, Queen of England, given by Mr. J. Salter, in 1847. Another of the older varieties that still worthily holds a prominent position is Empress of India, which has been cultivated since 1861, as does Princess of Wales, introduced in 1864. Then we have Golden Empress (1877). The varieties composing the Royal quartet have scarcely been surpassed in modern days, and they have given rise, by "sports" (pp. 28 and 351, Vol. I.), to some of the finest varieties in cultivation.

The greater stability of the incurved over the Japanese section of chrysanthemums is demonstrated by the fact that while, as has been stated, only three of the Japanese

varieties out of a hundred in the list were grown prior to 1880, more than half of the varieties in the selection of fifty incurved were cultivated then as now. In stoutness of texture in the florets, and solidity of bloom, the true incurved chrysanthemum is unique; and, for preserving the characteristics unimpaired, adjudicators on new varieties should be slow to admit into this section those which, as apparently the result of intercrossing with the Japanese race, betray their origin by quilling at the base of the florets, undue length and thinness of the same, with the peculiar twist or twirl which is absent from the pure Chinese incurved blooms. Under what may be termed the modern cult of size-worshippers, and the pressure of commercial influence, there is a danger of some of the most beautiful and refined of incurved chrysanthemums being driven out of cultivation by a more or less tainted race which can very well be either dispensed with or placed in a decorative group, as is done in the case of Dahlias and Pelargoniums, which are not true representatives of either the "show" or "fancy" sections.

The remaining sections of chrysanthemums call for no particular comment as their attributes and properties are adequately set forth as indicated on page 1 of the present volume.

SELECTIONS OF CHRYSANTHEMUMS.

One Hundred Japanese Varieties.

References.—*Heights*: D. dwarf, M. medium, T. tall. *Seasons*: E. early, M. mid-season, L. late. Best twelve varieties *; Best twenty-four ‡; Best forty-eight †; Best twelve incurved Japanese §.

	Raiser and Year.	Height.	Season.
	WHITE.		
‡†Emily Silsbury	(Silsbury, 1896)	M.	E.
Enfant des deux Mondes	(Crozy, 1893)	D.	E.
Florence Davis	(N. Davis, 1891)	M.	M.
W. G. Newitt	(E. G. Hill & Co., 1893)	D.	M.
§Lady Byron	(Weeks, 1896)	M.	M.
†Madame Ad. Chatin	(Calvat, 1893)	D.	M.
*‡†Madame Carnot	(Calvat, 1894)	T.	M.
Madame C. Molin	(Calvat, 1893)	M.	E.
‡Madame Gustave Henry	(Calvat, 1896)	D.	E.
Mdlle. M. A. de Galbert	(Calvat, 1894)	M.	M.
Mdlle. Marie Hoste	(Lacroix, 1891)	M.	M.
‡†Mdlle. Thérese Rey	(Calvat, 1892)	M.	M.
‡†Miss Elsie Teichmann	(Shea, 1895)	D.	M.
†Mr. C. Blick	(Cutbush, 1895)	M.	M.
*‡†Mutual Friend	(Mann, 1893)	D.	E.
Niveus	(Smith & Son, 1893)	M.	M.
†Madame Ad. Moullin	(Calvat, 1893)	M.	M.
Princess May	(Agate, 1893)	M.	E.
Souvenir de petite Amie	(Calvat, 1893)	D.	E.
††‡Western King	(Nathan Smith, 1896)	M.	M.
	BRONZE.		
† Directeur Tisserand	(Calvat, 1895)	M.	M.
Lord Brooke	(Pitcher & Manda, 1892)	M.	M.
Mrs. Falconer Jameson	(Cannell, 1890)	D.	M.
†Mrs. Hermann Kloss	(Seward, 1896)	M.	M.
†Mrs. John Shrimpton	(Seward, 1896)	M.	M.
Mons. C. Molin	(Calvat, 1894)	M.	L.
§† Miss Maggie Blenkiron	(Shea, 1894)	M.	M.
Mrs. Dr. Ward	(Pitcher & Manda, 1892)	M.	E.
‡§† Robert Owen	(Owen, 1892)	T.	L.
T. Wilkins	(Owen, 1894)	M.	M.
†*Charles Davis	(N. Davis, 1893)	D.	E.

Raiser and Year.		Height.	Season.
YELLOW.			
†Amiral Avellan	(Calvat, 1895)	D.	E.
A. H. Fewkes	(Hatfield, 1893)	D.	M.
*‡†Edith Tabor	(Notcutt, 1896)	T.	M.
Golden Gate	(Japan, 1893)	T.	L.
H. L. Sunderbruch	(F. Walz, 1894)	M.	M.
*‡†Modesto	(Nathan Smith, 1896)	M.	M.
‡†Mons. Panckoucke	(Calvat, 1893)	M.	M.
†Sunflower	(Cannell, 1888)	M.	M.
†§Oceana	(Australia, 1896)	M.	M.
†Pallanza	(Ironside, 1895)	M.	E.
‡†Phœbus	(Lacroix, 1893)	M.	M.
Sir E. T. Smith	(Pitcher & Manda, 1894)	M.	M.
W. H. Lincoln	(Japan, 1890)	D.	E.
CRIMSON.			
†C. Shrimpton	(Seward, 1892)	T.	M.
*‡†E. Molyneux	(Cannell, 1886)	M.	M.
†Richard Dean	(Owen, 1894)	M.	M.
William Seward	(Seward, 1893)	D.	E.
ROSE.			
*G. C. Schwabe	(Owen, 1892)	M.	M.
†International	(America, 1894)	M.	M.
†Mrs. C. Harman-Payne	(Calvat, 1892)	M.	M.
†Mrs. Hume Long	(Godfrey, 1896)	M.	M.
†Mons. Chenon de Leché	(Calvat, 1895)	D.	M.
Reine d'Angleterre	(Calvat, 1895)	M.	M.
PALE YELLOW.			
‡†A. H. Wood	(Cannell, 1896)	D.	E.
‡†Australian Gold	(Calvat, 1896)	D.	M.
Duchess of York	(Carruthers, 1895)	M.	M.
*†G. J. Warren	(Warren, 1897)	T.	M.
John Seward	(Seward, 1896)	M.	M.
Lady E. Saunders	(Cannell, 1894)	M.	M.
PINK.			
Eda Prass	(Dorner, 1891)	M.	M.
§†Good Gracious	(Henderson, 1893)	M.	M.
Lord Justice Lopes	(Wells, 1896)	D.	M.
§†Louise	(Calvat, 1892)	D.	E.
Madame C. Capitant	(Calvat, 1893)	T.	M.
Madame M. Ricoud	(Calvat, 1893)	M.	M.
Madame Rozain	(Boucharlat, 1893)	D.	L.
Mrs. E. G. Hill	(Hill & Co., 1894)	M.	E.
‡†Mrs. H. Weeks	(Weeks, 1896)	M.	M.
*‡†Mrs. W. H. Lees	(Pitcher & Manda, 1894)	T.	M.
§†Rose Wynne	(Owen, 1893)	M.	M.
*‡†Viviand Morel	(Lacroix, 1891)	M.	E.
§‡†Viscountess Hambledon	(Owen, 1892)	D.	M.
‡†*Pride of Exmouth	(Godfrey, 1896)	M.	M.
Madame Octavie Mirbeau	(Crozy, 1891)	D.	M
Puritan	(Waterer, 1887)	M.	M.
TERRA-COTTA.			
‡†Col. W. B. Smith	(Spaulding, 1892)	M.	M.
Dorothy Seward	(Seward, 1896)	M.	M.
†Hairy Wonder	(Pitcher & Manda, 1894)	M.	M.
Mrs. C. Wheeler	(Waterer, 1885)	D.	M.
AMARANTH.			
‡†Australie	(Cannell, 1896)	M.	M.
Commandant Blusset	(Calvat, 1893)	M.	E.
§†Duke of York	(Keane, 1893)	M.	M.
Deuil de Jules Ferry	(Calvat, 1894)	M.	M.
Mrs. E. W. Clarke	(Craig, 1888)	D.	L.
§*‡†Pride of Madford	(Australia, 1895)	M.	M.
Silver King	(Shea, 1893)	T.	M.
RED.			
Elmer D. Smith	(E. G. Hill & Son, 1891)	M.	M.
Eva Knowles	(Owen, 1894)	T.	E.
Henri Jacotot Fils	(Calvat, 1893)	M.	M.
Le Moucherotte	(Calvat, 1895)	M.	M.
Madame E. Capitant	(Calvat, 1896)	M.	L.
†Miss Dorothy Shea	(Shea, 1893)	M.	M.
Mons. Georges Biron	(Calvat, 1893)	D.	M.
§Mons. Demay Taillandier	(Calvat, 1895)	D.	L.
Mrs. A. G. Hubbuck	(Jones, 1896)	D.	M.
PURPLE.			
C. Harman Payne	(Calvat, 1895)	M.	M.
‡†Etoile de Lyon	(Boucharlat, 1888)	M.	M.
§Miss Ethel Addison	(Pitcher & Manda, 1894)	M.	M.

FIFTY INCURVED VARIETIES.

REFERENCES.—*Heights*: D. dwarf, M. medium, T. tall. *Seasons*; E. early, M. mid-season, L. late. Twelve best varieties *; Twenty-four best varieties †.

LILAC.			
Alfred Lyne	(Lyne, 1888)	M.	M.
Alfred Salter	(J. Salter, 1856)	T.	M.
*†Brookleigh Gem	(Cawte, 1892)	M.	M.
Empress Eugénie	(Pethers, 1865)	M.	M.
†Lord Rosebery	(Owen, 1893)	M.	M.

Raiser and Year.		Height.	Season.
YELLOW.			
*†Charles H. Curtis	(Jones, 1895)	M.	M.
D. B. Crane	(Jones, 1895)	D.	M.
†Mme. Darier	(Sautel, 1890)	M.	M.
Mrs. Norman Davis	(Mizen, 1886)	D.	L.
*†Mrs. Robinson King	(Hotham, 1891)	M.	M.
M. P. Martignat	(Hoste, 1892)	D.	E.
†Golden Empress of India	(Loader, 1877)	M.	M.
WHITE.			
*†Empress of India	(Downie, Laird, & Lang, 1861)	M.	M.
†James Agate	(Jones, 1894)	T.	M.
†Jeanne d'Arc	(Lacroix, 1881)	M.	M.
Lord Eversley	(Wildsmith, 1887)	D.	L.
Mrs. Heale	(Heale, 1867)	T.	M.
*†Princess of Teck	(Pethers, 1868)	D.	L.
PALE YELLOW.			
John Doughty	(Doughty, 1881)	T.	M.
*†Lord Alcester	(Freemantle, 1882)	M.	M.
†Major Bonaffon	(Dorner, 1894)	M.	L.
Miss M. A. Haggas	(Hayes, 1888)	T.	M.
Mrs. W. Shipman	(Shipman, 1878)	D.	E.
MAROON.			
†C. B. Whitnall	(E. G. Hill & Son, 1892)	D.	L.
MAUVE.			
*†Robert Petfield	(Owen, 1893)	M.	M.

Raiser and Year.		Height.	Season.
BRONZE.			
Barbara	(J. Salter, 1869)	D.	M.
Bonnie Dundee	(Owen, 1896)	M.	L.
Charles Gibson	(Mizen, 1887)	M.	L.
*†Globe d'Or	(Bruant, 1894)	M.	E.
†Lady Dorothy	(Bress, 1887)	M.	L.
William Tunnington	(Owen, 1893)	D.	M.
Golden Queen of England	(J. Salter, 1859)	M.	M.
PINK.			
*†Hero of Stoke Newington	(Forsyth, 1873)	M.	L.
†Mrs. R. C. Kingston	(Surman, 1895)	T.	M.
Novelty	(Clark, 1860)	M.	M.
*†Queen of England	(J. Salter, 1847)	M.	M.
RED.			
Baron Hirsch	(Owen, 1892)	M.	E.
George Haigh	(Owen, 1896)	M.	M.
*†Lord Wolseley	(Orchard, 1883)	T.	E
Lucy Kendall	(Kendall, 1893)	M.	M.
Nil Desperandum	(Smith, 1862)	M.	M.
Owen's Crimson	(Owen, 1896)	M.	E.
Robert Cannell	(Cannell, 1889)	M.	M.
†John Fulford	(Owen, 1895)	D.	M.
ROSE.			
Lady Hardinge	(Clark, 1861)	D.	E.
†Miss Violet Tomlin	(Doughty, 1888)	T.	M
†Mrs. S. Coleman	(Russell, 1889)	T.	M.
Mons. R. Bahuant	(Hoste, 1890)	M.	E.
*†Princess of Wales	(Davis, 1864)	M.	M.

TWELVE REFLEXED VARIETIES.

REFERENCES.—*Heights*: D. dwarf, M. medium, T. tall. Six best Reflexed †; Six best Large Anemone ‡; Twelve best Japanese Anemone and Pompons *.

WHITE.
Clara Jeal. M.
†White Christine. D.

PINK.
†Dr. Sharpe. D.
Peach Christine. D.
Phidias. M.
†Pink Christine. D.
†Cullingfordi. D.
†King of Crimsons. M.
Putney George. M.
R. Smith. M.

YELLOW.
†Chevalier Domage. D.
Golden Christine. D.

TWELVE LARGE ANEMONE VARIETIES.

PINK.
Cincinnati. M.
‡Empress. T.
Junon. D.

YELLOW.
Gladys Spaulding. D.
‡Gluck. D.
Miss Annie Lowe. T.
‡Mons. Charles Lebocqz. M.

WHITE.
Fleur de Marie. D.
Lady Margaret. T.
‡Mdlle. Nathalie Brun. M.

RED.
‡Descartes. M.

ROSE.
‡Mrs. Judge Benedict. M.

Eighteen Japanese Anemone Varieties.

White.
*Caledonia.

Pink.
*Judge Hoitt. T.
*Rider Haggard.
*Sir Walter Raleigh. M.

Rose.
*Enterprise. M.
*Madame Lawton. M.
M. Dupanloup.
Sœur Dorothée Souillé. D.
*W. W. Astor.

Yellow.
*John Bunyan. M.
*Queen Elizabeth.

Lilac.
Fabian de Mediana. M.
Minnie Chate. M.
*Owen's Perfection.
Jeanne Marty. M.

Purple.
*M. Panckoucke. M.
*Nelson. M.

Red.
*Ratapoil. M.

Twenty-four Pompon Varieties.

White.
Cedo Nulli.
La Pureté.
*Mdlle. Marthe.
Maid of Kent.
*Marabout. D.

Yellow.
Cedo Nulli. D.
*Golden Mdlle. Marthe. D.
*Nellie Rainford. D.
Prince of Orange. M.
St. Michael. D.
*Wm. Westlake. M.

Bronze.
*Florence Carr.

Crimson.
*Black Douglas. D.
Eleonore. D.
*Kyrle Bellew.
*Perle des Beautés. M.
President. T.

Lilac.
Adele Prisette. D.
Cedo Nulli. D.
*Mdlle. Elise Dordan. T.

Rose.
Pygmalion. M.
Rose d'Amour. M.
*Rosinante. D.
*Trevenna. M.

Twelve Anemone Pompons.

Yellow.
Antonius. D.
Astarte. M.
Eugène Laujoulet. D.

White.
Emily Rowbottom. D.
Madame Montels. D.
Madame Sentir. D.

Lilac.
Bessie Flight. M.
Marie Stuart. M.
Sidonie. D.

Pink.
Aglaia. M.
Marguerite de Coi. M.

Red.
Calliope. M.

Twelve Large Single-Flowering Varieties.

Pink.
America. T.

Rose.
May Jeal.

White.
Florence. M.
Jane. D.
Mrs. A. E. Stubbs. M.
Purity. M.

Yellow.
Admiral Sir T. Symonds. T.
Charming. M.
Golden Star. M.
Yellow Jane. T.

Crimson.
Rev. W. E. Remfrey. M.

Red.
D. Windsor. T.

Twelve Small Single-Flowering Varieties.

White.
Mary Anderson. D.
Pattie Penford. M.

Pink.
Emily Wells.
Ethel Smith.
Miss Rose. M.
Mrs. D. B. Crane. D.
Mrs. Langtry. D.

Yellow.
Buttercup. M.
Miss Annie Holden. D.

Brown.
Miss Crissey.

Red.
Scarlet Gem. D.

Terra-Cotta.
The Echo. D.

Forty-Eight Chrysanthemums for Specimens.

12 Japanese.

W. H. Lincoln, yellow.
Sunflower, golden yellow.
Etoile de Lyon, rosy purple.
W. Quicker, pink.
Col. W. B. Smith, terra-cotta.
Gloire du Rocher, amber.
Margot, rosy salmon.
Charles Davis, rosy bronze.
Viviand Morel, mauve.
Elaine, white.
J. Shrimpton, crimson scarlet.
Mdlle. Lacroix, white.

12 Incurved.

Mrs. G. Rundle, white.
Mrs. Dixon, orange yellow.
G. Glenny, pale yellow.
John Salter, cinnamon red.
Prince Alfred, rose-carmine.
Lord Wolseley, bronze red.
Barbara, amber.
Prince of Wales, purple.
Mrs. Sharpe, rose pink.
Lord Derby, dark purple.
Lord Alcester, primrose.
Baron Hirsch, golden buff.

6 Reflexed.

Golden Christine, fawn yellow.
Mrs. Forsythe, white.
Dr. Sharpe, purple magenta.
Pink Christine, pink.
Elsie, canary yellow.
King of Crimsons, crimson.

6 Pompons.

Mdme. Marthe, white.
Golden Mdme. Marthe, yellow.
W. Westlake, golden yellow.
William Kennedy, crimson amaranth.
President, rosy crimson.
Mdlle. Elise Dordan, pink.

6 Anemone Pompons.

Antonius, golden yellow.
Emily Rowbottom, white.
Marie Stuart, pink and yellow.
Mdme. Moutels, white and yellow.
Firefly, bright scarlet and yellow.
Magenta King, magenta.

6 Single-Flowered.

Florence, white-shaded rose.
Admiral Sir T. Symonds, yellow.
Mary Anderson, blush white.
Jane, white.
Rev. W. E. Remfrey, crimson.
Miss Annie Holden, canary yellow.

CINERARIAS.

The florists' cineraria, as represented by varieties now so popular among gardeners, originated from Cineraria cruenta, a tall-growing, purplish-flowering perennial species, introduced from the Canary Islands in 1777. In common with most other florists' flowers, the improvement effected in the strains of late years has been very remarkable. Instead of plants tall and loose in habit with small heads of starry flowers of the past, we now have compact, sturdy plants, with massive, stout, symmetrical blooms in colours most varied and well defined. This relates to the single varieties, a double-flowering section having been evolved from these in the usual way of variations from seed. The first so-called "double" cinerarias were unworthy of the name, and not till the full and globular variety, Mrs. Thomas Lloyd, was brought into prominence did the new section gain much attention. Even now the plants are considered to be so heavy in appearance, that their cultivation is by no means general, and only those varieties of compact growth and producing branching heads of perfectly globular flowers should be preserved. A typical single-flowering cineraria is portrayed in Fig. 1, next page.

Cinerarias from Seed.

Owing to the ease with which superior single cinerarias can be raised from seed obtained from a reliable source, named varieties are rarely to be met with. If a display

is wanted late in the autumn or much before Christmas, seeds should be sown in April or May; for prolonging the season sow in June or July. Prepare shallow pans by draining and filling with fine sandy soil, pressing this down evenly and forming a perfectly level surface. Give a gentle, yet thorough watering, and three or four hours later sow the seeds thinly, scarcely covering them with sifted soil. Place in a cold frame, rather than in dry heat, standing the seed pans on inverted flower pots, cover with squares of glass, over which spread brown paper, and close the frame. The soil must never be allowed to become dry; moisten as often as necessary with a fine-rosed watering-can or by partial immersion of the pans in a pail of water.

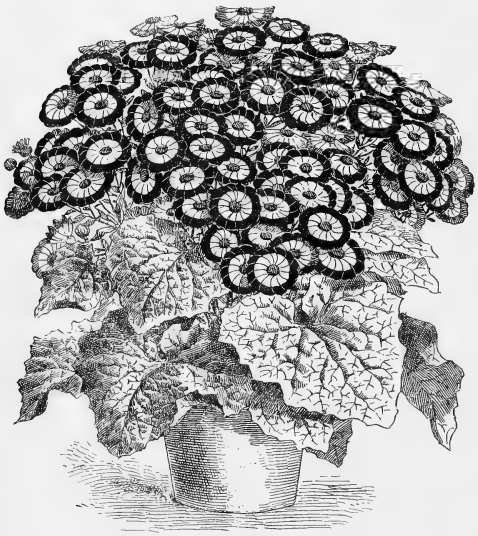

Fig. 1. CINERARIA.

Directly the seedlings appear remove the paper, but carefully shade from strong sunshine. Tilt the glass at first, wholly removing it before its retention causes the plants to become drawn or to damp off. When still quite small, transplant the more forward of the seedlings into other pans or boxes of soil, treating the rest similarly directly they are large enough to handle. Return them to cold frames, and shade from bright sunshine. They must not be left long enough in these pans to press against and spoil each other, but all should be placed singly in 3-inch pots or a size that will comfortably hold the roots. Before the hottest part of the summer is reached, cool quarters must be assigned to all cinerarias. Unduly exposing them to strong sunshine is responsible for the loss of many plants from a so-called disease. If space on the north side of a wall is not available, arrange the frames with a slope to the north, disposing the plants thinly on a bed of damp ashes and not far from the glass.

Before the pots become crowded with roots, transfer the plants from the small sizes into 6-inch pots, in which they may be flowered; but if larger plants are desired, another

timely shift ought to be given. For the smaller pots use a mixture of two parts loam and one part leaf soil, with sand added. A richer, coarser compost is desirable for the later shift. To two parts of roughly broken up fibrous loam, add one part each of dried and crushed cow manure, or partially decayed horse droppings, and leaf soil with a sprinkling of sharp sand and charcoal, adding also small potsherds if the loam is of a clayey nature. See that the plants are in a moist state at the roots before they are turned out of their pots and repot firmly, but not making the soil hard. Return the plants to the frames and allow them ample room to develop from the first, or objectionably long leaf stalks will result. Keep the frame somewhat close for a few days, but air must be freely admitted in time to prevent a weakly growth. The base on which they stand must be kept moist in bright weather. Removing the sashes on clear still nights in summer enables the plants to be invigorated by the dew.

Cinerarias, though delighting in coolness and moisture during the summer, are tender plants, and therefore best kept in greenhouses during the winter. Light, slate-covered staging suits them well; if the stages over hot-water pipes are only latticed, cover heavily with fresh moss as a cool, damp base for the plants, for they cannot stand direct fire heat. Cinerarias may be mixed with other kinds of plants when in flower, but ought to be arranged quite by themselves up to that period, and not crowded. Never allow the leaves to flag through want of water, and supply liquid manure after the flowering pots are well filled with roots. Safe and good liquid food can be obtained by soaking a bag each of sheep's droppings and soot in a tub of water, diluting the strong solution with sufficient clear water to give it the colour of rather weak tea. Renew the enriching matter in the tub every three weeks. Though cinerarias are essentially greenhouse plants, they may be forwarded in gentle heat, but give the most satisfaction when flowered in a house where only sufficient fire heat is provided to exclude frost, coupled with careful ventilation, to prevent damping.

Double-flowered Cinerarias.

Named varieties of these can be obtained in different colours, but excellent varieties are raised from seeds by following the routine above described. If any of them are considered worthy of it, they may be preserved and propagated by offsets. To obtain these, cut down the plants immediately the flowers fade and either place them out of doors on a bed of ashes in a cool position, or turn out of the pots, rub off a little of the old soil, and plant somewhat deeply in a bed of rich light soil in a cold frame, or even

in a cool shaded border in the garden. They must not be allowed to get dry, and as the offsets become strong and form roots, carefully detach them with a sharp knife, securing all the roots possible. Place singly in small pots and from that time forward treat exactly the same as seedlings. Single varieties can be perpetuated in precisely the same way. Plants raised from offsets do not grow so strongly as seedlings and the majority flower satisfactorily in 5-inch pots.

Insect Pests.

A form of Aphis, or green fly, is the principal enemy of the cineraria. If permitted to infest the plants, especially when they are in flower, they soon become objects of pity instead of beauty. They never become infested if properly managed. If grown on a bed of damp ashes in cool frames, adequately, yet judiciously watered, also otherwise as previously described, there will probably be no green fly on the plants when housed; but if one insect is discovered on any of the plants or on other occupants of the house, at once fumigate gently with tobacco on two consecutive evenings. A dense volume of smoke may do injury. Vapour cones or vapourised nicotine are preferred by some cultivators. By having recourse to those measures, early and periodically, the plants will be kept clean and reward the cultivator with handsome leaves and delightful flowers in infinite variety over a considerable period. No mistake is so great as permitting insects to gain the ascendancy, before repressives are resorted to, as then much mischief will have already been done and a complete clearance of the pests can only be effected by applications so strong as to injure the plants. A leaf mining grub is troublesome in some gardens. Directly these commence feeding on the fleshy portion between the skins of cineraria leaves, crush them with the finger and thumb, or disfigurement of the plant is inevitable. Both the small fly that deposits the eggs, and the resulting grubs may be destroyed on plants under glass by means of nicotine vapour.

CYCLAMENS.

A charming genus of Primulaceous plants, the name being derived from their circular bulb-like corms. There are several hardy kinds, all more or less attractive, but the most popular of all is the tender species, C. persicum, as represented by the numerous beautiful varieties ranging in colour from snow white, through the various shades of rose, pink, lilac, purple, to glowing crimson. The original species was introduced to this country from Cyprus, in 1731. Not, however, till greatly improved by

the well-directed efforts of florists, did the value of cyclamens become fully appreciated, their culture only becoming general during the past twenty years. Even now too few plants are grown, this being due to so many failures having occurred owing to faulty methods of cultivation. No more serviceable winter-flowering plant can be named. The season commences in October, and extends to March and April, some of the varieties producing flowers during the greater part of that time. Well-grown plants are

Fig. 2. Raising and Growing Cyclamens.—Faulty Practice.
a, crowded seedlings; *b*, spindled plant; *c* and *d*, unsatisfactory growth.

charming, both foliage and blooms being attractive, and in a cut state the latter are good for vases, bouquets, and other kindred purposes.

Raising the Plants.

Cyclamens are raised from seed only, and experts attach far more importance to the way in which this is sown than does the average gardener. Raising the plants thickly in pots or pans is the greatest initial mistake that can be made. There must be no

breaking of cyclamen roots, and no moving the tiny plants without soil adhering to the roots at any time, but if they are raised thickly, as shown at Fig. 2, they cannot possibly be moved otherwise than as shown at *b*, page 11.

The proper way to sow cyclamen seed is as follows. Prepare shallow pans by draining in the usual way and filling with a mixture of rather light loam, leaf soil, and sand, making this firm and level. Press the seed into the soil singly, and $1\frac{1}{2}$ inch apart, lightly covering with fine soil. Place the pans in a moist warm house or pit, having a

Fig. 3. Raising and Growing Cyclamens.—Correct Methods.
e and *f*, sturdy seedlings; *g* and *h*, satisfactory growth.

temperature of 50° to 60°, water, cover with squares of glass and shade heavily. Keep the soil constantly and uniformly moist, and directly the seedlings appear, remove first the shading and then the glass.

Before the first leaves become drawn, raise the pans well to the light, see that the plants never become dry at the roots, and afford light syringings occasionally, which do much good. New seed is the earliest to germinate, and sowing in October, instead of waiting till January or February, results in finer plants. The most important essential is to keep the plants steadily growing both at the roots and above ground. If this cannot be done in the case of all autumn-raised seedlings—and all gardeners have not the

same facilities as market growers—then it is better to sow early in January. The plant represented in Fig. 3 (*h*), drawn from life, was one of many obtained by sowing seed early in January, but finer specimens were the outcome of sowing in October—none of them having at any time received a check to free progress.

In every case remove the seedlings out of the pans when the second leaf is as forward as that shown at (*f*) Fig. 3. Do this with the point of a label, breaking few or no roots and saving as much soil as possible with them. Place them in 3-inch pots, using soil similar to that recommended for the seed pans and not potting very firmly. A mistake too often made is in arranging newly potted cyclamens on a warm, dry shelf, with the result that they suffer from the absence of humidity, the corms hardening and the leaves failing to develop. Once they get into this stubborn condition it is a difficult matter to restore them to health. Cyclamens should either be well grown or left alone altogether, those stunted starvelings that are so often seen being the reverse of attractive.

The newly potted seedlings ought to be arranged on a light staging covered with either cocoa-nut fibre refuse, ashes or moss, which should be kept constantly moist. On bright days, spray the plants every morning and again early in the afternoon; also afford light shade. The temperature may range from 50° to 65°, and there should be no great increase on these figures. Shallow frames or pits and a mild hot-bed answer well for the plants, and that is why many gardeners are in favour of January sowing; but trade growers, being in a position to devote proper house-room to the growth of young plants through the winter, sow in the autumn.

At *c*, Fig. 2, is shown a young plant that has resulted from moving (*b*) out of a crowded seed pot. Already it is a long way behind a plant of similar age (*g*), Fig. 3, and the chances are that it will never become much better than the plant shown at *d*, page 11. Those moved out of pans without breaking the roots may be safely placed in 3-inch or a size larger pots, and directly the soil is well occupied with roots, the next or final shift should be given. The strongest plants may be transferred to 6-inch pots, and the remainder, probably the majority, will only need the 5-inch size. A very rich compost is not desirable, abundance of flowers rather than a wealth of large leaves and a meagre display of blooms being the aim of good cultivators.

To three parts of the best moderately strong loam, preferably fibrous, add one part of each of leaf soil and powdered cow manure, with enough sharp sand and ashes from a slow garden fire to keep the mixture porous. When potting, the corms must not be wholly buried nor unduly raised, but may show just above the soil. Make the new

soil moderately firm, finishing off neatly. Some trade growers return their plants to a warm house, arranging them on a moist base for a few weeks, or till they are strongly established in the fresh soil, but as the final shift is seldom given before May, June, or as late as July, cool shallow pits and frames may be utilised at that time for their growth. A nearly exhausted hot-bed answers well, or a shallow mild bed might be formed, and covered with ashes for them. Bottom heat is not indispensable, but helpful.

Unless space is limited, avoid setting the plants closely together, and thin them out freely before they crowd each other, or the leaf stalks will become unduly long. Keep them close for a week, spray at least twice on clear days, and shade from strong sunshine, not watering till the fourth or fifth day after potting. Frames and pits facing west are the best adapted to the preparation of cyclamen plants, and light shade should be afforded in the afternoons of bright days. When growing strongly the plants must have a moderate amount of air, but guard against inrushes of cold winds. The leaves must never be allowed to flag through want of water. Frequent syringings are beneficial, and a humid atmosphere indispensable to free growth. If extra fine plants are desired, the more forward in the 5-inch size may be shifted into 7-inch pots before they become root-bound. The soil when used must always be sufficiently moist for compression.

Early flower buds ought to be pinched out, as it is unwise to permit the plants to flower before they are housed in October or November.

Treatment of old Corms.

Attempts to flower old corms are more often than not attended with indifferent results, and as a consequence the plants are usually thrown away immediately after flowering, reserving those only that are ripening pods of seed; yet one or two-year-old corms can be made to flower grandly the following season, though, as a rule, not so early as the younger plants. Instead of trying to save some of the old leaves, thoroughly dry the plants by laying them on their sides, if need be, in the full sunshine. They will stand a baking without losing their roots. Early in June set the pots containing the corms close together in a frame, moisten the soil, syringe frequently and keep the frame close. The majority of the corms will soon form numerous leafy growths, and may either be left much as they are in the pots, merely removing sour surface soil down to the roots, and top-dressing with rich compost, also applying liquid

manure freely; or the corms may be partially freed of soil, damaging the roots as little as possible, and be placed in pots a size larger than they were in before, using soil as recommended for the younger plants. Return them to frames or pits and treat similarly to the seedlings.

Planting out cyclamens is sometimes recommended, but in the case of old corms does not answer particularly well unless they are previously rested as already advised. They are liable to fail in hot and dry situations, and are best planted in beds of rich soil in frames on a mild hot-bed on the north side of a wall. With them may also be associated a portion of the newly raised plants, these not unfrequently succeeding admirably when planted out in frames. Treat in all other respects similarly to those grown entirely in pots, lifting carefully early in October, and placing in pots just large enough to hold the roots comfortably.

The Flowering Period.

Although the plants fail to grow well in a comparatively dry atmosphere, they must not have much moisture about them when in flower. Arrange them thinly on a light greenhouse staging not immediately over the hot-water pipes, and not in mixture with a variety of other plants. Maintain a gentle heat of 45° to 55°, according to external conditions, and open the top ventilators slightly during the warmest part of mild days. Attend carefully to the watering, pouring what is necessary round the sides of the pots rather than into the centres of the plants, damping off being the cause of many losses of flowering plants. A free use of liquid manure such as answers well in the case of cinerarias, is apt to result in the production of far too much foliage in cyclamens, at the expense of flowers, but enough may be applied in a mild form to keep strongly rooted plants in a robust state.

Never cut the flowers, but draw the stalks clean out of their sockets, as a preventive of decay. Treat decaying flowers and damaged leaf stalks in the same way. Flowers that expand during November and again in February are the most likely to give pods of seed, but these form at other times if the pollen is sufficiently dry for dispersion. Tapping the flowers towards mid-day is usually enough to effect fertilisation, or the pollen may be transferred from one flower to another with the aid of a camel's-hair brush. Allowing the plants to seed early seriously weakens them, and a few of the later flowers should be saved for the purpose, keeping the plants in frames and well looked after till the seeds are ripe.

Varieties.—Named varieties, of which there are many, come true from seed, always provided proper care is taken in keeping them together, and distant from other varieties at flowering time. There is also a tendency to doubling in some of the flowers—a doubtful improvement, while a new race with feathered or plumy segments seems on the point of evolution. With all these changes going on, no good purpose would be served in offering descriptions and selections; intending purchasers are therefore advised to procure seed of the best flowering strains, similar to those represented in a coloured plate which will be found on reference to the index.

Insect Pests.

Cyclamens are liable to be infested by red spider, thrips, and small green and black aphides. Keeping the young plants growing in a moist atmosphere, syringing and dewing them over as previously advised, are good preventives of red spider, and usually of thrips as well. The green and black fly prove the most troublesome, and unless the plants are kept free from the pests very little progress will be made. Ordinary fumigation with tobacco smoke does not reach the insects sufficiently to destroy many of them. The old remedy was to dip the plants in a decoction of quassia chips and soft soap, or tobacco water obtained by either soaking tobacco paper or shag tobacco in water and freely diluting, laying the plants on their sides and syringing them clean a few hours afterwards. Fumes of nicotine generated with the aid of a "vapouriser" is the latest and best preventive, and can safely be applied in pits and frames.

DAHLIAS.

The Dahlia (Dahlia variabilis) is a native of Mexico, and was first introduced to Europe by Vincentes Cervantes in 1789, who forwarded seeds to the Botanic Garden at Madrid. The plants raised from these seeds flowered the following year and were called Dahlias after Dr. Dahl, a Swedish botanist. In 1800 the new flowers were cultivated at Berlin, and in 1802 at the Jardin des Plantes, Paris. Little progress was made in their improvement until 1812, when Mons. Donckelaar, Louvain, succeeded in raising some semi-double flowers, and the next season obtained perfectly double ones. Seeds were also sent to England in 1789 by Lady Bute from Madrid, and in 1804 Lady Holland obtained more seeds from the same source; Lord Holland's librarian succeeded in flowering the three then known varieties, coccinea, crocea, and purpurea,

all single flowers. It was then that Lord Holland wrote to her ladyship, who was still at Madrid, the following lines, though they are not always attributed to him:—

"The Dahlia you brought to our Isle
Your praises for ever shall speak;
Mid gardens as sweet as your smile,
And colour as bright as your cheek."

It is rather obscure whether the double varieties of Mons. Donckelaar were imported into England, or whether our own florists succeeded in producing double flowers; but it was not until about 1830 that dahlias caught the public fancy, and societies became established to promote their culture; large sums of money were given for new varieties and shows were held all through the country.

Fig. 4. Cactus Dahlia.

The sole aim of raisers then, and for many years, was to produce flowers of the double type, all others being ruthlessly discarded, and in time the enthusiasm rather waned. About seventeen years ago a bold exhibitor submitted flowers of the old Dahlia coccinea (single) before the Royal Horticultural Society, and a certificate was granted for it; and soon afterwards single varieties in various colours became fashionable. Subsequently blooms of Dahlia Juarezii (named after Juarez, a Mexican President) were exhibited by Mr. Cannell of Swanley, before the same society and honoured; this, though a double variety, was totally unlike the symmetrical blooms of the florist with their round, smooth petals; for the florets of the new-comer were sharp-pointed like the rays of a double star or the petals of the large scarlet cactus; it then became known as the cactus dahlia, and the demand for it became great. New varieties were produced with rapidity, and the demand for cactus dahlias is still increasing. Their characteristics are well displayed in the illustration (Fig. 4), obligingly supplied by Messrs. Dobbie & Co., Rothesay.

The Pompon, or small double dahlias, are of German origin, but the varieties raised in England are so superior that few German varieties are cultivated here now. The Tom Thumb section of Mr. Girdlestone and Single Cactus types of Messrs. Dobbie & Co. are of quite recent introduction and have many admirers; with the advent of the single and cactus types the cultivation of the dahlia progressed by leaps and bounds, and there is no fear of these beautiful late summer and early autumn flowers, in their several forms, losing favour in a flower-loving country.

Fig. 5. Pompon Dahlias.
(*Dobbie & Co.*)

Description and Properties of Dahlias.

Dahlias are divided into several sections, the most important of which are classed as follows:—

Show Dahlias.—These include all the large double flowers that are self-coloured, or which have a dark edge on a lighter ground colour. The bloom should be of good size, globular, petals short and cupped, radiating from the centre, and smooth-edged; centre high, but not above the surrounding petals. Mrs. Gladstone is the most perfect type of a show flower.

Fancy Dahlias.—Similar to the shows as regards size and shape, but have two or more colours; the ground colour of the petals are either striped or splashed with other colours, as in the Reverend J. B. M. Camm, or the petals have a darker ground colour than the edge, in which case the flower is tipped, like Mrs. Saunders.

Cactus Dahlias.—Should be produced on long stalks, have full centres, the florets long, spiral and twisted, radiating from the centre. Lady Penzance (Fig. 4) is a good type.

Pompon or Bouquet Dahlias.—Flowers similar to the show and fancy type in shape, but of diminutive size; they should be about 1½ inches in diameter, have clear and well-defined colours, and be perfect in form. Bacchus is a fine example of the type.

Bedding Dahlias.—These are of the "show" type, selected for dwarfness in habit and free-flowering qualities for making an imposing display in gardens.

Single Dahlias.—Should consist of one row of florets, just overlapping each other, and each petal slightly reflexing, like Mrs. Henshaw.

Single Cactus Dahlias.—Like ordinary singles, should consist of one row of florets, each twisting in a spiral form and slightly incurving, like Ivanhoe.

Tom Thumb Dahlias.—Should have flowers similar to single dahlias, borne on stems 8 inches above the plant, which should be about a foot in height.

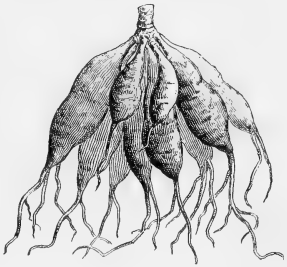

Fig. 6. Ground Root of Dahlia.

Propagation.

Presuming the tuberous roots (Fig. 6) have been well preserved from frost during the winter, and that there is a suitable place for starting them into growth, such as the front of a vinery, or propagating pit, or even a frame on a hot-bed, place the roots in soil early in January, leaving the crowns

Fig. 7. Dahlia Cuttings.

Gross hollow stems (*a*) useless; small solid stems (*b*) emit roots.

bare, give an occasional syringing with tepid water, and in a fortnight a good soaking of water. Strong shoots will then soon be produced; when these are four or five inches

long, throw them away, as the first shoots are usually hollow, and rarely emit roots. When the second shoots are about four inches long, take them off with a sharp knife, taking care not to injure the cluster of buds at the base. Cuttings about the thickness of a slate pencil root the best. Many persons think that only thick cuttings make good plants. This is quite a mistake, as they are often hollow. Thin, solid cuttings root far more quickly, and make the most satisfactory plants, see Fig. 7.

Prepare some 3½-inch pots, which fill with sweet soil, and surface with sharp sand; sever the cuttings close under a joint, then with a dibble insert them round the sides of the pot, taking care that the base of the cuttings rests on the soil, and make them firm, especially at the base. Write the name of each variety on a label as the cuttings are taken from the plant. A pot will hold half-a-dozen cuttings. As soon as they are inserted give a good watering and plunge the pots in bottom heat of 70 to 75 degrees. Shade immediately to prevent the leaves drooping, and in from fourteen to twenty-one days they will be transformed into plants supported by roots. They must then be gradually inured to endure the full sun, to harden them ready for dividing carefully and placing singly in 3-inch pots. Avoid a close atmosphere for the cuttings, always leaving, if possible, a little air on the house or frame. The secret of success rests in a warm bottom, cool top, and good shading.

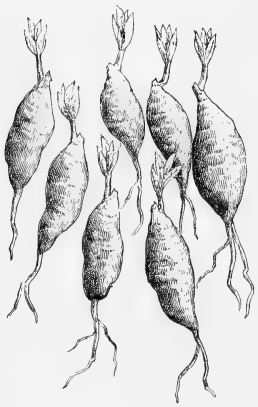

Fig. 8. Divided Dahlia Tubers. (Growing.)

If only a few plants are required, the cuttings may be taken off with a heel on them; this is wasteful, but they make roots quicker, and are more sure of having good eyes to start from the next season; those cut below a joint, and four inches long, will root freely, and make satisfactory plants.

If still fewer plants suffice, and there may not be suitable means for striking cuttings, split up the old roots, when started into growth, and place the divisions (Fig. 8) singly in 4½-inch pots, shortening any tubers that are too large for the pot, place them in a warm frame or house, and gradually harden off. Planting several tubers together results in crowded growths and indifferent blooms. Plants from cuttings are the best for producing exhibition blooms.

After the cuttings have been rooted a week they will be ready for placing singly

in 3-inch pots; use good soil, return the plants to a warm house or pit, and shade for a few days, then gradually harden by free, yet judicious ventilation. Early in May transfer to 6-inch pots, and arrange the plants in a cool frame, removing the sashes on favourable days, but replacing at night, also covering with mats if there are any signs of frost. The plants will then assume a sturdy habit. This is important, as if they are unduly weakened in the young state, they never make satisfactory plants.

Dahlias may be raised from seeds sown in pans on a hot-bed in March, the seedlings transplanted in boxes of fine soil, and subsequently placed singly in 3-inch pots. The plants if treated as advised for others will flower the first season.

Preparing the Ground and Planting.

In the autumn or early spring, the ground selected for growing double dahlias should be given a good coating of manure, and be well dug two feet deep. The most suitable soil is strong loam, but all the other sections succeed on poorer soil.

Fig. 9. Young Dahlia Plants.
a, from a cluster of tubers; *b*, from a cutting.

The last week in May in the south of England, and early in June in the north, is the best time for planting in the open. Drive stakes (1½ inches square is a suitable strength) into the ground 5 feet apart one way and 4 feet another; make an excavation 1 foot deep, about 2 feet across, break up the bottom, add some good soil and decayed manure, and place the plant in; break up the soil well before filling in, and make moderately firm with the foot; tie the plant to the bottom of the stake, the label on the top, and mulch with manure two feet round the plant. This prevents evaporation from the soil, and also feeds the plant when water is applied. If the weather is dry sprinkle the plants every evening with clear water. A sharp look out must be kept for slugs, a dusting of lime around the stem, but not touching it, is a good preventive, but catching them at night is the surest mode of riddance.

Training, Thinning, and Supporting.

When the side branches issue from the main stem, drive in four stakes slanting outwards, and select four shoots nearest the soil for securing to them. Thinning and disbudding must be left to the discretion of the grower. A small-flowered and weak-growing variety must have the growths well thinned out and also several buds removed, but with strong growers like Arthur Ocock, and Reverend J. B. M. Camm, only slight disbudding will be required. If the weather is at all dry, water must be given regularly and copiously, both over the leaves and to the roots.

Fig. 10. Dahlia Plant.
The result of *a*, Fig. 9.

Protecting the Blooms.

When the buds show colour, it is advisable to place them in muslin bags, 7 inches by 5 inches, tied round the stem. This prevents earwigs and caterpillars injuring the blooms. The bags require moving every few days to see how the blooms are progressing. Many devices have been adopted for protecting the blooms from the sun and rain. An easy method is to nail a flat board 1 foot square on the top of a stout stake, and place it firmly in the ground in a slanting position. Round tin shades can also be bought with glass tops, that slide up and down a square stake, which allows of their being altered to suit the height of the flower. In a similar way wooden stands are provided with a slit for the flower-stem, and the bloom covered with a pot, see Fig. 11. The tipped fancy dahlias and light show varieties are improved by being placed under a 6-inch pot for a few days previous to the show. Small pots, containing a little dry hay or moss, inverted on the stake, form excellent traps for earwigs.

The foregoing remarks apply to the show and fancy section, when grown for exhibition; if the plants are required for garden decoration, they should be treated similarly to the cactus varieties.

Cactus, Pompon, and single dahlias require to be planted in the same way as the Shows, but not on such rich ground. They should be mulched, watered, and well

staked. If blooms of the cactus type are wanted for exhibiting, the growths and buds must be well thinned, the blooms also sheltered from wet, and any leaves that touch the flowers removed to prevent bruising. Pompons, single, and single cactus dahlias, only require three stakes placed 24 inches from the centre stem, and some soft material tied round them. The plants will fill this space and become a mass of flowers.

Lifting and Storing.

About the middle of October the plants will probably be blackened by frost; as soon as they are hopelessly spoiled, cut the tops off to within six inches of the ground and raise the roots with a digging fork, tying the label on with wire or tarred twine. Remove all loose soil, and leave the roots on the ground, stem downwards, until the afternoon. If a greenhouse is available carry the roots in and place them on a stage for a few days to dry. They will winter well if placed in shallow boxes and partly covered with cocoa fibre, ashes, or very dry soil. Place in a dry position, free from frost. Look them over occasionally during the winter and cut away any decaying stems or tubers, dressing the wound with lime or dry wood ashes. If the grower propagate his own plants, it is advisable to keep three or four plants of a sort in small pots all the summer: these can be laid on their sides in a dry place during the winter, and are safe to keep, whilst the open ground roots are uncertain.

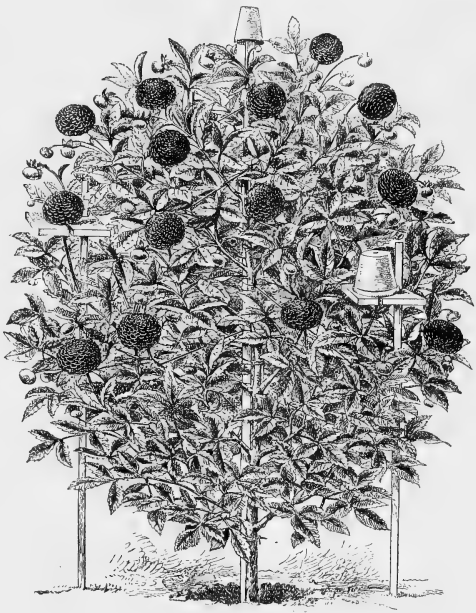

Fig. 11. Show Dahlia Plant.
Result of *b*, Fig. 9.

Exhibiting Dahlias.

Double dahlias are exhibited on perforated boards containing tubes of water.

Boards 24 inches long, 18 inches wide, supported on legs 9 inches high at the back, 3 inches high in front, accommodate twelve blooms; holes one inch in diameter and six inches apart. The boards are painted a dark olive green, and varnished or enamelled. Travelling cupboards must be provided into which they will fit, for it is advisable to stage the blooms at home. Cut them early in the morning or late in the evening, and convey them very carefully to a cool place; draw the stem of the flower through a wood or cork plug 3 inches long and wedge the stem at the bottom of the plug with a slice of turnip or rhubarb; then place the stem with one inch of the wood in a tin tube 3 inches long, filled with water, and fix in the board. Remove any deformed petals with a pair of ivory tweezers and carefully arrange any that have become displaced.

In arranging on the show-board, place the largest flowers at the back and the best blooms and most striking colours at the end of the stand; avoid violent contrasts, and blend the colours tastefully. Single blooms of the cactus varieties are often shown in this way, but the usual plan is to arrange them in a spray or bunch of six or ten flowers made as follows. To make a bunch for exhibition select the requisite number of blooms, and twist a wire carefully, without bruising, around the stem; then take a flower stick and place some green moss on it; start with a piece of dahlia foliage, then take the flower with the longest stem and secure to the stick; add two more below this and then three under them, if ten blooms are wanted add four more. Each flower must stand quite apart from the others; add some dahlia buds to give a light appearance and back with foliage—sphagnum moss is the best to use as it absorbs enough water to keep the spray fresh for two or three days. The same plan is applicable to the pompon and single varieties.

Place the bunches in brown vases, raising the rows behind well above those in front. Each bunch should be named on a slip of cardboard 3 inches by 1 inch, these being placed in slits at the end of thin green sticks. Double dahlias are best named on slips of thin cardboard, 2 inches by ½ inch, secured to the water tube by thin green twine and laid on the board in front of the blooms.

Selection of Varieties.

New varieties of Dahlias are being raised every year, and those cultivators who desire to be up-to-date must annually procure catalogues of those florists who devote special attention to the flowers. Only meritorious varieties will be mentioned, arranging where practicable under the prevailing colours.

Forty-Eight Show Dahlias.

White.

*John Walker
Herbert Turner
*Flag of Truce

Light.

*Mrs. Gladstone
Kathleen
Miss Cannell
*Majestic
Shottesham Hero
†Maud Fellowes
Virginale
Mrs. G. Rawlings
Ethel Britton
Mrs. Harris

Yellow.

*R. T. Rawlings
John Hickling
†Yellow Globe
Esmond
†William Powell
Mabel Stanton
Goldfinder

Purple and Lilac.

†James Cocker
James Vick
*Harry Keith
†Prince of Denmark
†Earl Ravensworth
*William Rawlings
†John Rawlings
Mrs. Glasscock
Shirley Hibberd
Clara
George Rawlings

Scarlet.

Eclipse
*W. H. Williams
†Willie Garratt
Glowworm
†Duke of Fife
Crimson King
*Arthur Rawlings

Orange Shades.

†Arthur Ocock
*Vice-President
James Stephen
*Colonist
*Henry Walton
Penelope
†Perfection
*Duchess of York
Cherub
†Mrs. Foster

Twenty-Four Fancy Dahlias.

*Mrs. Saunders
Gaiety
*Rev. J. B. M. Carm
*Mrs. J. Downie
*Frank Pearce
*Duchess of Albany
Henry Eckford
*Matthew Campbell
Chorister
*Mrs. N. Halls
Peacock
*George Barnes
*Hugh Austin
Rebecca
*Edmund Boston
S. Mortimer
Mrs. Ocock
*Sailor Prince
John Forbes
Lottie Eckford
*Dandy
Dazzler
Golden Fleece
Flora Wyatt

Forty-Eight Pompon Dahlias.

White.

*George Brinckman
†Purity
Lady Blanche
*White Aster
Dora

Purple.

Little Dorrit
*Midnight
Little Darkie
*Captain Boyton
†Othello

Scarlet.

*Bacchus
†Mars
Martial
Vivid
Sunshine
Gem
Little Jack
*Red Indian

Orange.

†Fashion
*Fabio
Rowena
Phœbe
*Sunny Daybreak
H. E. Searle

Tipped.

†Admiration
*Leila
Little Duchess
†Irene
Hilda
Katie Parnham
†Little Princess
Madge

Yellow.

Golden Gem
*Emily Hopper
Whisper
†E. F. Junker
Sovereign
Mary Kirk
†Flora
Florence Woodland

Lilac or Pink.

*Nerissa
†Lilian
†Rosea
Eva
*Grace
Hector
†Rosebud
Hebe

* Best. † Next Best.

Forty-Eight Cactus.

White.
†Mrs. F. Fell
Mrs. Peart
*Miss Webster
Delicata
The Queen

Maroon.
*Chas. Woodbridge
†Matchless
Arthur Cheal
Marquis
*Harry Stredwick
Regulus

Yellow.
*Lady Penzance
†Mrs. Barnes
*Bridesmaid
May Pictor

*Mrs. Kingsley Foster
†Harmony
Blanche Keith
Countess of Gosford
†Mabel Keith
Mrs. L. Seymour

Salmon.
Man Hillier
†Iona
*Fusilier
†Mrs. Broughton Stirling
Mrs. Gordon Sloane
*Mrs. Wilson Noble
Mrs. A. Beck
Royal George
†Princess Ena

Scarlet.
*Cycle
†Gloriosa
*Starfish
†Miss A. Jones
*J. E. Frewer
Bertha Mawley
Ernest Cannell
†Mayor Haskins
Endymion
Mrs. Montifiore
Miss Nightingale

Purple.
Purple Prince
Leonora
Beatrice
*Cinderella
Earl Pembroke
†Valkyrie
Ernest Glasse

Twenty-Four Single Dahlias.

Light.
*White Queen
Kitty
Little Snow-white
Mrs. Conninck
*Miss Henshaw
Florrie Fisher

Yellow Shades.
*Golden Locks

Yellow Satin
Miss Roberts
Lutea grandiflora
Aurora
*James Scobie
*Willie Fyfe
*Naomi Tighe
*Polly Eccles
Annie Hughes.

Dark.
*Amos Perry
*Mrs. Henshaw
*Duke of York
Demon
*Trilby
Cetewayo
*Nellie
Formosa

Twelve Single Cactus.

Queen Mary
Alice Lee
Ivanhoe
Sir Walter

Meg Merrilees
Brenda
Lady Rowena
Bruce

Pirate
Novar
Marmion
Althéa

* Best. † Next Best.

THE DELPHINIUMS.

Among the hardy flowers which owe so much of their perfect beauty to the art of the florist, there are few so stately and imposing as the delphinium. The noble hybrid larkspurs, which belong to the natural order of ranunculaceæ, are understood to be the offspring of about a dozen species; formosum, grandiflorum, cheilanthum, and elatum being the principal of these. The hybrids which have been obtained by the union of these surpass their parents—attractive as these are—in stateliness and form, and recent years have seen great improvements in colouring, which give even greater

brightness to the flower. These have been secured by careful cross-fertilisation of the most perfect varieties.

The delphinium presents among its many species, a selection of which is given below, considerable range of colouring, but among the hybrid varieties, blues of numerous shades or purples were for years the only colours represented. Within the last few years, however, plants with white and creamy-white flowers have appeared among the hybrids, and we may thus confidently look forward to the introduction of new tints which will form delightful contrasts or harmonies with the others. The colouring of many of the blue delphiniums is superb. Almost pearl blues are found among them; while darker shades are numerous, many having an exquisite lustrous sheen on the sepals. What is generally known as the "eye" in the centre is wonderfully varied in colouring. Some plants have the eye white, others brown, and others black, and the fine new white one named Beauty of Langport has these centre petals of a pale yellow.

The form of the flowers is also to some extent diverse; single, semi-double, and double flowers occurring among these showy plants.

The various original species, some of which have not yet been used for hybridising, are also of considerable beauty, and some should be included in good borders of hardy flowers.

The points of a good delphinium have not yet been very fully defined. The "Rules for Judging," issued by the Royal Horticultural Society (the 1896 code) state that if prizes are offered for these, "judges must take into consideration their (*a*) cultivation, (*b*) form, (*c*) freshness, and (*d*) colour, allotting points on the following general lines:—Culture, 3 points; Form, 2; Freshness, 2; Colour 1." To this we may add that the form should be circular, and the spike as closely set as possible without crowding. Some of the double and semi-double plants have the blooms too wide apart, a defect which considerably reduces the beauty of the spikes either for exhibition or garden ornament.

For general garden purposes the single-flowered delphiniums present a more showy appearance, but the newer semi-doubles are nearly as good. The delphinium deserves high cultivation; although in a somewhat poor soil, with a free root run, it makes better growth than would be supposed. A good loam deeply dug, with a free admixture of manure added as the work progresses, will grow it well. With such preparation little more will be required for many years, with the exception of removing a little of the soil about the plant every year or two for the purpose of adding a supply of well-

decayed manure. A large plant with from 20 to 40 spikes is a splendid object in the garden, especially when well grown, with the spikes towering 8 or 9 feet high. Good supplies of water are required. A distance of 3 to 5 feet may be left between the plants, which, generally speaking, ought to be planted in the back row of the border, or in a bed by themselves.

In order to make a pleasing bed of perennial larkspurs, it is necessary to have some experience of their heights in the garden in which they are planted. They vary much in this feature, and in some gardens will be seen 2 or 3 feet higher than in others. Unless they can be obtained in large clumps, it is better to procure them in spring than in autumn. Slugs are very destructive to these plants in some gardens; newly planted ones being more liable to injury from this cause than others. Ashes placed round the stools and a dusting of quicklime will help to ward off their attacks. Unless in gardens exceptionally well sheltered from high winds, delphiniums need to be well staked. The flower-stems are very brittle, and if neglected in an early stage difficult to deal with. It is thus advisable to put stakes in early, attaching the stems to them with raffia or bass, as they grow.

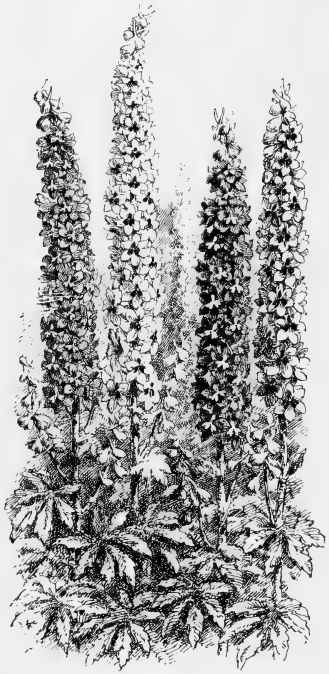

Fig. 12. Delphiniums.

The hybrid larkspurs flower naturally in June or July, but for some purposes it is desirable to have them in bloom later. They may be cut down nearly to the ground after making some growth, or even until showing the flowers. They will then make fresh growth and bloom in autumn. When the central spike has done flowering it may be removed, when the side spikes will continue in flower for some time. Late spikes are frequently produced from the plants if cut down after the ordinary bloom has faded.

The delphinium is propagated in several ways. The simplest is by division of the crowns and roots in spring, just after growth has begun. The young growths may

also be taken off, inserted in pots and treated as cuttings. If the plant is cut down in summer, the shoots produced in autumn may be taken off in a similar way and the pots in which they are placed kept in a frame the following winter. Plants thus obtained ought to flower the next summer.

The perennial larkspurs are easily raised from seeds, which are sometimes a little slow in germination. They may be sown either in pans or boxes in a frame or greenhouse, or in small beds in the open. This can be done in March or April, but seeds sown under glass earlier in the season occasionally produce plants which will flower the same year. When the young plants appear, it will be well to dust them over with quicklime now and then to keep off the slugs. After the seedlings have made two of their true leaves, prick them out into small beds a few inches apart, removing them the following spring to where they are wanted to flower. The species can be raised in the same way.

There are some hundreds of named delphiniums in cultivation, but the following are of first-class merit.

Selections of Delphiniums.

Varieties.

*Albert Edward, plum.
*Aziyadé, lavender blue.
*Beauty of Langport, cream.
Britannia, deep blue.
Dr. Mead, violet.
*Geneva, sky blue.
*John Thorpe, deep blue.
*King of Delphiniums, deep blue.
*Monument, lavender.
*Mr. Crompton Roberts, purple and violet.
Primrose, white.
Princess of Wales, white.
*The Rev. J. Stubbs, light blue.
Sara, sky blue.
*Tennyson, bright blue.
*Triumph, violet and plum.
True Blue, brilliant blue.
*Wonder, blue and lavender.

Those marked (*) are semi-double or double.

Species.

cardinale, scarlet, 2 to 3 feet.
cashmirianum, blue, 1½ feet.
formosum, sky blue, 2 feet.
grandiflorum, blue, 2 to 3 feet.
nudicaule, scarlet, 15 to 20 ins.
Zalil, pale yellow, 2 to 3 feet.

FUCHSIAS.

The majority of the different original species of fuchsias are not included under the heading Florists' Flowers, and they will be treated upon in that portion of Vol. III. devoted to Conservatory plants. The florists' forms were obtained by hybridising selected species, and the subsequent cross-fertilisation of resultant varieties, their improvement constantly going on. Evidently the corymb flowering species had little

or no share in the parentage of the popular garden varieties of fuchsias, now so extensively grown in pots, their habit of growth and flowering more nearly resembling those of F. macrostema, a Chilian species, and F. serratifolia from Peru. Double flowering varieties are nearly as plentiful as singles, their development from the latter having been rapid and striking.

According to the R.H.S. judging code, six points are the maximum number that should be awarded to a specimen plant, allotted as follows:—

(*a*) Growth vigorous, free branching, compact habit, 2 points; (*b*) Quantity and quality of bloom, the sepals reflexing sufficiently to display the corolla, which should not be too widely expanded, 2 points; (*c*) Foliage clean, fresh and luxuriant, 1 point; (*d*) Distinctness of colour, 1 point.

Raising Seedlings.—Fuchsias are easily raised from seed. Gather the fruits when fully ripe, crush and squeeze the pulp into water, separating it as much as possible from the seeds. Pass the liquor through a hair sieve, and wash the residue repeatedly till the seeds are clean. Spread them to dry on strong paper, and store in a dry place till early in March—the best time for sowing either home-saved or purchased seed. Fill well-drained 6-inch pots or pans with a mixture of light loam, leaf soil, and sand; water, and soon after distribute the seeds thinly on the surface, pressing them in and covering lightly with fine soil. Plunge in a brisk moist bottom heat, cover with squares of glass and shade till the seedlings appear, when the glass should be gradually withdrawn, and shade applied during the prevalence of bright sunshine only. When about half an inch high, prick out the seedlings thinly in pans of fine light soil, and return to warm quarters—a frame on a mild hot-bed answering well for raising and establishing fuchsias.

If properly looked after, the plants will be large enough in the course of about five weeks, to be potted singly. Lift them out with a label and place in 3-inch pots. Return to gentle heat till they have formed fresh roots, when cooler treatment will be desirable, admitting air freely. When the small pots are well filled with roots, shift the plants into 5-inch pots, and in these they may, if desired, be flowered during the summer. All that promise to be equal or superior to named varieties should be retained for further trial, and the rest unhesitatingly thrown away. Those selected may be given another shift, and can be propagated from the same season or treated much as advised in the case of plants raised from cuttings, delaying further propagation till the following spring.

Propagation by Cuttings.

Short, soft, or flowerless shoots, may be rooted in less than three weeks, the spring and, to a lesser extent, the autumn being the most approved times. About February prune some of the rested plants, and place them in a moist, warm house. Young shoots will soon be plentiful, and may either be taken off with a heel, or the tops shortened to a length of about three inches, cutting cleanly below a joint, and trimming off the lowest pair of leaves. Insert firmly round the sides of well-drained 4-inch or 5-inch pots filled with a mixture of light, sandy loam, surfaced with sharp sand, and give a gentle watering. Either plunge them in a gentle hot-bed, or keep close in a propagating frame, shading from bright sunshine, keeping the soil moist and the frame or handlights close till rooting has taken place. Gradually inure the newly rooted plants to the sun and air, and before the roots have spread much, place singly in 2½ or 3-inch pots. Return them to moist gentle heat; permit no check to growth, and guard against the stems hardening unduly. Before the plants become root-bound, shift into 5-inch pots, and still keep them growing strongly in a temperature of 50° to 60°, accompanied with abundance of atmospheric moisture.

Methods of Training.

When the young plants are from 5 to 6 inches high, it will have to be decided which form of training is to be adopted. Pyramids are the most popular, but informal bushes and standards also find favour. For exhibition purposes, pyramids are preferred, and they are not particularly difficult to grow to a presentable size in one season. Top the young plants lightly, and of the resulting side-growths select the uppermost for training upright by way of a leader, bringing down the remainder to an horizontal position. Top both the leader and side shoots when about 8 inches long, and soon after shift the plants into 7-inch pots. Before the points of the leader and side shoots show flower, again resort to topping, selecting and tying the leader to a stake as before. At this stage, allowing the plants to become root-bound or neglected in watering, would have the effect of causing a hardening of the growth, premature flowering being then unavoidable. Early in May the plants ought to be ready for, and receive, a shift into 9-inch pots, giving the final move into the 11-inch size from three weeks to a month later. For these later shifts, a richer compost than formerly ought to be used, that consisting of strong, mellow loam two parts and one part each of leaf soil and decayed manure, with sharp sand, adding a 6-inch potful of bone meal to every bushel of soil being suitable.

Firm, but not solid potting is correct. Topping and training must also be persevered with, till the soil in the flowering pots is well occupied by the roots, after which the top growth will harden and should be allowed to flower.

Bush plants can be formed by topping the growths often enough to secure a good number, tying the best of these to stakes slanting outwards, removing the weaker growths, or the stems may be looped to a central stake. If wanted large, the plants must be gradually shifted into 11-inch pots or they may be flowered earlier in smaller sizes.

When standards are wanted, and these display the graceful flowering branches to the best advantage, do not top the young plants till they afford signs of flowering. Select the uppermost shoot after topping, and train vertically, pinching out all the side shoots, this having the effect of causing the leader to grow with extra vigour. When the required height is reached, pinch out the point of the plant, and repeatedly top the shoots that issue. In this way, other details being the same as recommended for the pyramids, a fairly large head can be formed in one season.

Fuchsias fail to make satisfactory progress in a dry atmosphere, and they ought to be kept clear of the hot-water pipes in plant houses. Set the pots on a moist base, such as a slate-covered staging ashed or mossed over, or, better still, a genial hot-bed of leaves. The temperature may range from 55° to 65° during May and June, and the plants ought to be syringed every morning, and again when the house is closed early on clear days with a view to retaining the sun heat. If these conditions cannot be complied with, the plants during the summer will make better progress quite in the open, where they are far less likely to form hard, "wiry" shoots than when subjected to a dry heat. At no period of their growth ought the leaves to be seen flagging by want of water, and if there is any unavoidable delay in shifting the plants into larger pots, substitute clear liquid manure for the ordinary soft water. Liquid manure may be applied freely, but not in a very strong state after the flowering stage has been reached.

Treatment of old Plants.

After the plants, large and small, have ceased flowering, they should be removed to a sunny, sheltered position in the open. Give less water than previously, but avoid the common mistake of withholding it altogether. They must be watered often enough to prevent the young wood shrivelling. When the leaves change and commence falling in the autumn, there ought to be no further delay in placing the plants in their winter

quarters; glazed potting-houses, outhouses where severe frosts are excluded, or other safe positions where they will not be regarded as unsightly, and where also they can be looked after and protected, answer very well. Water must be given occasionally to keep the young wood plump and no more. If cuttings are desired early, shorten the young wood on some of the smaller plants, to within two joints of the joint where last topped, and place in gentle moist heat. This may be done early in February, but the larger plants ought not to be started into active growth thus early.

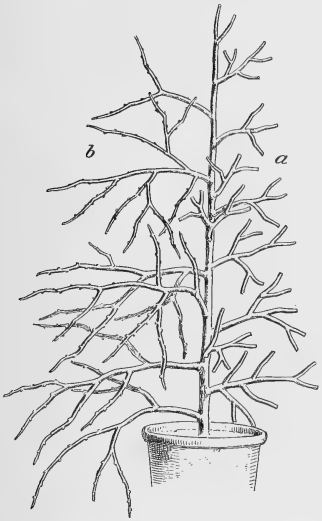

Fig. 13. FUCHSIA IN WINTER.
a, pruned; *b*, unpruned side.

If those intended for fine specimens can be afforded abundance of room under glass, they may be pruned early in March; but if they have to be grown principally in the open, as is the case with many large exhibition plants, delay pruning and retard as long as this may be done with safety. Before they form many young shoots at the points of branches, prune severely, or much as shown on the right-hand side (*a*) of Fig. 13, the opposite side (*b*) being unpruned. The young wood is very brittle and may be most safely and expeditiously shortened with scissors. The plants must all have a good soaking of water at the roots soon after pruning. Those under glass are syringed every morning and again when the house is closed early in the afternoon, but those standing out in a sunny position do not need

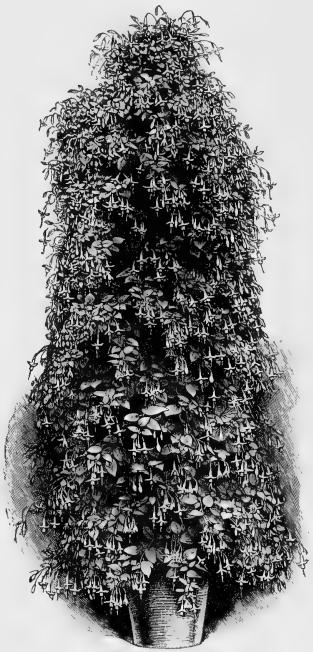

Fig. 14. FUCHSIA IN SUMMER.
From a photograph (Sutton's).

this attention. Directly the young shoots are seen, turn all the large plants out of their pots, reduce the old balls of soil freely, shorten the roots somewhat and return to the same size, or slightly larger pots than they were in previously. Any in comparatively small pots may be returned to sizes that will only just hold the roots comfortably, shifting into the larger pots when they are growing strongly. The soil employed may be the same as recommended for one-year-old plants, potting somewhat firmly. Subsequent treatment is also much the same. Top the young shoots till the plants are well and evenly furnished with growths and remove early flowers after topping has ceased, till near the period the plants are wanted at their best. Fuchsias grown in a sheltered sunny position are more floriferous than those kept constantly under glass, but the flowers are smaller and the colours less clear; for this reason it is advisable to place them in a span-roofed greenhouse or other light structure for about three weeks or a month prior to the date the specimens are shown for prizes. Young plants produce the finest branches of flowers, but those pyramids shown so well in the West of England, notably at Bath and Trowbridge, and which are frequently 9 feet and upwards in height, are not grown in a single season. The best course to pursue, therefore, is to be constantly raising young plants to take the place of the larger specimens when these are worn out.

Insect Pests.

Red spider, green fly, and thrips, are all troublesome at times, more especially in the case of plants grown under glass. The first and last-named pests, if allowed to get the upper hand, quickly spoil the plants by causing an early loss of leaves. A free use of the syringe and the maintenance of a moist atmosphere are the best preventives of red spider, shading lightly during the hottest part of the day also acting beneficially. Tobacco smoke is the old remedy for green fly and thrips, but if applied too strong, is apt to injure the leaves. Nicotine vapour does not have this effect, and is recommended as a substitute for fumigating. Any plants that have been flowered early and are stunted in growth, or have lost most of their leaves owing to insect attacks, may be freely pruned and treated as newly started old plants. This should lead to their flowering freely in the autumn.

Varieties.—A reference to the various trade catalogues will disclose the fact that new varieties are added to the lists in large numbers every season, and a selection made in 1897 would not long be up to date. For ordinary purposes a florist's selection

would be sufficient, but growers of exhibition plants, or those capable of winning prizes at leading flower shows, are advised to pay most attention to the vigorous growers, which are not floriferous in a young state. Below are given the names of a good dozen exhibition varieties, which are all single-flowering, the doubles not growing strongly enough and, in addition, do not travel well owing to the great weight of the flowers:—

Dark-Coloured Varieties.—Abundance, Lye's Rival, Charming, Doel's Favourite, Resplendent, and Walter H. Long.

Light-Coloured Varieties.—Beauty of Lavington, Beauty of Trowbridge, Gem of Lavington, Letty Lye, Mrs. Bright, and Mrs. Rundell.

GLADIOLUS.

The gladiolus belongs to the *Irideæ* or Iris family, and possesses in a marked degree the brilliant and chaste colouring so widely distributed throughout the family. There are many species—Mr. J. G. Baker enumerates upwards of 130, and only a few of these have been called to the aid of the florist in his remarkably successful efforts to improve the flower. Pleasing as many of the original species are, they cannot stand comparison with the magnificent hybrids of the gandavensis section or the other seedlings which have been produced. It was the introduction of G. gandavensis, little more than fifty years ago, that led so largely to the improvement of the gladiolus. There is some difference of opinion as to whether cardinalis or oppositiflorus share the honour of its parentage with psittacinus, but Mr. Baker says it is a hybrid between the first and last named. The work of the florist has enormously changed the flowers raised from this hybrid, and it is difficult to conceive anything finer than some of the grand spikes of named sorts exhibited at the principal flower shows.

In late years, new hybrids have been raised. Of these, the best known are Lemoinei, nanceianus, raised at Nancy in France, and Childsi. The first has been the outcome of the hybridisation of G. purpureo-auratus with the best varieties of gandavensis. The second was produced between Lemoinei and Saundersi, like nearly all the others a Cape species. Childsi is understood to have the same parentage, or to come from Saundersi and gandavensis. Besides these, there are a few other hybrids not so well known; and the early flowering species have given birth to a number of seedling forms of considerable beauty. The gladiolus in its best forms is thus a true florist's

flower, but it is to be regretted that the number of private exhibitors of so beautiful a flower does not increase; the principal exhibits being from trade growers.

The beauty of the gladiolus, with its lasting properties as a cut flower, renders it, however, increasingly popular as a garden plant. In beds, lines, or groups it produces a surpassing effect, and the cheapness of the bulb-like corms of mixed seedlings enables them to be largely used for this purpose, these seedlings, if from a good strain, approaching nearly to the qualities desired by the florist. These, condensed from the R.H.S.'s code, may be briefly stated as follows:—

The flowers must be of good form, large, with substance in the segments; spike long and symmetrical; the flowers all facing to the front and at such a distance from each other as just to hide the stem. The colours of the dark flowers ought to be bright and effective and soft, but clear in the light ones. Common defects are spikes showing the stem in the centre, the flowers facing to the sides; indistinct and faded colours; flowers with thin and narrow segments, and short crowded spikes.

The cultivation of the gladiolus is comparatively easy. A good loam inclining to stiffness will produce fine spikes if well prepared by trenching to the depth of 2 feet in the autumn, a good supply of old hot-bed or cow manure being well mixed in the earth. A sandy loam is recommended by some, but modern growers are inclining to the belief that a heavier one is to be preferred. The position should be open and sunny. The corms—popularly known as "bulbs"—can be planted from the beginning of March until the end of May; although for late planting they must be kept in a cool place. For exhibition it will be found preferable to grow them in lines in beds, but in borders they may be grown in groups of three or more. A depth of 3 inches is that generally practised for planting the corms, which are placed about a foot apart. The bed may be mulched to a depth of 2 or 3 inches with half-decayed manure as soon as the plants are some distance through the surface, and in dry weather the application of liquid manure, when the flowers appear, is beneficial. The plants need also to be staked early. When the flowers are for exhibition they may be shaded. The best way of doing this is by an oblong box about 2 feet long with a glass front. This is attached to a stake and placed over the spike. A little whiting on the lower part of the glass prevents the flowers at the base from fading before the upper ones are expanded. In cold climates it is often advantageous to start the corms into growth in pots or boxes under glass, planting them out when the spike has grown a few inches. The gladiolus is subject to a disease for which there is no known remedy.

For greenhouse or conservatory decoration gladioli may be grown in pots. One of the best authorities gives, as an ideal compost, the following:—"One part decomposed hot-bed manure, two parts rich loam with a little river or silver-sand under each bulb." A 6-inch pot is required for each corm; the pots being plunged outside until the blooms show colour.

The early flowering gladioli need similar treatment, except that they ought to be planted in autumn about 4 inches deep. Three corms of these may be placed in a 6-inch pot, and some — especially G. Colvillei, The Bride—are greatly prized as cut flowers. When the leaves begin to fade lift the corms and dry them gradually. When quite dry, cut off the stems, clean the corms, and store in paper bags out of the reach of frost until planting time.

A few of the species of gladioli are hardy; the best of these being byzantinus and segetum, which have purplish flowers. The varieties of Lemoinei are sometimes recommended as hardy, but they are not to be depended upon in this respect in our climate.

Fig. 15. Early Gladiolus.

Gladioli are propagated by increase of the corms; by small "spawn" formed at the base; and by cutting the corms into pieces before planting. They are also grown from seeds, but do not come true to the parent when so grown. Some gladioli increase more freely than others, and often form two new corms in place of the old one, which dies. Some varieties also

produce the small corms or "spawn" at the base more plentifully than others. These cormlets should be taken off before the planting season, and when that comes round, put in soil about 2 inches deep, lifting them when the leaves grow yellow, as in the case of the larger corms. In the course of a year or two they will produce good flowers. The practice of cutting up the large corms is not much followed, but it is quite a successful one if care be taken to secure for each piece an "eye" from which a stalk will grow.

Seedling gladioli are very cheap, and few care to be at the trouble of growing from seeds. There is, however, no difficulty in doing this. The seeds may be sown in March or April in large, deep pots filled with light soil, and placed in a frame; 10-inch pots are suitable, and 20 or 25 seeds are enough for each pot. Seedlings on first appearing are very like grass. Keep them close to the glass, and give plenty of light and air. Early in summer place the pots outside, where they may remain until October, unless frost appears. The small corms can be removed from the pots when the leaves have ripened, and stored away until spring. They will flower in the second or third year if they receive fair treatment. We have raised thousands by sowing in drills in the open ground, at the same time and in the same manner as sowing carrot seed.

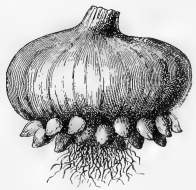

Fig. 16. Gladiolus Corm with Cormlets.

It is impossible to give a full selection from so many of the gandavensis section, but the following, of comparatively recent date, are of exceptional merit. The catalogues of the principal dealers ought, however, to be studied carefully. For bedding and for cut flowers, the brilliant scarlet brenchleyensis should be grown largely, although it is not included in the selection. Only the principal colour is named in most instances.

Selections of Gandavensis Varieties.

Accia, crimson.
Alfred Henderson, vermilion.
Alicia, white.
Anthony Waterer, scarlet.
Apollo, flesh.
A. M. Penn, rosy scarlet.
Baron Schröder, crimson.
Basis, rose.
Empress of Germany, white and rose.
Grover Cleveland, carmine and white.
James O'Brien, salmon red.
John Warren, orange-scarlet.
Kate Kove, white, violet spot.
Lady Carrington, lilac.
Mr. Fowler, rose.
Mrs. Bates, white and purple.
Mrs. Stanley Leighton, rose and orange.
Nicon, blush.
Painted Lady, red.
Poltis, white and lilac.
Princess Royal, blush and rose.
Rev. H. H. D'Ombrain, cerise and white.
Sir Massey Lopes, orange-rose and white.
Thalia, ivory white and crimson.

Selection of Lemoinei Varieties.

Acum, white.	Dagmar, rose.	Mera, violet blue.
Ajax, pink.	Deuil de Carnot, black crimson.	Precurseur, rose.
Admiral Gervais, salmon.	Jules Develle, lilac.	Rembrandt, salmon rose.
Crépuscule, rosy lilac.	M. Deviolaine, violet rose.	Rev. W. Wilks, orange red.

The above have variously coloured spots on the lower segments.

Selection of Nanceianus Varieties.

A. de la Devansaye, salmon, spotted.	Persimmon, blue.	Robert Lindsay, orange.
A. M. Carlyle, scarlet, spotted	President Carnot, cherry red.	Sir Trevor Lawrence, scarlet.
A. Van den Heede, scarlet.	Professor Lambin, lilac mauve.	W. Watson, lilac-rose.

Selection of Childsi Varieties.

Aurea superba, orange scarlet.	Dolops, orange scarlet.	Splendour, rose, purple and white.
Ben Hur, salmon rose.	Earl Cadogan, orange scarlet.	Tross, scarlet and white.
Columbia, orange scarlet.	Henry Gillman, salmon scarlet.	Wm. Falconer, pink and blush.

Selection of Early-Flowering Gladioli.

Blushing Bride, ivory white and crimson, 1½ ft.	Fire King, orange scarlet, flaked, 1½ ft.	nanus in variety, 1 ft.
byzantinus, purple, hardy, 2 ft.	formosissimus, scarlet, 1½ ft.	Queen Victoria, scarlet and white, 2 ft.
cardinalis, scarlet and white, 1½ ft.	insignis, rosy scarlet, 2 ft.	Salmon Queen, salmon pink, 1½ ft.
Colvillei, The Bride, white, 2 ft.	Ne Plus Ultra, salmon rose, 2½ ft.	Sarnian Gem, salmon, 1½ ft.

Most of the original species are principally interesting from a botanical point of view, so that it appears unnecessary to give a list of them here.

GLOXINIAS.

According to Nicholson ("Dictionary of Gardening"), the gloxinia rightly belongs to the genus Sinningia, but the more popular term has for years past been universally accepted and will never be altered. From Sinningia, or Gloxinia speciosa, a Brazilian species first brought into prominence about the year 1815, have been raised numerous hybrids and varieties of superior merit, and further improvements are constantly being effected by florists interested in this class of plants. Not only are the erect-flowering gloxinias fast superseding the older drooping forms, but the colours and markings are also much more diversified and beautiful than formerly. Some of the strains are equally remarkable for the great size and substance of their foliage, the crassifolia type effectively hiding the pots with their large recurving leaves.

The gloxinia is a popular exhibition plant, and the Royal Horticultural Society's code for judging says the flowers should have a "corolla circular, smooth on the edge;

lobes well-rounded, overlapping each other, and perfectly flat; throat widening upwards and in proportion to the length of the segments of the corolla; stems stout; colours clear and distinct. Foliage healthy, unbroken, of good substance, and covering the pot." Maximum number of points 6, allotted as follows:—(*a*) massive display of unblemished flowers, 2 points; (*b*) superior culture and unbroken foliage, 2 points; (*c*) freshness, quality, and colouration of blooms, 2 points.

Gloxinias from Seed.

Gloxinias are raised from seeds and further increased by cuttings of young shoots and leaves. The first method is most in favour, as it is possible to raise scores of plants from a small pinch of seed, and if this is from a good strain there may not be an inferior variety among them. Six-inch pots half-filled with drainage, or better still, pans properly drained, may be filled with a mixture of fine peat, leaf soil, and sand, making this firm and level. Give enough water to moisten every particle of soil, and two or three hours later distribute the seeds thinly on the surface, only just covering with fine soil. Plunge the pots or pans in a gentle hot-bed, a cucumber or melon frame answering well, dry staging being unsuitable. Cover with squares of glass and shade constantly till the minute seedlings are visible. The soil must be kept constantly moist but avoid drenching heavily, and never apply other than luke-warm water. Gradually expose the seedlings to the light and air and commence pricking them off into pans of fine peat, leaf soil, and sand directly they can be moved with the point of a stick. Disturb those left in the pots or pans as little as possible, transplanting them as they become large enough. All must be kept growing in moist heat. If the seed is sown during January and February, the two best months for the purpose, the plants ought to be in flower during the summer and early autumn months, while if more seed is sown in May, the resulting plants should carry on the display till mid-winter.

Stem and Leaf Cuttings.

When the old tubers push shoots long enough to make into cuttings, as some varieties will do, these may be placed round the sides of 5-inch pots, freely drained, and firmly filled with the same mixture as recommended for seedlings. Plunge these in a propagating frame or in handlights on a hot-bed, keeping them close till rooted. Matured leaves may be treated as cuttings; the leaf stalk only being inserted in the soil, will strike root and form small tubers suitable for growing to a flowering size the following season. Gloxinia

leaves may also have their back ribs cut through at distances of 1 inch apart, and then be pegged or pressed down with small stones into the surface of sandy peat soil. Place them in a propagating frame and keep the soil steadily moist till the leaves decay. The pea-like tubers that have formed where the cuts were made may be stored in sand till the following spring, when these also may be grown to a flowering size.

Cultural Details.

Seedlings and newly-rooted cuttings must not remain close together too long in pots and pans. Lift them out with as much soil as will adhere to the roots, and place them singly in 3-inch, or if need be, slightly larger pots, using the peaty soil as before and returning the plants to gentle heat. Too often these young plants are placed on dry, hot shelves and stages with the result that they are crippled by insect pests. They ought to be arranged on a moist bed or base of some kind, and the atmosphere also kept moist in a temperature of 55° to 65°. Allow ample room for the foliage to properly develop, shade carefully from bright sunshine, and never let the plants become dry at the roots.

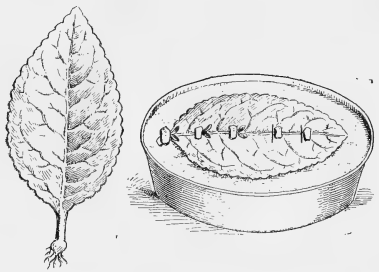

Fig. 17. Raising Gloxinias from Leaves.

Late-raised plants may be flowered in 3-inch and 4-inch pots, but those resulting from the January or February sowings ought principally to be shifted into 5-inch or slightly larger-sized pots before the plants become root-bound. For the final potting a suitable compost is formed by light-brown fibrous loam, two parts; leaf soil, one part; peat, one part; with sharp sand and a sprinkling of small pieces of charcoal. In potting be very careful not to bury the hearts of the plants too deeply, and also not to damage the easily broken leaves. While growing strongly the surroundings must be moist by syringing the pots and stage occasionally in bright weather, but during the flowering period a drier atmosphere is desirable, as preparing the plants for either travelling or conservatory and house decoration. Gloxinias when strongly rooted in their final pots should have weak liquid manure frequently till they are in flower, taking care that none of this falls on the leaves.

After they have ceased flowering gradually withhold water, and duly remove the

dead leaves. The tubers may either be wintered in the pots in which they were grown, storing in a warm greenhouse, but not close to the hot-water pipes, or they may be shaken nearly clear of soil and packed closely in boxes with enough fine peat, or cocoa-nut fibre refuse, to prevent shrivelling. Tubers when at rest must not be subjected to low temperatures.

Plants from old Tubers.

Gloxinia tubers produce flowering plants for three or more seasons, but they give the finest flowers, and are usually at their best, during the first two years. When, therefore, a number of young tubers are raised every year, the very oldest may be advisedly thrown away. A good succession of flowering plants can be had by starting the old tubers into growth. Some of these start naturally in February, and cannot very well be retarded without injury. Place them singly in pots 2 inches more in diameter than the tubers measure, and start them into active growth in a temperature of 60° to 65°. A moist atmosphere is required by these as well as younger plants, and from the first ample space must be afforded; also shade from bright sun. Little water will be needed till the fresh soil is occupied with roots; the supply must be increased with the growth of the plants, and before the limited pot-room causes them to flower prematurely, give them a shift into pots one or two sizes larger. Soil and subsequent treatment are the same as recommended for the seedlings. The tubers later in starting may prolong the flowering period till the end of August, at which time the current season's seedlings should be flowering freely. Large plants in particular ought to be kept quite clear of each other, and they are greatly benefited by frequent applications of liquid manure.

Insect Pests.—The worst enemy to gloxinias are thrips. These are most troublesome in mixed plant houses, and the plants arranged in dry, hot, sunny positions are the most liable to be injured by them. Once thrips gain the upper hand they quickly paralyse and disfigure gloxinia plants, and in this as well as in so many other cases prevention is better than cure. If, in spite of good treatment, thrips are seen, mild fumigations with tobacco, or nicotine vapour—a safe remedy—will usually destroy them. Insecticides must not be applied, as they would disfigure the leaves. Gloxinias love heat and moisture, and attempting to grow them in dry airy greenhouses has been responsible for many failures.

Varieties.—Gloxinias are so easily obtained from seeds that new varieties are raised

in shoals nearly every season. If named varieties are desired they can always be procured from leading nurserymen, but nearly or quite as good may be had much more cheaply from seeds saved from the best strains, and it may be added that seedlings grow more freely than do plants raised in any other way.

HOLLYHOCKS.

The hollyhock (Althæa Rosea) has been cultivated as a florists' flower for many years, and when in perfection is a great ornament to the garden in autumn. As an exhibition flower it is generally much admired, the spikes and blooms being very attractive on a show board. Its popularity was greatly decreased for a number of years by the attack of the hollyhock fungus (Puccinia malvacearum), which committed great havoc among the plants. Its virulence has now greatly abated, and the hollyhock is again becoming more largely grown. This disease has swept away a number of fine varieties raised by the attention of many old florists, but there are still good named hollyhocks at command.

The late Mr. G. Glenny's list of rules for the properties of the hollyhock is so clear and precise that it is reproduced here:—

"The flower should be round, and the principal or guard petals should be thick, entire on the edges, and lie flat, being free from puckering or frilling. The centre, which is composed of florets, should form half a ball, and the more it covers the principal or guard petals the better. These florets should be thick, large, whole on the edges, perfectly free from fringe, or notch, or raggedness all over. The colour should be dense, instead of watery or washy. The more bright and novel, the more desirable. The spike should be close, the flowers touching each other, and tapering from the bottom to the top, the foot-stalks of the flower being longer at the lower end of the spike than at the upper end. There is no fixed height for the plant; but the flowers should begin one foot from the ground, and open all at once." According to the code of the Royal Horticultural Society, the guard petals should be about half an inch beyond the centre, and the colours of the flowers clear and decided if self; if shaded or mottled, pleasing and harmonious.

As a garden flower the stately habit of the hollyhock and its beautiful colours render it particularly desirable. In the back of a flower border or in groups in the shrubbery it looks very handsome, with its flowers embracing shades from blush to

carmine, white, pale yellow to deep orange, or purple or brown, with mottled flowers besides.

To have fine spikes and blooms, generous treatment is necessary, although a few, probably owing to dread of the disease, recommend a poor soil. Rich loam, well enriched with decomposed manure, and trenched 2 feet deep, is appreciated by the hollyhock. Shelter from high winds with a fair amount of sun and plenty of room are also needed.

Fig. 18. Double Hollyhock from Seed. (*Sutton's.*)

Propagation of choice varieties is by means of cuttings, divisions, and eyes. Cuttings of young shoots 2 or 3 inches long may be taken from the old root almost at any time, inserted singly in a 3-inch pot in light soil carefully watered, and put in a close and shady frame until rooted. If taken in the winter months a little bottom heat is necessary. Division of the root after flowering time is also practised, preserving as many roots as possible and one or two buds with each piece of the crown. In July or August eyes from the side shoots may be used for raising plants by putting them in light, sandy soil under a hand-glass. Old stools may be preserved throughout winter in many gardens by protecting them with ashes or litter.

Young plants should be kept near the glass during winter in cold frames. In March they must be hardened off, and removed to the beds near the middle or end of April. About 3 feet may be allowed between each plant. Protect from frost at nights, and after the flower spikes appear, top-dress with manure. Water ought also to be freely given in dry weather. Only strong plants may be allowed to carry more than one spike. A stout stake is required for each spike, and must be placed early. After flowering cut the spikes down to a few inches from the base.

Seeds of a good strain generally produce a large proportion of excellent double flowers, new varieties being obtained from seed. The single flowers are admired by some. The seeds may be sown in June or July in prepared beds of good soil. The

seedlings should be thinned out, and before the approach of winter removed to cold frames. As soon as the seed is ripe it can also be sown in pans or pots of rich but light soil. Place these in a frame with a little bottom heat, and when the seedlings are large enough, place them singly in small pots. Do not allow them to become pot-bound. Keep in a close frame until established, when they may be removed to a cold one for preservation during winter, repotting if necessary before planting-out time in April.

The hollyhock fungus is difficult to cope with, but must be eradicated, if possible. A trade grower of great experience recommends syringing the plants with a weak solution of Condy's Fluid in the proportion of about half-a-pint of the fluid to one gallon of water. A strong solution of soft-soap, sulphur, and Gishurst compound is sometimes efficacious. Should these remedies fail take up the plants and burn them, removing also some of the soil about the roots, exposing it also to the action of fire. As already said, a large proportion of double flowers can be secured from a good strain of seeds, but a short selection of named varieties is given for those who desire them.

Selection of Hollyhocks.

Agnes Berry, light rosy lilac.
Blucher, maroon.
Charles Chater, crimson.
Cheer, light red.
Dulcimer, yellow, black ground.
Electra, mottled, sulphur and rose.
Excelsior, salmon.
Favourite, rose.
Franc. Gibb Dougal, purple.
Her Majesty, pure white.
Mrs. Downie, bright orange.
Mrs. Laing, shaded lilac.
Negro, black.
Queen of Buffs, buff.
Queen of Yellows, yellow.
Rev. Jas. Robertson, pale orange.
Standard-Bearer, creamy white.
Venus, light yellow.

HYACINTHS.

Of the various bulbous-rooted plants grown in gardens, few are more admired than the hyacinth. The small Roman species (Hyacinthus romanus albulus) is perhaps the most serviceable, owing to the ease with which it may be forced, as well as the lightness and elegance of its spikes of white flowers. The successful culture of this kind will be described under the heading "Forced Bulbs for Conservatories" (Vol. III.). What may be termed the Florist's Hyacinth originated from Hyacinthus orientalis and its sub-species, H. o. provincialis. Both single and double varieties are numerous, and many of them very handsome. The soil and climate of Holland are admirably adapted to the preparation of hyacinths for culture in pots and beds, and from that country our supplies are drawn. Favourable as may be the conditions under which they labour, the

Dutch growers, with all their experience, cannot produce large solid bulbs under four years, while many of the finer samples are five years old, and it is therefore a little surprising that they can be sold so cheaply.

The old florists' ideas as to what constitutes a perfect hyacinth, are too lengthy to be given here, but they may be summarised as follows. Pips when viewed from the front must be circular in outline, looked at in profile, semi-circular. Petals or segments reflexed, this being the most pronounced in the case of single varieties. Lower pips to be the largest, or from 1 inch to 1½ inches in diameter, gradually diminishing in size to the summit; stem straight, stout, and long enough to raise the lower pips above the points of the leaves. Colours bright and distinct. Fragrance indispensable. Leaves stout and not rising above the flowers.

Cultivation in Pots.

As previously indicated Hyacinth bulbs are raised in Holland, and are sent to this and other countries in millions, when they are in the best condition for flowering. They are raised from seeds, and increased by division, also from bulblets as shown on page 202, Vol. I. The flower stems are picked out for three or four years, with the object of developing strong foliage, as it is from the deposition of organized matter by the leaves, that the bulbs are formed and the embryo flowers in them. All we have to do then is to bring out in the best possible manner the finest leaves, spikes, and flowers that are closely encased in the bulbs. We cannot add one more flower to a spike than already exists in embryo, but both spikes and blooms may be spoiled by defective management and cultivation. If hyacinths are wanted in flower late in December, or during the early part of January, a portion of the bulbs should be potted early in September, giving preference to those medium-sized and heavy of single-flowering varieties. A succession can be insured by potting more, at intervals of about three weeks, up to the end of November. There ought to be no further delay in potting the later bulbs, as these should not commence top growth before root action has progressed considerably. The plants can be retarded in cold frames after the pots have been well filled with roots. Pots 5 inches in diameter are largely used for hyacinths, but the finest spikes of bloom are usually had from those rooted in the 6-inch size.

A suitable compost consists of two parts of the best fibrous loam procurable, to one part each of leaf soil and crumbled manure, with an eighth part of the bulk of sharp sand, the whole well incorporated a month before required for use. The pots must be

drained in the usual manner, covered with fibre shaken from the turfy soil and this blackened with soot.

The soil ought not to be made very firm in the pots, covered with sand, and the bulbs forced down with great pressure, as is too commonly done, as the mass of roots emitted cannot freely penetrate the hard base thus made, which acts as a fulcrum, the bulbs being lifted upwards and thrown on one side, never with the plant to be put right again without receiving injury. It is much better, after nearly filling the pot and making the soil moderately firm, to make a cavity large enough for holding the bulb without pressing it down firmly, letting it rest on a layer of sand. The roots then enter the medium freely. The bulbs should be nearly covered, the crown only being visible, and the soil may be pressed firmly round them, but not filling the pots within more than half an inch of the rim.

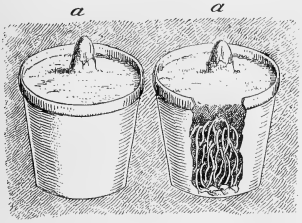

Fig. 19. POTTING AND BURYING HYACINTH BULBS.
For references see text.

It is of the greatest importance that root action be well in advance of top growth, and that the bulbs be prevented from springing up from the soil soon after they have formed roots. They must be kept cool, and in the dark. Set the pots in the open closely together on a firm level base impervious to worms, a thick layer of ashes being suitable. If the soil is at all dry give a good watering; but if moist enough when used for easy compression no water will be needed. Then surround and cover the pots with about 6 inches of cocoa-nut fibre refuse, fine sweet damp ashes, or leaf soil, as may be best obtainable. This will have the effect of keeping the soil moist, and the bulbs dark and cool, while the weight of the covering will further prevent the bulbs being heaved out of the soil by the pressure of their roots in it. In the course of about six weeks, the bulbs ought to be in the condition shown at *a a*, Fig. 19, that is to say, the pots well filled with roots and the top growth only just commencing. If not covered as advised, and especially if the bulbs are forced down on a hard base, the result may be ruined plants as shown in *b b*, Fig. 20.

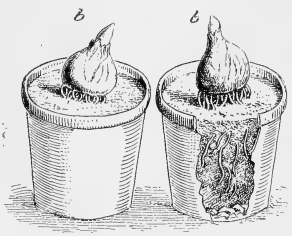

Fig. 20. POTTING AND BURYING HYACINTH BULBS.
For references see text.

On no account leave the bulbs covered long enough for them to commence unfolding their leaves, or the plants will be spoiled. The pots must be withdrawn when the crowns are about the size of cob nuts, and then the tender white growth ought not to be suddenly exposed to full daylight, as in this case the points of the leaves are liable to be damaged. As the pots are taken out of the ashes, place them in shallow pits or frames, where they can be shaded and gradually inured to the light till the crowns assume a green hue, and they will soon not only endure, but benefit by, the sun; or they may be arranged on a cool, moist, greenhouse stage, and have small pots inverted over the crowns for a few days, preparatory to full exposure.

Fig. 21. HYACINTH. (Well-grown.)

A temperature ranging from 50° to 60° will bring them along quite fast enough. Single varieties are the best for forcing. Those which are allowed to develop in an ordinary greenhouse temperature will produce much the finest spikes, such as represented in Fig. 21. Plants that are desired to flower early must be gently forced, the effect of undue forcing is seen in Fig. 22, but strong heat weakens the stems and injuriously affects the size and colours of the flowers.

Adequate supplies of water are imperative; if the soil get so dry as to shrink from the pot, injury will be done. Weak liquid manure may be given with advantage when the flower spikes are developing: clear water and a cool airy position after they are fully open. Bulbs that have been flowered in pots are of no further use for producing imposing spikes of flowers, but if taken care of, water being given till the leaves die down, they may be kept till the autumn and planted in the borders with every likelihood of their flowering the following spring; or if placed close together in pots or boxes, afford small spikes that are acceptable for cutting.

Fig. 22. HYACINTH. (Spoiled.)

HYACINTHS IN GLASSES.—These flowers may be grown in glasses of water by those who desire to have them, and it is interesting to watch the progress of the roots. Proper hyacinth glasses are surmounted with a circular top just large enough to hold a bulb, and can be bought of most seedsmen. They should be nearly filled with

rain water and a few lumps of charcoal thrown in. The base of the bulb to nearly, but not actually touch the water. Place the glasses in a cool dark cupboard, bringing them out to the light when the roots are half-way down to the bottom. They must have a light airy position to prevent the leaves and spikes becoming drawn, and the water in the glasses must be replenished as it is imbibed by the plants. It seldom requires changing, as the charcoal keeps it pure. Single-flowering varieties are much the best for this form of culture.

Selection of Hyacinths.

Twelve Single Red.

Cavaignac.
Fabiola.
Garibaldi.
gigantea.
King of the Reds.
Lord Percy.
Macaulay.
Meteor.
Prince Albert Victor.
Queen of Hyacinths.
Von Schiller.
Vuurbaak.

Twelve Single White.

alba maxima.
Avalanche.
Grandeur à Merveille.
King of the Whites.
La Franchise.
La Grandesse.
L'Innocence.
Madame van der Hoop.
Miss Nightingale.
Mont Blanc.
Queen of the Netherlands.
Snowball.

Twelve Single Blue.

Blondin.
Charles Dickens.
Czar Peter.
Duke of Connaught.
Grand Lilas.
Grand Maître.
King of the Blues.
Lord Byron.
Lord Derby.
Magnificent.
Masterpiece.
Queen of the Blues.

Six Single Yellow.

Bird of Paradise.
Ida.
King of the Yellows.
L'Or d'Australie.
Obélisque.
Sovereign.

Six Double Red.

Chancellor.
Groot Vorst.
Lord Wellington.
Princess Dagmar.
Princess Louise.
Regina Victoria.

Six Double White.

Bouquet Royal.
Florence Nightingale.
La Tour d'Auvergne.
Lord Derby.
Prince of Waterloo.
Princess Louise.

Six Double Blue.

Blocksberg.
Charles Dickens.
Garrick.
Laurens Koster.
Louis Philippe.
Van Speyk

THE IRIS.

The irises, which have for a long time been favourite garden flowers, are clearly divided into two great natural groups or series, from each of which the agency of the florist has given us many beautiful varieties.

The first of these, of which the flag iris of our gardens may be taken as typical, is distinguished by the plants included in it having as a root-stock a short, thick rhizome, from which the true roots proceed. The second is distinguished by the possession of bulbous root-stocks; the common "Spanish" or "English" irises may be cited as familiar

examples of this group. These are divided into several sub-genera, which are again subdivided into more than 160 species in Mr. J. G. Baker's "Handbook of the Irideæ,"* an admirable work which should be consulted for the descriptions of the species, with their botanical characters.

The iris is widely distributed over the globe, and occurs in various climates, and in many situations. It is found growing in shallow water; in bogs and swamps; among rocks or stones; on fertile lands; and almost barren mountains. Its treatment can therefore only be dealt with in a general way.

There are few irises without great beauty, fascinating alike in colour and in shape. They are increasing in favour, their popularity being heightened by the circumstance that many of the flag irises thrive well in towns where few flowers can be grown. To limit this chapter to the irises which come strictly within the category of florists' flowers would be beset with so much inconvenience to the reader that both the varieties and species have been treated together. For gardening purposes the two groups above mentioned may, for convenience, be divided into several sections requiring separate notice.

Bearded Flag Irises.

The first of these is a large one—comprehending what are known as the "bearded" irises—a group comprising some of the most valuable of our summer flowering plants, all of exquisite beauty. They are popularly known as "German" or "Flag" Irises, but comprise, besides a few natural species, seedling varieties and hybrids of germanica, aphylla, pallida, and some others.

These are of easy growth almost anywhere. They are more stately in rich soil, but grow by the margins of lakes or ponds; in the mixed border of hardy flowers; in beds; and even on the tops of walls where a few inches of soil can be obtained. They flower more freely in sun than in shade, but should not have the rhizomes covered with soil. The best time to plant irises of this section is about the beginning of August; but, as it is not always possible to carry this out, the operation may also be performed in mild weather during February or March.

The Bearded Irises have flowers of exquisite colouring, which, on account of their beauty, and the ease with which they can be secured, have been appropriately called the "Poor Man's Orchids." The "beard" is a coloured hair-like excrescence produced on

* London: G. Bell & Sons, 1892.

the flower down the claw and lower part of the blade, called the "fall," the upper portion of the flower the standard, as shown in Mr. Barr's illustration, Fig. 25, page 55.

The irises of the group with rhizomatous root-stocks are propagated by division of these. This is better performed in August than at any other season, but may be done in spring or summer. They may also be propagated, and new varieties raised, by means of seeds sown, if possible, as soon as ripe. These generally lie about a year before germination. They may be sown in the open ground, or in pans, or boxes placed in frames. The young plants ought to be pricked out a few inches apart whenever they become a suitable size.

Dwarf Bearded Irises.

A charming section of Bearded Irises is formed by a number of species and varieties varying in height from 6 to 18 inches. These may be grown in a similar way to the taller sections. The dwarf irises form attractive plants for the front of the border, the rockery, or as edgings for taller plants. A selection of these beautiful little plants follows. They can be confidently recommended for wider cultivation.

Beardless Flag Irises.

Three are also many species of Beardless Flag Irises, a number of these being of great beauty. Several of the beardless irises are well suited for growing as semi-aquatics, and in the selection of kinds these have a distinguishing mark. They may also be grown as border plants, but are more vigorous when cultivated in shallow water, or where their roots have free access to moisture. Their propagation is effected in a similar way to that of the other flag irises.

The Japanese Flag Irises.

The Japanese I. lævigata, frequently known as I. Kæmpferi, has produced magnificent florists' varieties of these distinct Flag Irises, to the beauty and splendour of colour of which we cannot hope to do justice. The colours appended to the names in the selection given are only those of the main body colour, the shades being indescribable. Some are beautifully veined, flaked, or margined, and, with the exception of the whites, all have a halo-like shading of pale or deeper blue round the yellow blotch which is seen just under the petaloid stigma. The flowers are larger and flatter than those of the other irises. Some produce six petals instead of three, and are marked *d* (page 55).

All gardens do not appear to suit the Japanese Irises, but they may be successfully cultivated in the greater number. They usually do well in a moist and adhesive loam, but also succeed perfectly in some gardens in sandy peat soil. Some cultivators recommend treating them as semi-aquatics in summer only, but they are also admirably grown as bog plants where they are partially flooded in winter. A sunny exposure, but with abundant moisture for the roots, appears to be the most suitable for these noble plants, which are deserving of the care of the lover of flowers. Like all the irises in the selections, they are quite hardy in Britain. The flowers named on a subsequent page are all of high merit, but it is not to be concluded that only these can be recommended, as many seedlings have been raised, and several equally good named flowers produced. The methods of propagation to be followed with other flag irises, are also applicable to the Japanese varieties.

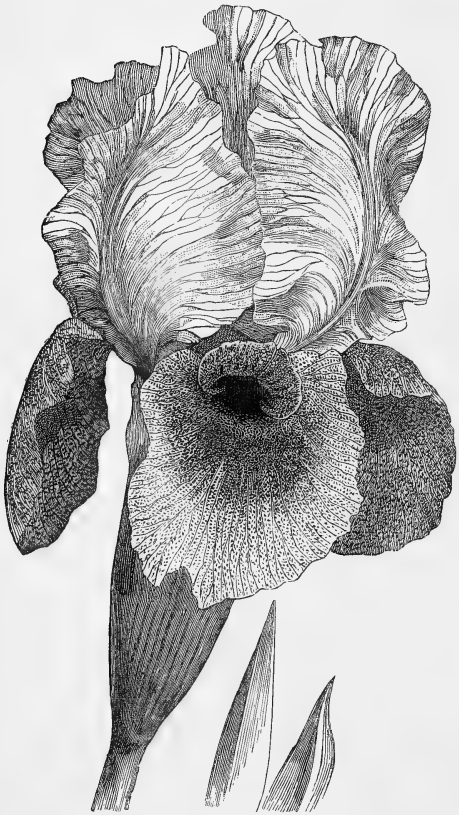

Fig. 23. Iris Lorteti.

The Cushion Irises.

The oncocyclus irises require special treatment, and the singular, if rather sombre, colouring they show, renders them of great interest to many. Numbers of hybrids have been raised between different species belonging to this section, and also by hybridising these with species belonging to the other sections. These are not properly introduced into the trade, and it seems unnecessary to name varieties of them. The Cushion Irises, a beautiful example of which is represented in Fig. 23, are not

likely to be so widely grown as those in the other sections, but they must not be overlooked.

They should be planted in late autumn in light soil which is about 12 inches deep, elevated above the ground level, on the top of a pavement of stones, which will prevent the summer moisture from rising. The rhizomes may be kept a little below the surface. In the beginning of June cover the bed and keep the soil dry until the middle of October, when the covering may be removed, protecting the irises with a few dry flower stems or litter in severe frost only. Propagation by division or seeds.

Fig. 24. Iris Bakeriana.

Bulbous Irises.

The number of bulbous irises, while not so great as that in the preceding group, is a large one. Some of the early flowering species are of striking beauty, and the well-known "Spanish" and "English" Irises, which have been "Florists' Flowers" for many years, are increasingly admired. Some of the Spanish irises have been appropriately likened to Gothic carving on account of their elegant form. The colours are also very beautiful, and altogether the group of bulbous irises could ill be spared from our gardens.

The bulbous irises generally prefer a rather light and sandy soil. The "English" varieties (from I. Xiphioides, a native of the Pyrenees) should have adequate moisture at the flowering time, or the leaves will turn yellow before the blooms open. The soil for these may also be a little stiffer than that for the Spanish ones (varieties raised from I. Xiphium, a native of Spain and North Africa). Bulbous irises increase by the formation of fleshy offsets, and by separating these when at rest, immediately after the foliage has become yellow, the stock is enlarged. This is also the best

time for planting. Bulbs should be procured as early in the autumn as possible, and planted 3 inches deep. Growing from seeds is not often resorted to. The seeds lie dormant for about a year, and the seedlings are some years before they reach a flowering size. Sow as recommended for the other irises.

Iris reticulata, which is now giving rise to several pretty varieties, is subject to a disease. Where this appears, the roots must be lifted when at rest and dried slowly, re-planting in fresh soil in autumn, but destroying the badly affected bulbs. There are no more charming flowers than in this section, the character of which is displayed by the sparkling gem Iris Bakeriana, depicted on the preceding page.

A good iris of any of the sections is distinguished by clear colouring, broad segments, and substance of flower.

Selection of Bearded Flag Irises.

These are divided into sections thus:—*Germanica* (large German Flag Iris); *aphylla* (frill-like margins); *amœna* (white standards); *neglecta* (lavender and purple standards); *pallida* (rose-lilac standards); *squalens* (bronze-tinted standards); *variegata* (yellowish standards).

germanica Amas, blue and violet.
*Kharput, blue and purple.
Purple King, purple (*see* coloured plate).
aphylla Gazelle, white and lilac blue.
*Madame Chereau, white and azure (*see* coloured plate).
amœna Mrs. H. Darwin, white.
Mrs. G. Darwin, white, gold, and violet.
*Victorine, white and blue, mottled.
*neglecta Cordelia, lilac and crimson.
Fairy Queen, lavender.
Miss Maggie, silvery lavender and rose.
pallida Assaurez, pink and crimson.
Celeste, azure.
*dalmatica, lavender.
Mandraliscæ, lavender-purple.
*Queen of May, rose-pink.
squalens Arnols, claret and purple.
Greyhound, fawn and crimson.
*magnifica, fawn and maroon.
variegata alba, ivory white.
*Darius, yellow and lilac.
Gracchus, crimson, reticulated white.
*Robert Burns, gold and maroon.
albicans Princess of Wales, white
*flavescens, pale yellow.
*florentina, white.
*sambucina, fawn and rosy purple.

For small gardens those marked (*) may be chosen.

Selection of Dwarf Bearded Flag Irises.

Balceng, Miss C. M. Owen, white and blue.
biflora purpurea, purple.
*Chamæiris aurea, yellow.
Fieberi, blue, late.
*nudicaulis, purple.
olbiensis Socrates, claret.
*grandiflora, violet-purple.
*pumila in variety. *Count Andrassy, &c.
virescens major, whiet and yellow.

Selection of Beardless Flag Irises.

Those marked (†) make good plants for moist places as well as for the ordinary border.

†aurea, yellow.
fœtidissima fol. var., crimson berries for winter.
*graminea, blue and purple.
missouriensis, lilac.
†Monspur, blue.
*†Monnieri, yellow.
*†orientalis, white and yellow.
*†sibirica alba, white.
*†orientalis, blue.
spuria Notha, lilac and blue.
‡unguicularis, blue, winter flowering.
*†versicolor Fosteri, pale blue.

‡ This should have a warm and dry place.

For rock-gardens cristata and lacustris are also recommended; light soil.

Selection of Japanese Flag Irises.

Those with 6 broad petals instead of 3 are marked (*d*).

* (*d*) Aki, crimson.
* (*d*) Beauty, lilac-purple.
(*d*) Dr. Veron, purple-red.
(*d*) Duke of Clarence, rose-purple.
(*d*) Grandeur, white.
* (*d*) Loveliness, snow white.
* (*d*) Mikado, blue and white.
Mrs. G. V. Blois, lilac.
(*d*) Nagato, lilac-blue and white.
*Shiomi, white, speckled pink.
Satsuma, violet-purple.
* (*d*) Tanga, deep blue.

There are many others equally good.

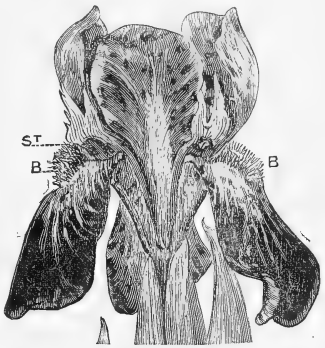

Fig. 25. Bearded Iris.
St, standard; *B*, beard and fall.

Selection of Oncocyclus (Cushion) Irises.

atrofusca, velvet-brown.
*Gatesi, cream and rose.
Lorteti, rose (page 52).
*lupina, yellowish brown.
iberica, white, brown and black.
susiana, blush and brown.

Selection of Bulbous English Irises (I. Xiphioides).

*Argus, pinkish, spotted.
Blanche Fleur, white.
Clio, reddish purple.
*Emma, French grey.
Graaf Bentink, magenta and white.
*Grande Celeste, blue.
King of the Blues, blue.
*La Charmante, lavender and white.
*Mont Blanc, pure white.
Penelope, white and violet.
*Ruby, crimson purple.
Vainqueur, lavender.

Selections of Bulbous Spanish Irises (I. Xiphium).

Alex. von Humboldt, blue.
Blanche Superbe, white.
*Blue Beauty, violet and azure blue.
Cantab, azure and Cambridge blue.
Carmen, rosy purple and yellow.
*Catherina, sapphire blue and white.
Chrysolora, bright yellow.
Golden King, golden yellow and orange.
*Jaune Brilliante, orange yellow.
Princess Ida, white and primrose.
*Queen Isabella, primrose, yellow, and orange (*see* coloured plate).
*Snow Queen, white.
Sunset, lavender and yellow.
*Thunderbolt (lusitanica sordida), bronze.
The Moor, chestnut and gold-brown.

Selection of various Bulbous Irises.

alata, pale blue, 6 ins.
Bakeriana, blue and white, 6 ins.
Danfordiæ, yellow, 4 ins.
juncea, yellow, 15 ins.
*orchioides, yellow, 1 ft.
persica, pearl blue and white, 6 ins.
reticulata cyanea, pale blue, 9 ins.
histrioides, blue, 6 ins.
reticulata Krelagei, red purple, 9 ins.
major, deep violet, 1 ft.
Rosenbachiana, white and violet, 6 ins.

These all flower early. The hardiest are the varieties of reticulata. The others should have a warm, rather dry position in light soil.

NARCISSUS.

Although the narcissus has only lately received the full recognition its beauty and usefulness deserve, it has for very many years been prized by admirers of the highest types of floral beauty. Gerarde (1597) speaks of twenty-four kinds as being grown in abundance in London gardens, and only a few years afterwards Parkinson mentions nearly a hundred kinds. Since Parkinson's time much has been done in the way of raising seedlings, Herbert, Backhouse, Leeds, and Nelson adding many exquisite flowers to the older forms. To John Horsefield we are indebted for the fine bicolor which bears his name; and the work has been continued in recent years by such florists as De Graaf and Engleheart, an example of whose work is given in the hybrid Narcissus Albatross (Fig. 26). This was obtained by crossing a Poet's Narcissus with a Trumpet Narcissus, and is intermediate between them. Mr. Peter Barr, of the well-known firm of Messrs. Barr and Son, King Street, Covent Garden, a great admirer of the narcissus, deserves much of the credit for the favour with which the flower is now

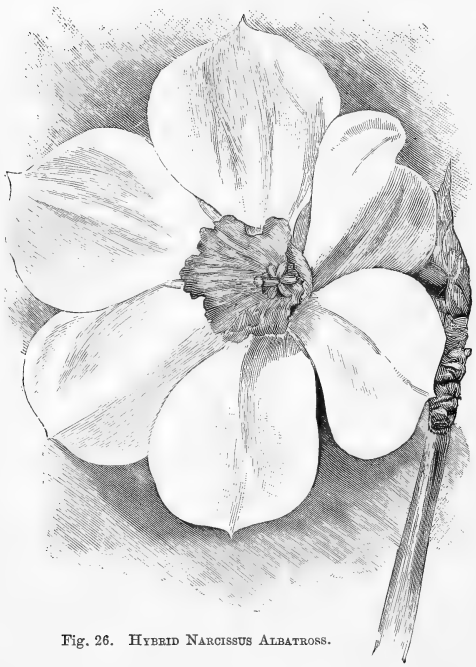

Fig. 26. Hybrid Narcissus Albatross.

viewed; a great feature having been made of the daffodil at the spring shows, and its cultivation having been taken up by him on an extensive scale. To him is also due the re-introduction of some of the narcissi known to the older florists, but lost to cultivation; his travels in Spain and Portugal in search of these leading also to the discovery of forms before unknown.

Gerarde, Parkinson, Salisbury, Haworth, Herbert, and, more recently, Mr. J. G. Baker and Mr. F. W. Burbidge, have, by their writings, contributed much to our knowledge of the narcissi. The Daffodil Conference held by the Royal Horticultural Society in April, 1884, exerted also a great influence in favour of their cultivation, while the appointment by that society of a Narcissus Committee secured the adoption of a more scientific nomenclature, and in other ways greatly promoted the cultivation of the flower.

So much has been written and said of the daffodil that it is almost superfluous to say anything more in its favour. Its beauty commands admiration. None of our early flowers is more worthy of praise. Its value in the garden, the shrubbery, the park, the wood, and for cut flowers is incalculable. Its nodding trumpets and chalice-shaped cups give delight to all—a delight increased by the more glorious or more refined beauty of some of the newer flowers. A garden without the daffodil is unfurnished indeed, and the greenhouse may be made gay with it in early spring ere the outdoor flowers have come into bloom.

The genus Narcissus belongs to the Natural Order of Amaryllideæ, and is found in various parts of Europe, North Africa, and North and West Asia. It has been very fully described and arranged by Mr. J. G. Baker in his "Handbook of the Amaryllideæ," * which may be referred to for botanical details. Mr. Baker's arrangement in three sections is a convenient one, which is generally followed in the selections which are given below.

The first of these are the plants included in the Magnicoronati, with a funnel-shaped or cylindrical cup, as long as the perianth segments; the second are Mediocoronati, with a cup-shaped crown, about half as long as the perianth segments; and the third, the Parvicoronati, with a small obconical or saucer-shaped crown.

The first of these include what are known as the Trumpet Daffodils, perhaps the finest and most admired of all. The Mediocoronati embrace the elegant N. triandrus, "Angel's tears," with reflexed petals (Fig. 27); N. incomparabilis, the "Great None-

* London: G. Bell & Sons. 1888.

such Daffodil"; and N. odorus and N. juncifolius? the sweet-scented Campernelle and Rush-leaved narcissi. The other section includes N. Tazetta, the "Bunch-flowered narcissus"; the Poets' Daffodils, and the beautiful Jonquils so much admired by all.

A good narcissus should have a stout stem, and the segments and corona with substance—not flimsy, but stout.

The cultivation of the narcissus in general presents no difficulty, with the exception of a few of the species and varieties. In beds, mixed flower borders, and in shrubberies it usually does well. Some kinds, however, require to be planted out in grass, and nearly all are suitable for this. Thus planted they may be undisturbed for years, and when established present a superb effect. The meadow, the orchard, the hedgerow, and the grassy bank may all be mentioned as illustrative of suitable places, and in woodland walks, not too densely shaded, they are charming in the spring months.

Fig. 27. Narcissus triandrus.

For planting in grass the noble Trumpet varieties, the varieties of N. incomparabilis, and those of N. poeticus are especially suitable; but in select places the charming little minimus, nanus, and other dwarf flowers look very beautiful. The grass should not be cut until the leaves of the narcissi have become yellow.

A good loam free from fresh manure is the most suitable for the narcissus; but, should the soil be poor, bone meal or bone dust may be added at the rate of about 2 ozs. per square yard. Keep the crown of the bulb about 3 inches below the surface if a strong-growing narcissus, or 2 inches if a weaker one. The best time for planting is from the middle of July until the middle of November, as near the earlier date as possible. Some large growers lift the bulbs annually and dry them before re-planting. The poeticus section should not be dried, and ought to be re-planted at once.

In the south an aspect facing the north, or at least with partial shade, is preferred by many growers, but others of great experience grow them in full sun with good results; in the north it will be found that the narcissus flowers more freely with more sun than it would receive with a northern aspect. The white Trumpet varieties

often fail in rich soil, and generally thrive better in grass than in cultivated ground. The unique N. cyclamineus, the only Trumpet narcissus with reflexed perianth, is a little difficult to establish in some gardens, but may be grown in rather moist soil at the base of rockwork. An eminent authority on the narcissus recommends raising this quaint little flower from seeds, as he finds it die off after flowering; but some have succeeded in establishing it in moist peat at the base of a rockery with a due south-west exposure.

Fig. 28. Narcissus Southern Star.

The Hoop Petticoat daffodils (N. corbularia or Bulbocodium) may be grown on a moist subsoil with a few inches of peaty soil above. A milk-pan without drainage is successfully used by some growers in the following way. It is sunk into the ground to about 4 inches below the surface. A small drain pipe is then set upright in it, and the pan is filled with peaty soil, which is added until level with the surface. Water is poured into the upright drain pipe, so that the soil is saturated in summer. The bulbs are planted in the soil just above the pan. The white N. corbularia monophylla ought to be grown in pots or pans of gritty soil; in frames; or at the foot of a warm sunny wall. N. triandrus (Fig. 27) is a delightful little plant for rockwork, between stones, but often fails in the north. The dwarf daffodils make most attractive edgings, and may be carpeted with dwarf plants such as Thymus serpyllum, or Campanula pumila.

For indoor cultivation the narcissi are charming flowers. For a 4 or 5 inch pot use from three to six bulbs of the larger narcissi; a larger number of the smaller ones ought

to be planted in each pot. For cutting in quantity plant the bulbs very thickly in boxes 5 or 6 inches deep and cover them with very little soil. Place the pots or boxes on a bed of ashes outside. Cover with cocoa-nut fibre refuse or ashes until the plants have made a little top growth and filled the pots with roots. Some kinds of coal-ashes are injurious. When growth has been thus begun, take the pots or boxes indoors where the plants are to bloom, giving a good supply of water. For very early flowering place in a moist forcing-house.

Fig. 29. Narcissus Ellen Willmott.

As a cut flower the daffodil is of rare beauty, producing the most artistic effects if arranged in a simple way. It lasts long in water, and if cut before fully opened expands perfectly. Choice varieties it is desired to see in perfection may thus be cut and taken indoors, where their flowers will not be disfigured by bad weather. If the flowers are to be sent away in a box or other package they ought to be cut before opening fully.

The narcissus is propagated by offsets from the bulbs, which, in some varieties, form freely. The best time for separating these is when the foliage has withered. New varieties are obtained by raising from seeds. This process is a slow one, it being several years before the seedlings flower. The seeds may be sown soon after being gathered in pans filled with sandy loam. After the first season's growth is completed the young bulbs, which are very small, may be planted in a bed or border, where they may remain until they have shown their first flowers, which only form an imperfect test of their merits.

The hybridising and crossing of narcissi is very interesting work. The following notes on the parentage of the various sections, may be a guide to those beginning. Yellow trumpet narcissi and N. poeticus produce the incomparabilis and Barri varieties. White trumpets and poeticus give the beautiful Leedsi varieties; bicolor trumpets and poeticus yield Backhousei, Nelsoni, and Macleai. Bernardi is between the trumpet variety abscissus and poeticus. Odorus is between the jonquil and a trumpet narcissus, and biflorus comes from poeticus and a tazetta. Burbidgei is from incomparabilis and poeticus. Narcissi are rarely subject in this country to the attacks of the narcissus fly (Merodon clavipes), but some varieties are liable to what is known as basal rot. The cause of this and its remedy are still obscure.

Selections of Narcissi.

The more expensive varieties marked (†).

Those marked (*) some growers consider to prefer the shade of deciduous trees, or to be planted in grass in shady corners or on slopes facing north.

MAGNICORONATI.

corbularia citrina, pale yellow.
,, conspicua, golden yellow.
,, monophylla, white.

Yellow Trumpet Daffodils.

†Captain Nelson.
cyclamineus major.
Emperor
†Glory of Leiden.
Golden Spur.
Henry Irving.
†J. G. Baker.
Johnstoni, Queen of Spain.
maximus.
minimus.
minor.
†Monarch.
nanus.
obvallaris.
P. R. Barr.
†Samson.
Santa Maria.
Sir Wm. Harcourt.

Narcissi with Yellow Trumpets and White Perianths.

Ada Brooke.
Dean Herbert.
Empress.
grandis (Grandee).
Horsefieldi.
J. B. M. Camm.
†Madame Plemp.
†Ellen Willmott (Fig. 29).
†Weardale Perfection.

Narcissi with White or Sulphur Trumpets and Perianths.

*cernuus.
*Dr. Hogg.
Lady Grosvenor.
†Madame de Graaf.
Mrs. J. B. M. Camm.
Mrs. Vincent.
*moschatus.
*pallidus præcox.
*Rebecca Syme.
*tortuosus.
W. P. Milner.
*William Goldring.

MEDIOCORONATI.

Selection of N. Incomparabilis.

Flowers with Chalice-shaped Cups.

Beauty.
C. J. Backhouse.
†Commander.
†Gloria Mundi.
Gwyther.
James Bateman.
†Lulworth.
Mabel Cowan.
Princess Mary.
Queen Bess.
Queen Sophia
Sir Watkin.

Selection of N. Barri with Shortened Chalice Cups.

conspicuus.
†Dorothy E. Wemyss.
Flora Wilson.
General Murray.
Maurice Vilmorin.
Sensation.

Selection of N. Leedsi.

White or Whitish Chalice-cupped.

Beatrice (Fig. 30).
Duchess of Westminster.
elegans.
Gem.
Hon. Mrs. Barton.
Katherine Spurrell.
Minnie Hume.
M. Magdaline de Graaf.
Princess of Wales.

Selection of other Chalice-cupped Narcissi.

montanus.
Humei, Hume's Giant.
Backhousei.
,, Wolley Dod.
,, William Wilks.
Macleai.
Nelsoni, major.
,, aurantius.
,, Mrs. C. J. Backhouse.
Bernardi, H. E. Buxton.
tridymus, A. Rawson.
odorus.
,, rugulosus.
triandrus albus.
juncifolius.

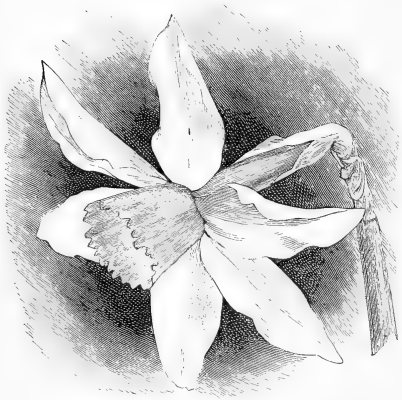

Fig. 30. Narcissus Leedsi Beatrice.

PARVICORONATI.

Selection of N. Burbidgei.

Hybrids of Incomparabilis and Poeticus.

Burbidgei.
Baroness Heath.
Beatrice Heseltine.
Ellen Barr.
Little Dirk.
Model.
Mrs. C. Bowley.
Ossian.
Vanessa.

Selection of N. Poeticus.

ornatus.
grandiflorus.
poetarum.
poeticus (of Gardens).
Southern Star (Fig. 28, page 59).

Various Narcissi of this Section.

gracilis.
biflorus.
schizanthes orientalis.
Jonquilla.

Selection of Tazetta or Bunch-flowered Narcissi for Pot Culture.

Bazelman Major.
gloriosus.
Grand Monarque.
Grand Soleil d'Or.
intermedius bifrons.
Jaune Supreme.
orientalis (Muzart).
Paper White grandiflorus.
Paper, Sir Isaac Newton.
Scilly Isles White.
White Pearl.
Double Roman.

Selection of Double Narcissi of Various Sections.

telamonius plenus.
minor plenus.
plenissimus.
capax plenus.
incomparabilis aurantius plenus.
,, albus plenus aurantius.
incomparabilis albus plenus sulphureus.
Jonquilla plena.
odorus plenus.
poeticus plenus.

Selections of Cheap Narcissi for Planting in Quantity.

Trumpet Varieties.

abscissus.
*Achilles.
major.
nanus.
obvallaris.
*spurius.
cambricus.
*English Lent Lily (pseudo-narcissus).
lobularis.
*pallidus præcox.
princeps.
telamonius plenus.

Chalice-cupped Varieties.

Cynosure.
Figaro.
Stella.
aurantius plenus.
Golden Mary.
Leedsi, Duchess of Brabant.
Macleai.
odorus.

Short-cupped Varieties.

Burbidgei.
,, John Bain.
poeticus ornatus.
,, angustifolius.
,, of Gardens.
,, double.
biflorus.
Jonquilla.

THE PÆONIA.

The beauty and variability of the Pæony early attracted the notice of the florist, with the result that the varieties of both sections may now be counted by hundreds. The brilliancy of colour and the size of the flowers of both the Moutan, or Tree, and the herbaceous Pæonies compel admiration, however much some may decry them as gaudy; and their effectiveness in the garden can hardly be gainsaid. Like many other flowers, they must be used with judgment; and those who deprecate their beauty can hardly be acquainted with the chasteness of colouring shown by many, while the single varieties may be commended to those whose taste is averse to the double flowers given by a large number of the plants.

So far as can be gathered, the first of the herbaceous pæonies was introduced about 1548; the tree one following a considerable time later—in 1789. The number of species of herbaceous pæonies is large, but it is to P. albiflora, a native of Siberia and neighbouring countries, that we owe our florists' varieties, with a few exceptions. There has lately been a revival of interest in the other species, with the result that several varieties of some of these have been distinguished, and these are likely to be increased in the near future. A selection of the most distinct of the species is given, but space will only allow of the remark that some of these are plants of considerable character and beauty.

The Moutan or Tree Pæony (P. Moutan), a sub-shrub, is not so much known as it should be—a circumstance due to some extent to its liability to injury from spring frosts. There is no doubt of its hardiness, however, and its large flowers, which are unique in their way, are great favourites with the Japanese and Chinese, who have long cultivated these plants. Mr. J. G. Baker's synopsis of the genus distin-

guished the Moutan pæony from the herbaceous groups by the disk of the former enveloping the base of the carpels ; that of the latter not presenting this feature.

The Tree Pæony flowers about May, as also do the varieties of P. officinalis and some others of the herbaceous section, followed in June by the varieties of albiflora and others. The general appearance of the Pæony is too well known to require description.

The requirements of the florist with regard to the Pæony as an exhibition flower are well represented by the "Rules for Judging" of the Royal Horticultural Society. In judging these flowers it is recommended that the scale of points should be "Size and fulness of bloom" 2, "Regularity of guard petals" 1, Compactness and symmetry" 1, "Clearness of colour and freshness" 1, "Average evenness of blooms" 1.

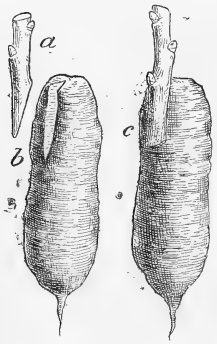

Fig. 31. Root Grafting of Pæonies.

The cultivation of the Pæony presents few difficulties. A rich soil deeply trenched and highly manured will grow it to perfection, and poorer soils enriched by the addition of a large quantity of manure will also give good results. The tree pæonies are the better for the protection of a mat during severe frosts, whenever it is seen that they have begun to shoot, the young growths being liable to injury when tender. They should also have a warm and sheltered position. Grown in pots for early flowering they form striking plants for the conservatory.

Herbaceous pæonies look very well in front of shrubberies, among other flowers in large borders, or in beds by themselves. When grown in beds a magnificent effect is presented from a little distance if the colours of the plants are properly arranged. To grow them successfully liquid manure may be applied to the beds in dry weather.

The tree pæonies are usually propagated in August, by grafting them on the roots of the herbaceous species ; choosing for the purpose scions without flower buds (see illustration (Fig. 31) from Burbidge's "Propagation of Cultivated Plants," Blackwood). The roots should then be potted, plunged into a frame, and kept close until a union is effected. The soil in which the pots are plunged ought to come over the junction of the scion and root. Occasionally, division of the roots may be followed, and layering is sometimes practised.

The herbaceous species and varieties are increased by division of the roots, one or more crowns being kept on each piece. August is one of the best months for division, but it may also be performed a little later, or in spring. The same seasons are also the most suitable for planting.

New varieties are obtained by sowing the seeds as soon as ripe, either in beds in the garden, or in pots or pans under glass. The seeds lie a long time before the plants appear—sometimes several months—and the seedlings are slow in attaining a flowering size, so that raising from seeds can hardly be recommended. In the selection which follows only the principal colours of the flowers are given, some flowers showing several shades of colour.

Selection of Double Herbaceous Pæonies.

Varieties of P. albiflora.

*Agnes Mary Kelway, rose and yellow.
candidissima, primrose.
*Comte de Gomer, deep crimson.
Comte d'Osmonte, white and yellow.
Cyclops, purple crimson.
*Duchess de Nemours, snow white.
Duchess of Teck, cream and pink.
Duke of Devonshire, rose.
festiva maxima, snow white.
*François Ortigat, purple.
Grizzel Muir, white.
John Fraser, cerise rose.
*Lady Beresford, rose pink.
Lady Carrington, flesh.
*Lady Leonora Bramwell, silvery rose.
*Madame Breon, peach blossom.
Madame de Galhau, pink.
Marguerite Gérard, white and cream.
Miss Brice, rose and yellow.
Moonbeam, white.
Miss Salway, white and sulphur.
Princess Beatrice, pink and yellow.
* ,, Christian, white.
,, Clothilde, pink, cream, and blush.
,, Irene, pink.
,, May, cream.
Queen Victoria, flesh.
rubra triomphans, rich crimson.
*Sir Henry Irving, rose pink.
Sir Walter Scott, rose.

Selection of Single Pæonies.

Varieties of albiflora.

*autumnus, purple.
Beauty, rose.
*Blucher, carmine.
Dreadnought, crimson.
*Duchess of Sutherland, pink.
*Emily, bright pink.
Millais, maroon.
Purity, white.
Queen of May, pink.
Rosy Dawn, white.
*Stanley, maroon crimson.
*The Bride, pure white.

Selection of European and other Species of Pæonies.

Those marked (‡) are double.

*anomala, rosy lilac.
*arietina, crimson.
Broteri, crimson.
corallina, deep crimson.
*decora elatior, crimson.
Emodi, satin white.
officinalis anemonæflora, crimson.
‡ ,, fl. pl., crimson.
*‡ ,, alba, fl. pl., white.
‡ ,, rosea, fl. pl., rose.
paradoxa, purple.
peregrina, crimson.
* ,, Exquisite, pink.
*‡tenuifolia, fl. pl., crimson.
tenuifolia rosea, blush rose.

Selection of Tree Pæonies (P. Moutan).

Those marked (*d*) are double or semi-double.

(*d*) Agenoria, rose and white.
(*d*) Alchemist, deep purple.
(*d*) Beauty of Canton, mauve.
(*d*) carnosa, flesh.
(*d*) Eastern Prince, dark scarlet.
Ella C. Stubbs, white.
(*d*) Leonard Kelway, French white.
Lord Iveagh, rosy red.
(*d*) Marchioness of Granby, rose.
papaveracea, lilac, blotched purple.
(*d*) Reine Elizabeth, reddish salmon.
(*d*) Robert Fortune, rose.

PANSIES AND VIOLAS.

While, for convenience in speaking of them, it may be well to distinguish between the pansy and viola, there is so little real difference in the flowers that it is more convenient to treat of them and their cultivation under one heading.

The "Show" pansies, with their refined yet quaint-looking blooms; the "Fancy" varieties, with their large and strikingly-coloured flowers; and the violas, or "tufted" pansies, are all so beautiful that it is needless to praise their qualities. We may thus pass on to tell of their history and cultivation.

The introduction of the pansy as a florist's flower appears to be due to Mr. Thompson, gardener to Lord Gambier at Iver, near Uxbridge, who, in 1813 or 1814, at his employer's request, took in hand the improvement of the common Viola tricolor dug from the fields. It is sometimes said that other species had a share in the production of Mr. Thompson's Pansies, but his statements give no countenance to this opinion, although many of the earlier flowers figured bear a strong resemblance to some of our modern violas which are admittedly hybrids. Be this as it may, the show pansies were quickly evolved from these early flowers.

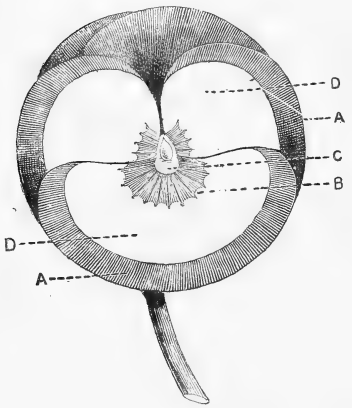

Fig. 32. Show Pansy.
References:—*A A*, belt; *B*, blotch; *C*, eye; *D D*, ground colour (white or yellow).

Beautiful as the "show" pansies are, they have fallen back in popularity since the improvement of the "fancy" varieties, which are understood to have been obtained from pansies introduced from Belgium. More recently still the hardier, more compact, and more profuse flowering "violas," obtained by fertilising some of the pansies with natural species, have grown rapidly in favour and bid fair to be more largely grown than the others. To the florist, however, a show-board of "show" or "fancy" pansies gives the keenest pleasure, and the delight with which he examines a bed of the choicest varieties is unbounded.

There is no better definition of the properties of the show pansy than that given by the late George Glenny, which is as follows:—

Form and Texture.—The outline should be a perfect circle, and free of every

notch, serrature, or unevenness, the petals lying close and evenly on each other. Texture thick, and of a rich, glossy, velvety appearance.

Colour.—In all two-coloured flowers, the ground colour (of whatever shade) should be perfectly alike in all the three lower petals, circular, and of equal width between the blotch and belt in the three lower petals.

Belting.—The belt or margin should be exactly the same shade as the two top petals, and whether broad or narrow, should be of equal breadth throughout, without running into or flushing with ground colour.

Blotch.—The blotch should be dense and solid, and of a circular character, free from all running into or through the ground colour, or the eye.

Eye.—This should be bright gold or orange, and solid, without mixing or running into the blotch, and should be exactly in the centre of the bloom.

Size.—The larger bloom (other properties being equal) should be the better, but no flower should be considered fit for competition under $1\frac{1}{2}$ inches diameter.

Selfs.—Of whatever colour, should be of the same shade throughout, in yellow, white, blue, or any other shade, the denser the blotch the better.

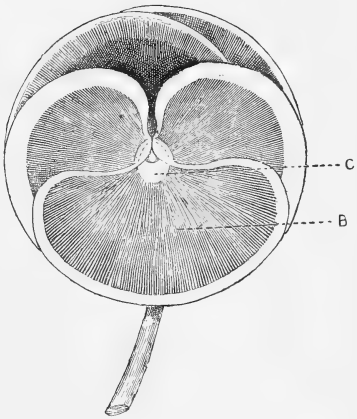

Fig. 33. Fancy Pansy.
References:—*B*, blotch; *C*, eye.

The above description is applicable to fancy pansies with the exception of that as to "belting." In the top petals the colours may run into each other. The blotches ought to be dense and solid, and the margins of the under and the two side petals regular and distinct. The margins of the three petals should meet and form three parts of a circle. No fancy pansy should be less than $1\frac{3}{4}$ inches in diameter. A show Pansy is depicted in Fig. 32, and a fancy in Fig. 33, which have been taken from Mr. James Simkin's excellent work on the Pansy (Simpkin, Marshall & Co).

The properties of what is known as the "viola" may be described as follows:—The flowers ought to be as nearly circular as possible; the petals of good substance and

smooth. The colour should be well defined in the selfs, and in blotched and belted flowers it must be harmonious.

The stems ought to be stout and erect, and of such a length as to bring the flowers well together. The habit (an important consideration in this flower) should be dwarf and procumbent, short-jointed, and bushy or "tufted."

The "rayless" varieties must have no central ray or marking, and the "miniature" or "Violetta" type should not be more than $1\frac{3}{4}$ inches nor less than 1 inch across.

Growers vary considerably in their methods, but that which follows has been proved by the writer to be as good as any. It is based upon the directions of a successful cultivator for exhibition.

A suitable soil for pansies and violas is a good, fresh, turfy loam of medium texture; but as this is not always obtainable it is as well to know that it is not absolutely necessary. Heavy, damp soil may be made suitable by trenching the earth two spades deep, mixing, as the work proceeds, lime rubbish, $\frac{1}{2}$-inch or $\frac{1}{4}$-inch bones, well-decayed manure, and wood ashes. A dressing of soot is also beneficial, forking it over afterwards. Light soil can be improved by mixing with it old cow-manure, bone-meal, soot, and turfy loam, the bed being trenched to the same depth as in the case of heavy soil. Prepare the bed in autumn and fork it over occasionally afterwards.

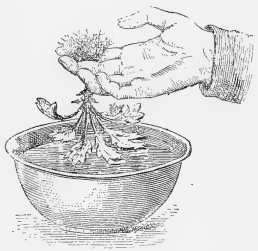

Fig. 34. Dipping Plants.

Pansies may be planted during mild weather, from the middle of March, so that the roots may penetrate deeply before the setting in of hot weather. Before planting fork over, rake, and level the beds, marking them into squares of about 12 inches with a piece of board pressed across the bed. The intersection of the lines shows where to put in the plants. If these are in frames lift them with a hand-fork, leaving as much earth about them as possible. The pansies may be planted in holes dug to receive them about 6 inches deep. Into these place a little compost of loam and decayed manure or leaf-mould; place the plant in the centre and fill up the hole with the same compost, making the plants firm. If there is any suspicion of insects when planting, Mr. Simkin's plan of dipping in soft soap and tobacco water (Fig. 34) is an excellent one, and equally applicable to other kinds of plants.

After planting give the soil a good watering. Keep the surface of the beds between

the plants well stirred nearly every week. Never allow them to flag through want of water; and the application of one to two ounces of guano to the square yard two or three times in the season, watering it in in the evening, is a great benefit. Syringe the plants after very warm and dry days.

If for exhibition, thin the stems out to three to each plant, and do not allow any buds to remain which will open until about the time required. A week before the show is generally a suitable time at which to stop disbudding, but much depends on the weather. The pansy does not stand hot sun, and blooms for exhibition ought to be shaded with tiffany or other light material, or with small covers of bent tin or stiff pasteboard fastened to a small stake.

The propagation of all sections of the pansy and viola is effected by seeds, cuttings, and occasionally by division; cuttings being, however, the best way of increasing particular varieties. Raising seedlings is very interesting work if the seeds are saved from good flowers, and it is in this way that new varieties are obtained. Several good strains of bedding pansies are offered under various names.

The seeds may be sown as recommended on page 241, Vol. I., sowing them indoors about the beginning of February. When the seedlings have made the second or true leaf they should be pricked out in boxes in rows about 2 inches apart and $1\frac{1}{2}$ inch between the plants. A good compost is loam, leaf-mould and sand sifted through a half-inch sieve. Place in a house or frame with gentle heat, keeping them near the light, and, when established, give plenty of air. After making two or three pairs of leaves, gradually harden off in cold frames, and then plant out where they will bloom. Most of these will flower the same season, and all inferior ones must be discarded. Good plants for bedding may be raised from seed sown in the open, as advised on page 241, Vol. I.

In propagating by cuttings avoid unhealthy and weak plants. Do not choose long, thick, or hollow stems, but short ones from the base as near the root as possible, if they can be obtained, with not fewer than four or five joints. If such are at command, with a sharp knife cut off the leaves from two of the lower joints, then cut the stem right across below the lowest joint. The cuttings may be inserted in soil surfaced with sand in frames or boxes, the former being preferred. September is the best month for this purpose. See pages 189 and 213, Vol. I.

The frame ought to be placed so as to have a northerly exposure. Before placing the frame in its position dig the earth where it is to stand one spade deep. Place the

frame on it; then surface the earth with six inches of compost formed of equal parts of loam, decomposed manure, fine sand and leaf-mould. Add about four inches of the same soil with the addition of one part more sand. Press this down, water with a fine rose, and, after letting it remain for an hour, insert the cuttings in lines about three inches apart. Take care that each cutting rests firmly on its base and that it is well in contact with the soil all the length below the surface.

Water the cuttings through a fine rose, and keep the frame close and shaded from sun for about a fortnight, when air may be gradually admitted and the shading removed. Give air at all times, with the exception of during hard frost. In severe frost place a mat over the frame. Should good weather prevail about a fortnight or so before planting-out time in the spring, remove the frame from the plants. Be careful during winter to remove all decaying leaves, and practise constant cleanliness about the frames. Keep also a good look-out for slugs. If the cuttings are struck in boxes they must be placed in frames; the same routine to be adopted as if planted in soil in the frames themselves. Division of old plants does not usually give the best results, but it may be done in autumn or spring.

Some growers in certain localities grow their pansies in pots, but this involves a great deal of additional trouble. A good method of treatment in pots is as follows:— In the beginning of October place stout plants in well-drained 4-inch pots filled with good, open soil; keep them in a cold frame with a southerly exposure, affording sufficient light and air for promoting sturdy growth. During moderate weather the frames are better without the lights, but when severe they may be put on and covered with mats. Early in February the pansies ought to be shifted into larger pots 7 or 8 inches in diameter, filled with soil similar to that recommended for beds. Tie out the stems and thin out the buds. In April remove to frames with a north exposure.

The pansy occasionally withers away suddenly; but it is difficult to give a cure for this defect in the plant. It is also subject to the attacks of green fly and red spider. Some insecticides are used for these in the proportions recommended on the packages, but great care is needed in their application or the plants will be injured. Vigorous growth in an open situation will generally ward off these enemies. For slugs, water with lime water.

Violas are generally hardier than either the show or fancy pansies, and, from the tufted habit of many, they are more adapted for division than the pansies. It is also found that they flower more freely if planted in the places where they are to

bloom in autumn than if only put out in spring. Cuttings should, therefore, be struck early, so as to have good plants in autumn. In very cold localities, or within the confines of populous cities, such as the parks of London, it is desirable to practise autumn propagation and spring planting, except in the case of a few varieties of less hardy constitution. A typical specimen of a bedding viola is represented in Fig. 35.

In order to have the full benefit of their continuous blooming habit, Violas ought to be planted early to get deep and firm root-hold before the summer, and should also have a top-dressing of good old manure or leaf-soil put through an inch sieve and well worked among the plants in June. Unless it is intended to save seed, all seed-pods and decaying flowers must be picked off. The plants of the Violetta section usually come into bloom later than the others. Violas are exhibited in sprays of from six to nine blooms.

Fig. 35. Spray of Bedding Viola.

The difficulty of selecting a small number of pansies and violas from among so many meritorious varieties is very great. New varieties are constantly being introduced, and the selections below are not therefore to be taken as including all the best flowers.

Selection of Show Pansies.

Dark Selfs.
Alexander Lister.
Black Knight.
Graham Murray.
Major-General Stewart.
Mary Robertson
Sir Wm. Arrol.

White Selfs.
Bobby Harper.
Mary Mitchell.
Maud Stewart.
Miss Cramb.
Mrs. Gladstone.
Mrs. Kirrigan.

Yellow Selfs.
Bella Wilson.
Maggie Milne.
Miss Jane McLaine.
Mrs. D. Baxter.
Provost Colville.
Winnie Irvine.

Yellow Grounds.
Chaucer.
Colonel Stirling.
G. C. Gordon.
John Borrowman.
P. C. D. Boswell.
Peter Simpson.

Selection of Show Pansies (*continued*).

Wm. Beatson.
Wm. Frater.
White Grounds.
Agnes Borrowman.
Agnes Kay.
Grace Darling.
Jessie Thomson.
Mrs. Finlayson.
Mrs. J. G. Paul.
Mrs. Wilson.
Royal Visit.
W. E. Gladstone.

Selection of Fancy Pansies.

Agnes Mabel.
Alexander Ollar.
Andrew Struthers.
Andrew Frater.
Celtic Gem.
Cluny McPherson.
Col. M. R. G. Buchanan.
Constance Steel.
David G. McKay.
David Rennie.
Emeline.
Endymion.
George Anderson.
H. A. Stuart.
Jeanie P. Tait.
John Allan.
J. J. Ashton.
John McLellan.
Joseph McNish.
Lady Duff.
Maggie Laurence.
Mary Irvine.
Miss F. Harrison.
Miss Stirling.
Mrs. J. Bolton.
Mrs. G. P. Addie.
Mrs. M. Cuthbertson.
Mrs. J. Downie.
Mrs. Lister.
Mrs. Sherrard.
Mrs. John Smellie.
Mrs. Spence.
Mrs. W. Watson.
Thomas Dagg.
W. B. Smellie.
Wm. Paul.

Selection of Bedding Violas.

The following are selected from those which proved most satisfactory at the trials of bedding violas, at Regent's Park, London, 1896. Those marked * are especially suitable:—

*Acme, purple.
*Archie Grant, blue.
*Ardwell Gem, sulphur yellow.
Border Witch, pale blue.
*Bullion, yellow.
*Countess of Hopetoun, white.
*Countess of Kintore, purple, white edge.
Countess of Wharncliffe, white.
*Duchess of Sutherland, bluish [mauve.
*J. B. Riding, mauve.
Lemon Queen, lemon.
luteola, yellow.
*Lord Elcho, orange yellow.
*Mrs. Charles Turner, purple.
*Niphetos, creamy white.
*Norah May, silvery white.
*Pencaitland, pure white.
Princess Beatrice, rose.
Princess Ida, rose heliotrope.
*Princess Louise, rich yellow.
*rosea pallida, blush.
Rosine, blush, pink, and mauve.
*Sylvia, primrose.
*The Mearns, plum.
*True Blue (Dean), blue.
*Wm. Niel, pale rose.

The following are also among the best of the bedding violas:—

Bessie Clark, light mauve.
Blue Cloud, white, edged blue.
Crimson King, crimson and white.
Duchess of Fife, primrose, blue edge.
Favourite, light blue.
Holyrood, dark blue.
lilacina, rich lilac.
Royalty, yellow.

Selection of Exhibition Violas.

A. J. Rowberry.
Blush Queen.
Charm.
Cherry Park.
Colleen Bawn.
Columba.
Commodore.
Countess of Hopetoun
Countess of Wharncliffe.
Craigie.
Dandie Dinmont.
Duchess of Fife.
Duchess of Sutherland.
Florizel.
George Lord.
Hamish.
Harry W. Stuart.
Iona.
Iris.
Jessie Pretsworth.
Lavender King.
Lizzie Barron.
Lucy Bertram
Mary Stuart.
Mrs. Frater.
Mrs. Wm. Haig.
Mrs. R. K. Mitchell.
Princess Ena.
Miss Gibson.
Prince of Wales.
Sylvia.
Wm. Haig.
York and Lancaster.

Violas—Violetta Type.

(*Small-flowered.*)

Blanche, white.
Dr. Stuart, white.
Gold Crest, golden yellow.
Lilian, lilac.
May, lavender and white.
Myra, sulphur.
Oliver, violet blue.
Picotee, white-edged blue.
Violetta, white.
White Lady, white.

PELARGONIUMS.

All the more popular varieties, included in the Large-flowering, Show, Decorative, Fancy, Zonal and Ivy-leaf sections, have originated from the earlier introductions of pelargoniums from the Cape of Good Hope, and are the outcome of much well-directed zeal on the part of florists. At one time the show and decorative sections were mostly grown, but these have scarcely held their own with the more generally serviceable single and semi-double zonal varieties. Not because there has been any relaxation in the direction of raising new and improved varieties of show pelargoniums, but rather on account of the zonal section being more continuous in flowering, and easy to be had in attractive condition during the duller months of the year. All are alike easy to propagate and cultivate, and are well within the reach of every one having a greenhouse to partly devote to them.

Show, Decorative, and Fancy Sections.

Of the show or true florists' pelargonium it may be said the leaves are crisp and more or less deeply cut. The flowers should be nearly flat and not in the least reflexed. Petals nearly equal in size, rounded and smooth at the edges, of good substance, and arranged in a perfect circle. Size of bloom not less than 1½ inches in diameter. Colours clear, distinct, and bright, with uniform edges, into which the dark blotch should not run. The plant ought to be dwarf rather than tall in habit, and floriferous. The truss should stand up well above the foliage, and the number of blooms forming a truss be not less than five.

Propagation.—Cuttings of firm young side shoots that have not flowered may be rooted any time from the spring to the autumn, but the usual time is when the plants are cut down after flowering, though it is better to take them sooner. Shorten these young shoots to a length of 2 inches or rather more, cutting cleanly across below a joint, and trim off the lower leaves. Lay them in a shady place long enough for the wounds to dry. Fill clean well-drained 4-inch pots with a mixture of fine loam two parts, leaf soil one part, and a sixth part of sharp sand, making this firm, and facing over with

sand. Insert the cuttings firmly three or four round the side of the pot. Plunge in a half-spent or mild hot-bed, taking care to exclude worms, or arrange the pots and cuttings in other warm quarters where they can be kept somewhat close, warm, and shaded. When the cuttings have commenced forming roots, gradually cease shading and admit a little air. Before the roots interlace each other, the plants should be placed singly in 2½-inch or slightly larger pots, using soil similar to that in which they were rooted. Return them to a warm frame or other close quarters not far from the glass, shading lightly till they have commenced rooting afresh, after which they must have abundance of light and air to induce a sturdy growth.

Fancy varieties are smaller in all their parts than the preceding, and less easy to propagate. In this instance short cuttings of young shoots should be inserted in shallow pans of sandy soil, placing these either on shelves in a propagating or other heated house, or raise them well up to the glass in a warm frame. Some of these varieties may also be increased by means of root cuttings. Short lengths of the thicker roots, each with a few fibres attached, can be detached from the old plants after flowering, and be either placed singly in 2-inch pots, or they may be started in pans similarly to the cuttings of young shoots, only just the top or thickest end showing out of the soil. Plunge in a warm frame, keep the soil uniformly moist, and shade from bright sunshine. Leafy growth will not be slow in forming, after which they should be treated similarly to other newly-rooted plants.

Raising Seedlings.—Seeds are gathered when ripe, divested of feathery appendages, wrapped in paper, and stored in a drawer in a cool room till the spring. Early in March is the best time for sowing. Fill pans or well-drained 6-inch pots with the same soil mixture as advised for cuttings, sow the seeds thinly on a level surface, cover lightly, set on or plunge in gentle bottom heat, cover with squares of glass, shade heavily, and if the soil is kept uniformly moist germination will quickly take place. Soon after the seedlings appear remove the pots to a shelf near the glass in gentle heat, and when the plants have formed a second leaf, place them singly in 2-inch pots, returning them to the shelves. Directly the small pots are well filled with roots, shift into 4-inch pots. Keep them growing steadily in light, airy quarters under glass, and early in June all may be arranged on a bed of ashes in the open. This will promote a bushy habit of growth, and cause the wood to become sufficiently firm to flower freely the following season. Winter the plants on shelves in a cool greenhouse, and do not top them, as the principal aim should be to prove the varieties as early as possible.

Retain only those which correspond with the characteristics already given of a good pelargonium, and increase by cuttings as previously advised.

Decorative Plants.

Strong-branching young plants flower profusely, and, all things considered, are the most generally serviceable. Those recently raised from cuttings and well established in 2½-inch pots should be topped, and when breaking afresh be shifted into 5-inch pots, arranging them in a shallow frame or pit and keeping it somewhat close for a few days. If two or three shoots result from the first topping, have their points taken out beyond the third leaf; enough shoots will then be obtained to form a strong plant. Another shift may be given to a few of the largest of the plants in the spring before they become root-bound, but the majority may be flowered in the 5-inch pots. Pot firmly, and in the summer grow the plants in a sunny position in the open air, standing the pots on a bed of ashes, and keep well yet judiciously supplied with water. Before cold rains or autumn frosts injure the plants, transfer them to light shelves or stagings not far from the glass in a greenhouse. They are less liable to be infested with green fly and are certain to flower the most satisfactorily when arranged thinly by themselves in a temperature that seldom exceeds 45° or falls below 35° during the winter, air being admitted freely whenever external conditions admit of this in safety. When the growths are lengthening and branching prior to flowering, support with light stakes, and also afford weak liquid manure frequently. During the flowering period shade from bright sunshine, and if bees can be excluded this will tend to prolong the beauty of the flowers. At this period abundance of moisture must be supplied to the roots. Early in the summer sturdy shoots are often seen which do not elongate for flowering; these, if taken off and at once inserted singly in small pots of

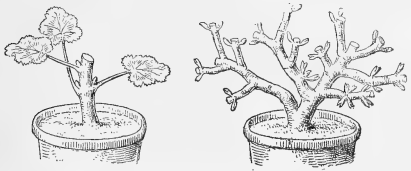

Fig. 36. Cutting Down Pelargoniums—First and Second Years.

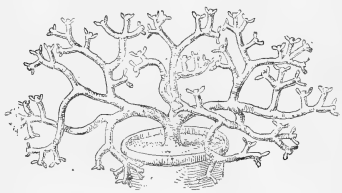

Fig. 37. Cutting Down Pelargonium—Third Year.

sandy soil and kept fresh in a warm house or frame, speedily emit roots, and under good management make attractive flowering plants the following season.

Specimen Plants.

Trained plants are sometimes required for conservatory decoration and also for exhibition purposes. Commence with young plants that have flowered once, selecting those with dwarf, well-balanced heads. After these have ceased flowering they should be rested in the open, giving only enough water to keep the wood plump. About the second week in August cut them down, shortening to within two or three joints of the main branches (Fig. 36, which shows the cutting down the first and second years). Give no water to the roots for about a fortnight, but daily syringings assist the plants to break strongly and evenly. When the young shoots are half-an-inch or rather less in length, all the plants should be turned out of the pots, have the soil removed, and the roots freely trimmed, so as to be able to return them to pots two sizes smaller than those they were previously in. For this potting the compost may consist of two parts sound fibrous loam to one of leaf soil and well-decayed manure, with enough sharp sand added to secure porosity. Pot rather lightly, and dispose on a bed of ashes in a shallow pit or frame, placing on the lights in wet weather only. Apply water sparingly till fresh roots have formed. Before the pots become crowded with roots

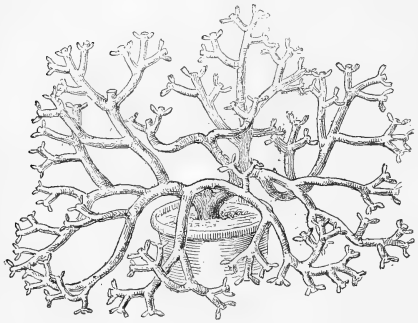

Fig. 38. Pelargonium—Established Plant.

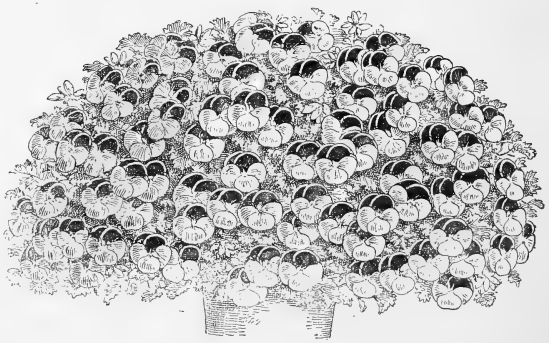

Fig. 39. Pelargonium—Flowering Specimen.

shift into the flowering size, which may be from 8 inches to 10 inches in diameter, according to the size of the plants and the pots they are in. This time a sprinkling of bone meal, or a small quantity of some special mixture used at the rate advised by the vendors, may be added to the compost already recommended, and in the case of vigorous growers firm potting is imperative, or the shoots will be sappy and not sufficiently floriferous. Experts advise preparing the soil and storing it in a heap some months before it is wanted, and it must not be in a wet state when used.

After this final potting, clear staging or large suspended shelves in a cool, light, well-ventilated greenhouse are suitable positions for the plants. Once more the watering must be done carefully, giving only sufficient to keep the soil just moist till well occupied by roots. If watered recklessly the new soil will become soured, and the leaves of the plants turn yellow and drop off in consequence. When the young growths are about 5 inches long train them outwards by means of strips of raffia attached to small string passed round below the rim of the pots, and top them. If more shoots are required resort to a second topping, and proceed with the training as before. When the shoots are long enough place a neat light stake to each, these being from 2 to 3 feet in length, forming a circular outline with a well-raised centre, and hide all bent stems. These specimen plants should be raised near the glass roof in a light greenhouse, allowing them a clear space all round. They ought also to be turned half round every few days, so that all portions of the plants may have an equal amount of sunshine.

When growing strongly and the pots are crowded with roots, abundance of water should be given, twice a day not being too often in some cases during hot dry weather, and weak liquid manure occasionally. The temperature recommended for young plants also suit the older ones. Trained specimens (Fig. 39), after they have ceased flowering, ought to be treated, as far as resting, pruning, and re-potting are concerned, similarly to the untrained small plants, and may be kept in a healthy, serviceable condition for several years. At the same time it is advisable to have young plants always coming on to take the place of the older ones as they become weakened by age.

Zonal Pelargoniums.

Although very showy at all times, especially if the newer varieties are grown, zonal pelargoniums (often called "Geraniums") have had to give way to tuberous begonias during the summer and early autumn months. The begonias fail in October, and from

that time the zonal pelargoniums are in the ascendant. If they fail to do well during the winter it is the fault of the grower. Young plants invariably give the best results, always provided they have not been allowed to weaken themselves by flowering during the summer. If a summer display is desired, prepare young autumn-rooted plants specially for that purpose, and do not rely on these for winter flowering. So many novelties being constantly offered by florists, such as Mr. Henry Cannell, selections given now would be out of date two or three years hence, and we will only observe that the semi-double flowering varieties of the F. V. Raspail type are the most generally serviceable in winter, and will endure and even enjoy a fair amount of fire-heat. A typical example of a single zonal pelargonium, from Messrs. H. Cannell & Sons' "Floral Guide," is represented in Fig. 40.

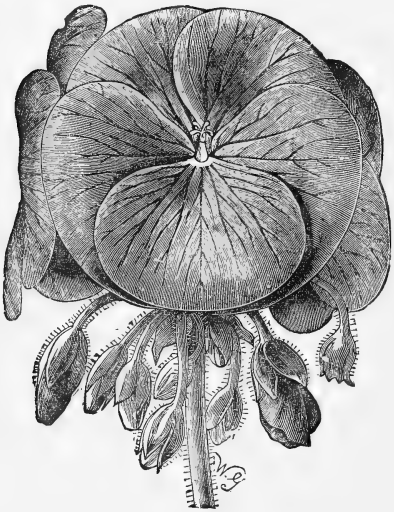

Fig. 40. Zonal Pelargonium.

Propagation and Culture. — In February select stout, short-jointed, firm shoots, not those hard and dry, which are difficult to root; also reject those which are gross and sappy, because they are liable to damp off; shorten the cuttings below the third joint, cut away the lower pair of leaves, and remove the scales. Spread the cuttings on a dry bench for the ends to dry, and then insert them, either singly in 2½-inch pots, or thinly round the sides of well-drained larger pots, taking care that the end of each rests firmly on the base, made with a blunt dibbler, and fix them firmly in their positions. Place them on either dry stagings or shelves in a forcing-house or other well-heated structure, not shading in any way, and giving water only to prevent shrivelling.

When they have formed roots, give more water, and duly pinch out the points of the plants. On fresh growths starting, there should be no delay in carefully separating those plants of which several are raised in a pot, potting them singly; but those already in small pots will be the first ready for shifting into the 5-inch size. After this shift, the

plants ought to be grown not far from the glass in warm frames or pits, and should have their shoots topped; when they are breaking afresh another shift may be given, this time into either 7-inch or 8-inch pots, in which size the bulk may be flowered. At this and previous pottings use a compost similar to that recommended for the show pelargoniums, and do not fail to pot firmly.

During the summer the plants may be arranged in an open, sunny position outdoors, setting them on boards with a view to preventing roots striking into the ashes or soil underneath. If this precaution is not taken the plants must be frequently turned round to break any roots that may have left the pots. Cease topping after July, keep the plants uniformly moist at the roots, and pinch off all flower buds till near the time for housing, which should be not later than the second or third week in September.

Winter Treatment.—An excess of heat and moisture promotes sappy, flowerless growth, and the other extreme, or an ordinary greenhouse temperature, is also unsuitable, the flowers not expanding properly, and damping is liable to take place. They require to be kept in a temperature ranging from 50° to 60°, and should be disposed thinly on a light staging over, or not far from, the hot-water pipes, or else be raised near the glass on inverted flower-pots. Maintain a dry atmosphere, and give water whenever the soil in the pots approaches dryness, with an occasional supply of clear soot-water or other weak liquid manure. Under this treatment the plants are equal to producing abundance of perfectly formed, highly coloured trusses of flowers during the dullest part of the year.

Trained Specimens.—Plants for exhibition may be grown much as advised in the case of show pelargoniums. The finest trusses are produced by young plants, or any, say, that are rooted in the summer, and kept growing all through the winter in a warm greenhouse. They ought to be raised up to the glass, have their shoots tied out and topped as often as they are forward enough for this to be done; moderately large, well-rounded specimens may then be ready for the shows in the summer. No flowers should be left on them till within a month or rather more of the time they are wanted to be at their best. These trained plants may be wintered in a greenhouse or cool vinery, only enough water being given to keep the roots alive and the wood from shrivelling. Early in the year cut back the stems to where the wood is matured and leafless, and re-start into growth in gentle heat. When young shoots are forming, turn the plants out of their pots, reduce the soil considerably, trim the roots, and return to the same

sized pots they were in before, potting firmly. If grown in a light position in a warm greenhouse, and the growths duly regulated, topping those requiring it, they will develop into extra fine specimens, from which flower buds should be removed till within six weeks of the shows. The plants require ample room, and during warm weather abundance of air. Those turned out into the open are apt to lose many of their best leaves, and neither the trusses nor individual flowers are so fine as those produced by plants under glass.

Ivy-leaf Pelargoniums.

Of these there are many excellent novelties annually introduced, including single, semi-double, and double flowering varieties, the two first sections proving the most generally serviceable. They are all very effective in hanging baskets, and form neat margins to the fronts of stages, while the stronger growers are admirably adapted either for clothing pillars in conservatories or for training over trellises. Cuttings of firm, yet not hard and dry, shoots may be rooted much as advised in the case of zonal pelargoniums. They should be kept growing in a temperature of about 50°, and be given more pot room as they require it. If dwarf trailing plants are needed, top them twice, and these will flower all the summer. In the case of plants that are to be trained over trellises, top these often enough to lay a good foundation, and gradually shift them into 9-inch or larger pots before commencing to train, then let them run, distributing the growths evenly and neatly over the trellises. They may be wintered with the trained zonal varieties, and be similarly treated early in the spring for producing fine specimens during the following summer.

Diseases and Insect Pests.

Show and fancy pelargoniums are most liable to be infested by green fly, which, however, may easily be kept in subjection by means of occasional fumigations with tobacco, or the nicotine preparations introduced of late years. Unless the plants are kept free from this pest they speedily become unsightly. Few or no insects trouble the zonal and ivy-leaf sections, but the leaves of winter-flowering plants are liable to become spotted, then turning yellow, the points of the shoots and eventually the whole of the plant succumbing to this disease. It is of a fungoid nature and there is no known remedy for it. Most instances of it occur among plants growing in comparatively low temperatures accompanied by a moist atmosphere, and the maintenance of a good circulation of warm dry air, also carefully avoiding over-watering, are the best preventive measures.

THE PENTSTEMON.

The pentstemon, which belongs to the natural order of *Scrophularineæ*, has, within a comparatively recent period, been included among florists' flowers, with the result that its beauty has been greatly increased. Some of the original species, all of which come from North America, are handsome plants, valuable for flower borders or beds; but in beauty of colour and form, size of flower, and general effect, the hybrids obtained from P. Hartwegi, P. Cobæa, and others, far surpass them for garden purposes. These hybrids have been much improved lately, so that flowers which, at one time, would have been considered of exceptional beauty, are now superseded by newer ones more nearly approaching the qualities wished. A valuable feature of the pentstemon is the succession of flowers it yields for several months.

A large bed of pentstemons of the most advanced type is very beautiful. The long spikes closely clad with fine gloxinia-like blooms of great size, attractive colours, and exquisite markings can hardly fail to please the most fastidious eye. In beds, lines, or groups the florists' pentstemon is much admired, almost its only faults being its early fading when cut and its doubtful hardiness. The latter is, however, hardly a fault when treated, as it ought to be, as a florist's flower.

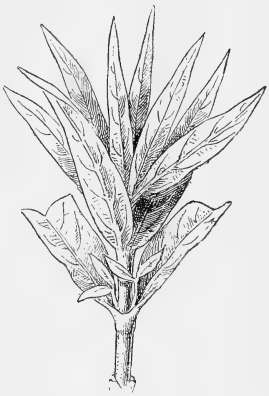

Fig. 41. Pentstemon Cutting.

The pentstemon should have the spikes long, symmetrical, stout, and slightly drooping, besides being closely set with flowers on one side. The flowers must be well expanded, with well-rounded lobes, forming a circular outline. Their substance must also be thick and firm. The markings of those with striped or painted throats ought also to be well defined, and the colouring is required to be bright, clear, and well defined.

Like nearly all florists' flowers, for outdoor cultivation the pentstemon needs liberal treatment. Any good soil will do, but a sandy loam, rather moist, is to be preferred. A good quantity of well-decomposed manure and leaf mould should be added, and frequent waterings given in dry weather. It is apparent that a plant flowering for so long a time in summer and autumn requires to be well supplied in this respect.

The pentstemon is propagated by cuttings or seeds, the former being the means by which good varieties are increased. Cuttings of the young growths round the main stem may be made in August or September, but this mode of increase can be adopted almost at any time. Take the points of the leafy shoots and cut them across just below a joint, so that they may be about four or five inches long (Fig. 41). Insert the cuttings in well-drained pots of light, sandy soil. Press them firmly into the soil and remove the pots to a cold frame. They may also be rooted in the ground if covered with a hand-light or frame, and allowed to remain during winter with some protection; this plan answers admirably. Plant them out about April or May, according to the climate of the locality. Old plants sometimes stand the winter outside, but should have a covering of ashes. Even with this precaution they cannot be depended upon.

Fig. 42. PENTSTEMON.

New varieties are raised from seeds, and the strains of these now offered by the leading seedsmen yield a very large percentage of first-class flowers. The seed should be saved from the best varieties only—those with distinct colours and well-formed large flowers. In February or early in March sow the seeds in pans or boxes filled with light soil, placing them in gentle heat. The illustration (Fig. 42) is a fair example of the present race of pentstemon.

When the seedlings appear admit air gradually and keep them well to the light. When large enough to handle prick them off into boxes. Keep them growing with a little heat, and then harden in cold frames preparatory to planting out in beds. The plants so raised flower during the summer. About a foot apart is a good distance between the plants. Some sow the seeds in beds in June, lifting the plants in August, wintering them in cold frames until planting out begins in spring.

The following selection will give good exhibition flowers, but there are many others equally good, and a choice strain raised in Sir Trevor Lawrence's garden is to be recommended:—

SELECTION OF PENTSTEMONS.

Argon.	gigantea.	Moonshine.
Brian Wynne.	James Douglas.	Mousquetaire.
Buccleuch Gem.	John Duncanson.	Neil McKinnon.
Cavalier.	John Stewart.	Pythagore.
Dietz-Monnin.	Leonidas.	Sesostris.
Emperor.	Lord Mayor.	Thos. McCrorie.
George Reynolds.	Lucien Biart.	Waverley.
George Uhlrich.	Maggie Porter.	W. E. Gladstone.

THE PHLOX.

Occasionally in old gardens one meets with a specimen of the old phloxes which serves as an object lesson to exhibit the improved beauty of the flower as it has been developed by the hybridiser and seedling raiser. The small, imperfectly formed flowers with thin petals, the sparsely-flowered trusses, the weedy-looking plants, contrast with the large, well-formed blooms of substantial texture, the well-filled trusses, and the compact habit of the modern phlox. The latter seems to fulfil the requirements of the florists' code, which says that the stem of the plant should be strong, stout, and erect; the spikes full of bloom, dense, and of symmetrical shape; the blooms stout in texture, flat, and quite circular in form, with clear, decided colours. For representations of these see Index for Coloured Plate.

Phloxes are divided into three sections. The first are the dwarf phloxes, which flower in spring or early summer, and are valuable for edgings or the rock garden, under which headings they have been included. For convenience, a selection is given here also.

The varieties immediately under notice as florists' flowers, and so valuable from their beauty and effect in the mixed border or in beds or borders by themselves, like the preceding, seem to have originated in North America. They are divided into two sections, called, for convenience, the early and the late flowering phloxes. The first is understood to have been derived from Phlox glaberrima suffruticosa; the second from P. maculata and P. paniculata. The early-flowering varieties have not yet reached so great a stage of perfection as the later, but all are very beautiful, well deserving the cultivation they require.

These phloxes are propagated by means of division in spring or autumn, and by cuttings of the young growths, which come at the base of the stem in summer. A plentiful supply of these can also be secured in March. They may be rooted in a frame, and more quickly if a little heat is at command. Short lengths of root inserted in pots of light soil in winter will also produce young plants. The cuttings may be kept in a cool house or frame during winter, and planted into their proper position in March or April.

Fig. 43. PHLOX AMŒNA.

The phlox succeeds best in a rather heavy soil with plentiful additions of well-decayed manure. The beds may also be top-dressed with the manure in summer. The plants should never be allowed to suffer through drought, good soakings of water being given instead of only a little at a time. Should very fine spikes be desired the flower stems may be well thinned out. Some growers consider three stems on a large plant quite enough. Each stem must be carefully tied to a stake. If required for exhibition they will be the better of some protection. This may be supplied by forming a tripod of three stakes or wires fixed firmly in the ground over the spike. A wirework frame covered with canvas is put over the upper part of the tripod during rain or at night. The side branches may be tied in a little so as to keep them off the sides of the cover.

Phloxes are sometimes grown in pots for conservatory decoration. They are propagated as previously directed, and, after shifts from 3-inch to 6-inch pots, are placed in pots from 10 to 12 inches in diameter in spring. They are then kept plunged in ashes until the flowers are nearly ready to open, when they can be taken into the place where they are to bloom. The potting must be firmly done in good soil, and full drainage given, as copious supplies of water are needed.

The phlox is also grown from seeds, but many are unsuccessful in raising the plants. The seeds should not be sown in heat, but the pans or boxes placed in a cold frame, keeping the soil moist. They germinate irregularly, especially if not fresh, so that patience ought to be exercised if germination appears slow.

Selection of Phloxes.

(See Plate, page 149, Vol. I.)

Late-Flowering Varieties.

Amazon, pure white.
Avalanche, pure white.
Aurore, orange-scarlet.
Coccinea, crimson.
Cœur de Lion, lilac.
Corneville, dark wine-colour.
Diadem, white.
Eclaireur, purple-carmine, white eye.
Eclatant, rose, crimson eye.
Eugene Danzanvilliers, lilac, white eye.
Eugene Scholt, rose, white eye.
Miss Tennant, white, rose centre.
John Forbes, pink, crimson eye.
L'Ornement, rosy lilac.
Madame Antoine Denis, blush, crimson eye.
Matador, rich crimson.
Mrs. Kinghorn, salmon-rose.
Pantheon, salmon, white eye.
Regulus, rose-salmon, white eye.
Roxelane, deep carmine.
Sheriff Ivory, salmon.
Sylphide, white.
Tourbillon, crimson, white eye.

Early-Flowering Varieties.

Charles Downie, rose, crimson eye.
George Macmillan, lilac.
James Thompson, deep rose.
King of Purples, purple.
Lady Halliburton, white.
Lady Napier, white.
Marquis, rose, crimson eye.
Modesty, rose, crimson eye.
Mrs. J. Hope, white, crimson eye.
Purple Emperor, light purple.
The Marquis of Huntly, veined rose.
White Swan, white.

Spring-Flowering Varieties and Species.

amœna, purple (Fig. 43). 6-15 ins.
divaricata, pale blue. 9-12 ins.
ovata, rose. 12-18 ins.
reptans, purple, trailer.
Stellaria, lilac, ,,
subulata, atropurpurea, purple, trailer.
,, lilacina, lilac, trailer.
,, Nelsoni, white, ,,
,, The Bride, blush, ,,
,, Vivid, crimson, ,,

THE POTENTILLA.

The hybrid potentillas are attractive border flowers, although for some time they have fallen into comparative neglect. A good deal of attention was devoted to them about fifty years ago, and the introduction of double forms was a considerable advance, many of these coming from the Continent. The present varieties have been derived from several species introduced from various countries. They form, when well grown, good bushy plants, and being naturally of a trailing habit, most of the hybrids need staking when planted in a border. The flowers are of various colours, and afford a pleasing change when planted with other hardy flowers. They also make a pleasing bed when in bloom in summer.

The plants have leaves resembling to some degree those of the strawberry, and the

flowers are of the same character, the potentilla being, indeed, known in some places as the "Barren Strawberry." The hybrid potentillas like a sunny position in good, rich soil, well manured, and with a sufficient supply of water. They grow from 2 to 3 feet high when tied up, and bear their pretty flowers very profusely. They are quite hardy and are increased by division of the roots in spring when beginning growth, or in autumn after flowering. They may also be increased by means of seeds sown as recommended for *Hardy Plants* on page 241, Vol. I.

The following selection is composed of good varieties :—

Selection of Double Potentillas.

Alfred Salter, scarlet and orange.
Arc-en-Ciel, chrome yellow.
Californie, golden yellow.
Carnival, golden yellow.
Eldorado, purple and yellow.
Hamlet, dark crimson.
Jupiter, crimson.
Le Vésuve, red, flushed yellow.
M. Daudin, dark vermilion.
Wm. Rollisson, mahogany and orange.

Single Varieties.

aurantiaca superba, vermilion and orange.
atro-sanguinea, dark crimson.
Golden Cup, bright yellow.
Magnet, velvety crimson.
splendidissima, vermilion-scarlet.
splendens, orange, striped scarlet.

THE POLYANTHUS AND PRIMROSE.

The primrose and polyanthus are among the most prized of our early flowers. Their neat habit and beautiful bright-coloured blooms make them appreciated by nearly every one. While they have been long cherished by lovers of flowers, it was what is known as the Gold-laced Polyanthus which practically engrossed the skill of the older florists. The Auricula, another member of the family of *Primulaceæ*, was the object of much of their care.

Beautiful and attractive as is the gold-laced polyanthus (and there are few who can deny its beauty), it has greatly gone out of cultivation, the number who grow named varieties being extremely small. This, however, has not led to a similar falling off in the popularity of primroses or other polyanthuses, which, on the contrary, are in increasing request. Their cultivation in pots is little followed, but in beds, in borders, or on rockeries they are very largely grown. For any of these purposes the primrose is well adapted, while the self-coloured and fancy polyanthuses with their fine trusses of flowers are attractive with their bright and effective colouring. (See page 188, Vol. I.)

The flowers of the primrose are produced singly on stalks proceeding from the crown of the plant. Those of the polyanthus, which is understood to be the result of a cross

between the primrose and cowslip, form a truss or bunch of several flowers each on a foot-stalk proceeding from a flower-stem. There are also what are called primrose-polyanthuses, *i.e.*, the first blooms are like those of the primrose, the others being elevated on a stem like those of the polyanthus. The points of these flowers may be formulated as follows:—

The Gold-laced Polyanthus ought to have a strong, straight stem, from 4 to 6 inches in height, rising above the foliage. The foot-stalks should be of sufficient length to bring the flowers into a close, compact, and symmetrical bunch of not fewer than five expanded blooms. The pips large, flat, and circular, with the exception of a small indentation at the margin of each of the divisions. The flower to be "thrum-eyed," the ground colour red or black, unshaded and dense, with a thin lacing regularly round each segment, cutting down to the centre, and of the same colour as the latter. The centre must be free from stain. A truss is shown in Fig. 44.

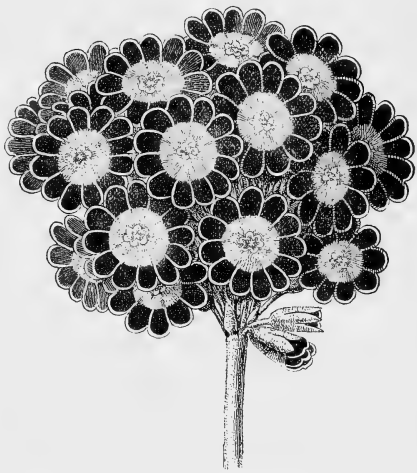

Fig. 44. Gold-laced Polyanthus.

The Fancy Polyanthus should have stout and erect flower-stems, with compact heads of bloom formed of large, well-shaped pips with "thrum eyes."

The Primrose must be of compact tufted habit, with stout foliage and numerous flowers, which should be on foot-stalks of such length that the blooms are displayed in a mass well outside the leaves. The flowers to be of clear and distinct colours, unstained, of good substance, and circular, with "thrum eyes" (Fig. 45).

The Gold-laced Polyanthus is generally cultivated in pots, receiving almost the same treatment as the Stage auricula; but seedling plants of no special merit may be grown in beds or borders, their cut flowers being often much admired. The best time for propagating named sorts is in the beginning of August, when the old plants require re-potting. The offsets should then be taken off and put in pots. The old plants must have the ball reduced, and the roots pruned so as to allow of fresh

soil being added. Pots 6 or 7 inches in diameter are suitable for the larger plants.

A good compost is two parts loam, the top spit of old pasture kept for 12 months, half a part of cow manure two years old, half a part of well-decayed leaves, with a little sand. After re-potting, water gently to settle the soil, and place the pots in saucers or pans on the north side of a low wall. About the last week of August remove to a west border or other open space, dispensing with the saucers if the weather be moist, and placing the pots on a thick bed of ashes to keep out worms. About the last week of October remove to a frame with a south aspect; washing the pots if dirty; seeing that the drainage is clear; stirring the surface soil; removing weeds or moss and decaying leaves; and top dressing with fresh soil. Give only enough of water to prevent the leaves flagging. In hard frost cover at night with a double covering of mats, or water-tight wood covers. Give as much air as possible. About February remove about an inch of the surface soil, adding in its place a mixture of loam and manure. Be careful not to injure the roots. When the trusses begin to develop, remove the plants to a frame or house with a north aspect, shading from bright sun and protecting from draughts. After flowering, place the pots on the north side of a low wall. Red spider is apt to be troublesome, and if the pots are placed in garden pans or saucers, the moisture in these will aid in keeping off this enemy.

Fig. 45. Primrose.

Seeds may be sown in light sandy soil early in March, or as soon as ripe. The soil in the boxes or pans should be made level and smooth. Scatter the seeds thinly, and cover with a thin layer of earth. Press the soil down gently, and place a piece of glass over the pan. Keep the soil moist, and admit air when the plants begin to appear. The seedlings are very irregular in making their appearance, some being months after the earlier ones. Seeds may also be sown in the open ground. Directions for doing this will be found on page 241, Vol. I.

Self-coloured and Fancy Polyanthuses and Primroses are propagated in a similar way; but instead of using pots they are planted in the open ground. Plants for bedding are generally divided at the time of bedding-out spring plants—about October. When beds are required for summer-flowering plants, lift the polyanthuses or primroses with the ball attached to the roots, and re-plant in a cool and shady border, keeping well watered in summer. When planted in beds or other places out-of-doors, primroses and polyanthuses ought to have rich soil, rather of a heavy nature, and manure should be liberally added if necessary.

Double Primroses are much admired and are usually prized by all who know them. They require more care in cultivation, some standing severe weather rather badly. In many gardens they would be best treated as frame plants, keeping them from severe frost in winter, and sun and draught in spring and summer. They like shade, and do well in summer in a frame with the glass shaded with whiting or other shading. Remove the light in dull and moist weather, and when on give plenty of air, keeping the plants moist by watering them over the leaves occasionally. They are increased by division in August or spring; preferably in the former season.

A few double polyanthuses are also in cultivation, but these, with various out-of-the-way forms of primroses—such as "hose-in-hose," "galligaskins," &c.—and polyanthuses are amenable to the same cultivation as the others. There are now so few named polyanthuses procurable that it is unnecessary to give a list of names. A selection of double primroses will be found under PRIMULA on page 253 of Vol. I.

PRIMULA SIEBOLDI.

There are now so many beautiful varieties of this very attractive primula, that it may appropriately be included among florists' flowers. There seems some difference of opinion as to the identity or relationship of this species with P. cortusoides—a question of but little moment to those who look upon flowers from a gardening point of view. There can, however, be no question as to the beauty and value of the seedling varieties which the pains taken by a few florists have given us. The improved flowers exhibited at spring shows have attracted almost universal admiration, and led to their increased cultivation.

Siebold's, or the Japan primrose, produces trusses of large flowers of varied form and colour (Fig. 46). The leaves are also very pretty, and in harmony with the shape and shade of colour shown by the blooms. Some flowers are circular and smooth-

edged; others are beautifully notched; and still others formed like the bloom of a clarkia. The colouring is from pure white to deep crimson, there being also shades of lilac and light purple. In some, the outside of the petals is of a different colour from the inside.

This primula is suitable alike for outdoor cultivation and for the conservatory or greenhouse. It looks well in beds or at the base of rockwork, but when grown outside ought to be sheltered from high winds, which often occur when it is in flower in May.

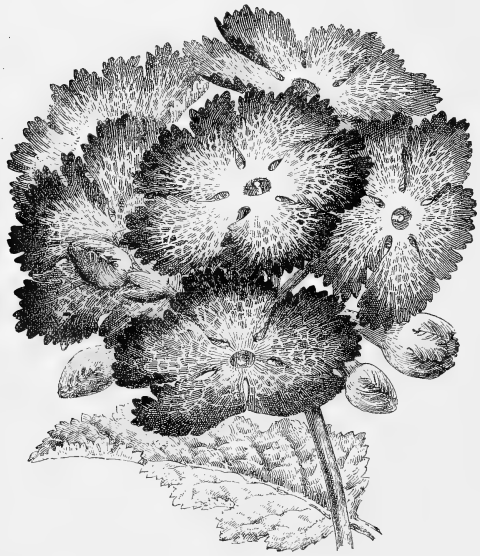

Fig. 46. PRIMULA SIEBOLDI.

It is propagated by means of division or seeds. Seeds may be sown under glass in spring or as soon as ripe, following the directions for raising *Hardy Flowers* on page 241, Vol. I. The roots may be divided in spring when making growth. In suitable soil Siebold's primrose increases rapidly. It is necessary to be careful of the crowns in winter, as it dies down to the crown, and is easily cut and destroyed by mistake when turning over the soil. A peg or tally should be put beside each plant. A light but rich and moist soil is very suitable for this primrose, and for outdoor cultivation there is no better place for it than the lower parts of the rock garden or the base of a rockery. Good plants may be grown in 6-inch pots of loam, leaf-mould, and sand.

SELECTION OF PRIMULA SIEBOLDI.

Bruce Findlay.
Distinction.
Harry Leigh.
Maiden's Blush.
Miss Kelly.
Miss N. Barnard.
Mrs. A. H. Jones.
Mrs. G. Geggie.
Mrs. Ryder.
Princess Beatrice.
Queen of Whites.
Ruby Queen.

PRIMULA SINENSIS.

This, the popular Chinese Primula of our gardens, was introduced into this country in 1820. For a time it was known as P. prœnitens, but in later years, or since it has become a general favourite, this name has been appropriately changed to P. sinensis. The old school of florists paid little or no heed to this species of Primula, and it is only during the past twenty-five years that its value as a greenhouse plant has been fully demonstrated. For a long time there were only two shades of colour, a dull red and white, available. Now we have a great range of colours, including scarlet, crimson, lavender, blue, rose, pink, and intermediate shades. The flowers are large and well formed, and the trusses bold and compact, bearing only a slight resemblance to the starry flowers and loose trusses of the original strain. There is also a great improvement noticeable in the habit of the plants. They are compact and sturdy, a few having dark purple and many more light green leaves and leaf stalks, while some have leaves round, and others elongated and prettily lobed, these latter well meriting the distinctive description of fern-leaved varieties.

It is worthy of note that, with the advent of strains with extra large flowers, the largest measuring $2\frac{3}{4}$ inches in diameter, there has been a revival in favour of the old-fashioned, starry-flowered varieties. For instance, the old P. s. stellata, when well grown, delights plant-lovers, on account of the freedom with which its informal, slender trusses of white flowers are produced, these contrasting pleasingly with the dark purple stalks and leaves. Double-flowering varieties, foremost among which must be placed the old C. s. alba plena, have also come well to the front. Some of the modern double forms produce equally fine trusses of large flowers, in as nearly a great variety of colours as the singles, with the same variation in the foliage; but they are less reliable and serviceable than the old double white. They have this advantage, though, of being as easily raised from seed as the single varieties, and, all things considered, these new double-flowering Chinese primulas deserve fuller appreciation by professional as well as amateur gardeners.

Raising Plants from Seeds.—Unless extra large plants are required, sowing seeds before April or May is a mistake. The handsomest plants are those from which the central truss has not been removed, a fact long since realised by many gardeners, and amply demonstrated by the accompanying illustrations. If the seeds are sown as advised in the older calendars, the central truss is certain to be produced long before it is desirable to have the plants in flower, and there is no alternative to pinching it out

early. When the plants are raised comparatively late, and the central truss is preserved, a fine pyramid of bloom results. Those who grow plants for exhibition find that it is not the largest plants, with no central truss, that, as a rule, gain the premier awards; but rather those with compact, healthy foliage, and a perfect cone of fresh blooms, with few or no traces of faded flowers or trusses having been removed. Grand plants can be had in November from seed sown late in April or early in May. A successional sowing may be made in June, but when early and late flowering varieties are sown at the same time, these form a good natural succession. Deferring the final potting of some of the smaller plants a month later than the rest is another method of providing a supply of late, compact-flowering plants.

More than ordinary pains ought to be taken in raising these primulas from seed. Fill pans or well-drained 6-inch pots with a mixture of equal parts of fine loam and leaf soil, with silver sand added, making it firm and level. Give a gentle watering and then lightly cover the surface with sand. Sow the seeds thinly, pressing them in with the smooth bottom of a flower-pot, and only just cover with fine soil. Place or plunge the pans or pots in a moist heat of from 65° to 70°, cover with squares of glass and shade heavily. The soil must be kept uniformly moist. Directly the seedlings appear shade from bright sunshine only and tilt the squares of glass, eventually dispensing with these altogether. According as the plants are large enough to handle, lift them out of the pans or pots with the point of a label without greatly disturbing the rest of the soil—a necessary precaution owing to the irregular manner in which primula seed germinates. Transplant the seedlings 1½ to 2 inches apart in pans of soil similar to that in which they were raised, sinking them up to the leaves. Keep them growing in a warm house or frame till well established, when they will require more air and less shade.

Cultural Details.—Before the young plants press against each other in the pans in which they are growing, move them carefully with a small mass of soil adhering to the roots, and place them singly in 2½ or 3-inch pots, taking care to sink them in the soil well up to the collar, without, however, burying the hearts. The old-fashioned plan of exposing a portion of the stem and steadying with crutches or three small sticks to each plant as shown at *a*, Fig. 47, is, or ought to be, obsolete. Instead of this being a preventive of canker it actually invites an attack, and in any case crutched plants are objectionable. Those potted deeper emit roots from the buried stem, and from first to last are the strongest and most serviceable plants, as shown in *b*. Use rather more loam at this potting than advised for the seed pans.

These newly-potted plants should be placed in a shallow pit or frame with either a northerly or western aspect. They ought to be arranged on a bed of ashes within 9 inches of the glass. Abundance of light, but not strong sunshine, coupled later on with a free circulation of air, serve to keep them sturdy and strong. For a few days they should be kept close, also watered carefully. Admit more air, ventilating freely in fact, before the leaf stalks lengthen unduly. Before they become root-bound shift into their flowering pots. At this potting the strongest plants may be placed in 7-inch, the medium-sized in 6-inch, and the later or more weakly plants in 5-inch pots. Never despise plants because they are weakly, as in all probability these, if properly treated, will prove to be among the best in point of quality of flower. For this potting a moderately rich compost is recommended. It may consist of brown fibrous loam, three

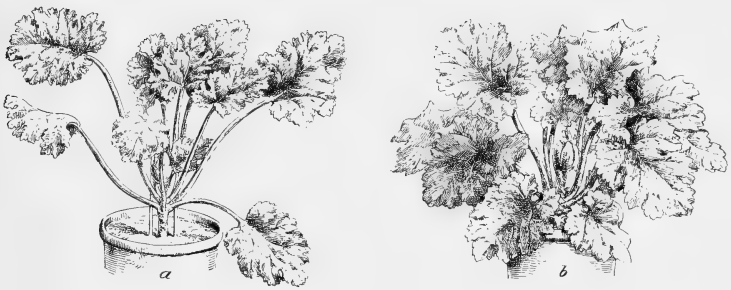

Fig. 47. Potting Primulas.
References:—*a*, a common error; *b*, correct practice.

parts to one part each of fine leaf soil and well-decayed manure, with small nodules of charcoal and sharp sand added.

Use clean, well-drained pots; pot firmly, again taking care to keep the stems low. Return the plants to the pits or frames and give less air and water for about a week. Before they become drawn allow them more space and admit abundance of air both by night and day, always remembering that once they form long slender leaf stalks there can be no recovery to the desirable compact condition. On fine, mild nights the lights may be wholly drawn off with advantage.

In the autumn and throughout the winter the proper position for Chinese primulas of this class are airy shelves and light greenhouse stagings, grouping them apart from all other plants. Low temperature and a damp atmosphere, conditions almost inseparable in this case, are most injurious to these by no means hardy plants, and there

ought to be enough fire-heat provided to maintain a genial temperature of 40° to 45° by night, opening the top ventilators on all mild days. Weak liquid manure may be applied to the plants when coming into flower. Avoid over-watering.

The result of raising primulas too early, with the consequent removal of the first or central flower, as previously referred to, is seen in Fig. 48. This is entirely unsatisfactory, yet even more time and attention are bestowed on such plants than on others which are infinitely superior, as will be admitted on reference to Fig. 49. Success is simply a question of good judgment in rearing the plants and their after management on the lines above indicated.

The small late-flowering plants are frequently the best for producing seed. Fertilise these during February, keep the plants under frames and properly attended to till the seeds are nearly ripe, when the pods may be gathered and the harvesting completed on sheets of paper in the full sunshine.

Double-Flowering Primulas.

As before intimated, some of the so-called double and all the semi-double varieties of P. sinensis are raised from seeds in the same way as the singles, and the plants may be successfully grown in exactly the same manner. The true old double white, P. s. alba plena, and forms of it, are exceptions to this rule. These are largely cultivated by market as well as private growers, owing to the flowers proving more serviceable in a cut state than are those produced by seedling single or double varieties. Added to this, they are extremely floriferous, and at their best at a time of year when cut flowers are most valuable—the late autumn and winter months. In this instance, the stock is increased by dividing old plants soon after they have ceased flowering. Growths or crowns, with long, hard stems, may have either fine leaf soil and loam or moss packed about them, and, if kept constantly moist, roots will probably be freely emitted. All that is further necessary is to detach these rooted growths from the old stem, and to place them singly in small pots, giving them the benefit of gentle heat till well established in the fresh soil. Old plants may also be split up; all divisions with a few roots attached to be treated as just advised, and the rest as cuttings. Place each of these cuttings in the centre of a small pot, supporting the leaves with a neat stick and strip of raffia. Plunge or arrange in a propagating frame, or in brisk heat, unaccompanied by much moisture. When they have formed roots, gradually expose the plants to the full light and air, greenhouse shelves suiting them best after this partial prepara-

tion. Divisions and rooted cuttings, once they are independent plants, will thrive in pits and frames under precisely the same treatment as recommended for single primulas. There ought to be no undue delay in shifting them into 5-inch pots—a size quite large enough to flower them in as first season plants. The larger or central portions of the divided plants should at first be placed in pots just large enough to hold the roots comfortably, and before becoming root-bound they ought to have their final shift. It is not often that these require a larger size than the 6-inch pot, over-potting being a too common mistake. In each and every case use soil similar to that recommended for single primulas, and clean, well-drained pots; also be most particular in burying the hard stems.

Fig. 48. Flowering Primula (Unsatisfactory).

If these double-flowering primulas are subjected to low temperatures during the winter, they almost inevitably lose all their old leaves, and in cool houses the flowers, if finer than those grown in gentle heat, are apt to be tinged with pink. The best positions for them during the late autumn and winter months are the swing shelves and light front stagings in a house kept at 45° to 50° by night, and warm and airy during the day-time.

Fig. 49. Flowering Primula (Satisfactory).

Primula Obconica.

Introduced from China in 1882, this remarkably free and almost continuously flowering primula has rapidly become popular, and no more serviceable greenhouse plant can well be named. The flowers of the original species were pale lilac in colour, small and insignificant, and the trusses also undersized. By careful selection and seed-saving, the strains have been greatly improved in every

way—the petals are rounder, and the flowers larger, fuller, and more perfect in form; trusses larger, stems stronger, and the shades of rose and lilac richer and more varied.

There is, unfortunately, one serious drawback attached to the cultivation of this primula. The glandular hairs on the leaves when they come into contact with the delicate skins of certain people are apt to set up an irritation which may easily degenerate into a form of eczema. It is only a comparatively few that it affects in this way, but the consequence may be serious, doctors not knowing the cause, and not always finding a remedy. No harm, however, would result if only the irritation were allowed to subside naturally, allaying it with vaseline. Rubbing and scratching the affected part increases the irritation.

Propagation and Culture.—Primula obconica may either be raised from seeds annually or increased by division in the spring. Seedlings are more vigorous and produce finer trusses than do the plants obtained by division of the crowns. February or early in March is a good time to sow the seeds, this affording ample time for growing the plants to a serviceable size by the autumn. Prepare pots or pans for the seeds and otherwise treat much as advised in the case of Chinese primulas. They germinate most surely in the heat and moisture of a cucumber house or frame. The seedlings when quite small may either be pricked in pans of soil, moving them from these into 3-inch pots, or they may be placed direct into 2-inch pots, sinking them up to the seed leaves. Directly they are well established in these small pots transfer from shelves in a moderately warm house in which they were started to greenhouse shelves, or to near the glass in a warm frame. They must not be allowed to flower prematurely nor to suffer by want of water, and before the pots become crowded with roots give the final shift, using the same kind of soil as advised for P. sinensis. The strongest of the plants may be flowered in 6-inch pots and the remainder in a size smaller. Care must be taken not to bury the hearts, and the potting should be done firmly. From this date onwards the plants, however raised, may be associated with the faster growing Chinese primulas, but are less liable than these to be injured if arranged along the fronts of greenhouse stagings. They should be fed liberally at the roots, and if the flowers are cut as fast as the stems are firm and rigid, the season will be considerably prolonged.

THE PYRETHRUM.

Pyrethrums rank among those flowers which are universally admired. The double-flowered varieties equal in beauty many of the ever-popular annual asters, which they

much resemble in appearance, and are prized as cut flowers. The single varieties, although less imposing, are more elegant when arranged in vases, and both are invaluable garden plants for massing in flower beds or planting in mixed borders, the neat foliage adding much to their beauty.

The pretty single-flowered Pyrethrum roseum from the Caucasus is the parent of the

Fig. 50. Double and Single Pyrethrums.

florists' pyrethrum. In the first quarter of this century the late Mr. John Salter, of Hammersmith, received a fine rose-coloured variety from M. Themisterri, of Belgium. From this several double forms were raised by Mr. Salter, and since that time various Continental and other raisers have improved the flowers. The finest varieties of recent years have been raised by Messrs. Kelway and Son, of Langport; a number of their new

varieties having received certificates and awards of merit from the Royal Horticultural and Royal Botanical Societies.

A double pyrethrum should have flowers formed of many florets arranged in a regular manner, and gradually becoming smaller until they reach the centre, which should be free from any opening. The flowers ought to be imbricated, *i.e.*, the florets lying over each other, so as to form half a ball. The ray florets must be sufficiently prominent to form a neat base, yet not so conspicuous as to make it unshapely. Light-coloured flowers ought to be pure and of pleasing effect; the darker ones to be decided, bright, and clear. The single varieties must have one or two rows of broad ray florets of good form and substance, symmetrically arranged, with a round, bright yellow disc, the colours possessing the same qualities as the double flowers. See illustration (Fig. 50) for double and single flowers, also page 262, Vol. I.

The pyrethrum is quite hardy when established, and is of easy cultivation in a sunny position in any good soil. This should be well dug, and a good dressing of well-decayed manure incorporated with it in the process. Spring is the best season for planting, and young plants ought to be frequently examined in search of slugs, which are extremely fond of the succulent growths, and must be warded off if possible. A dusting of quicklime or a little soot will be found of assistance in destroying or keeping off the slugs. The pyrethrum likes a good supply of water when coming into flower, and if the first blooms are cut before seeds form and liberal treatment is given during the summer, a second crop of bloom is generally yielded in the autumn.

The pyrethrum is increased by division immediately after flowering, or by cuttings of the side shoots made in summer. Insert these in sandy soil under a hand-light on a shady border or in a cool frame. There they may remain until well rooted, when they can be planted out where they are desired to flower.

From a good strain of seed single and double flowers can be obtained, several of them equal to those represented in the coloured plate, for which see the Index. Sow the seeds in pans or boxes of light soil, keeping them under a frame or in a cool greenhouse until the plants appear. Give air gradually; prick off the seedlings when large enough, and gradually harden them, previous to planting outside; if raised early and kept sturdy they flower the same year.

Selection of Pyrethrums.

Double Varieties.

Alfred, rich crimson.
Aphrodite, pure white.
Beauty of Laeken, crimson.
Carl Vogt, white, early.

SELECTION OF PYRETHRUMS (*continued*).

Diana, rose and yellow.
Empress Queen, blush.
Figaro, rose-lake.
Florentine, blush.
J. N. Twerdy, maroon and yellow.
King Oscar, crimson-scarlet.
Lord Rosebery, scarlet.
Leonard Kelway, rose.
Magician, pink, tipped yellow.
Mdlle. Benary, blush white.
Melton, crimson-scarlet.
Meteor, crimson, white tips.
Pericles, peach and gold.
Princesse de Metternich, white.
Queen Sophia, flesh.
Wega, yellowish pink.

Single Varieties.

Agnes Mary Kelway, rose.
Albert Victor, crimson.
Beatrice Kelway, cherry-rose.
Decoy, crimson purple.
Empress of India, pure white.
James Kelway, scarlet.
Jubilee, velvety crimson.
Lorna Doone, crimson.
Merry Hampton, crimson.
Prince of Wales, maroon.
Princess Marie, white.
Ruth, rose and white, new form.
Sunbeam, rose.
Tempête, blush white.

THE RANUNCULUS.

The Ranunculus, as a florists' flower in its highest form, has fallen into unmerited neglect. The more refined English and Scotch varieties of the Persian ranunculus, at one time so much admired, are now seldom seen, the larger and coarser French varieties being more extensively cultivated. The showier French sorts are perhaps more effective, but lack the refinement and perfect form which characterise the others, now so seldom seen, but so frequently figured in the horticultural books about fifty or sixty years ago, and grown in thousands long before. Some of Tyso's ranunculuses were lovely flowers, and it is to be hoped that a revival of interest in these plants may take place, to the enrichment of our gardens. The flowers (Fig. 51) are grown largely for sale in markets. The original species (R. asiaticus) is a native of the Levant, and it, or its varieties, were cultivated in English gardens more than three hundred years ago.

The ranunculus is a tuberous-rooted plant, the roots and crown being in general appearance not unlike a very miniature dahlia tuber. The flowers of the original species are single, but in cultivation double and semi-double forms of many colours are produced—the double ones being those desired by the florist. There are two distinct forms—the Turban and the Persian, the former having less refined flowers, a coarser habit, and larger leaves. The range of colouring is also less varied, there being white, yellow, scarlet, carmine, and deep brown varieties. It has, however, the advantage of being a little hardier, and is well suited for bedding purposes.

Few flowers had more care in the preparation of the bed in which they were to grow than the florists' ranunculus, and the flowers well repaid the extra pains taken. To do them full justice they should be grown in beds, although they may also be grown in groups in the border. The beds should have an open situation, well exposed to the sun, but sheltered from northerly winds. The soil must be rather moist and retentive beneath. The compost for the bed ought to be prepared some time before it is required, and frequently turned over, so as to be well mixed before being laid down. Two parts of sound, rich loam, from the top spit of old pasture, to one part of well-decayed cow-manure, which must, if possible, be a year old, make a good compost. The beds (about 4 feet wide) must be prepared as early in autumn as possible, not later than the beginning of October, but August is preferable, making the soil good to a depth of 2 feet. Let it settle for about a month. On the top add light, fresh soil, to raise the surface one or two inches above the path. Edge with slates or boards, to prevent the water from the path running into the bed. Some growers put very little cow-manure in the soil, but place a layer at the bottom of the bed. Should the soil be loose at planting time, make it firm.

Fig. 51. Ranunculus.

Turban ranunculuses can be planted in October, but from the 15th of February to the end of the first week in March is the best time for the others, should the weather be favourable and the ground in suitable condition. Plant in rows about 6 inches apart; each tuber 5 inches from the next. The rows may be marked off with a hoe, and drills made for the tubers, covering these with a little sand before levelling the bed. The crown of the tubers must be upwards, and $1\frac{1}{2}$ inch below the surface. Right and wrong methods of planting are shown on page 203, Vol. I.

Should the weather be favourable the plants will appear early in April, and the soil must be pressed gently, yet firmly, about them, so that they may not suffer by its being too loose. In dry weather, in April and May, it is often necessary to give the plants water; but a very experienced grower recommends that this be sparingly done, advising in preference mulching with moss, old tanners' bark, or similar material, and only watering occasionally in the evening between the rows. While the flower buds are opening, and when in full bloom, the bed may be protected from sun and rain by an awning, and watered gently, but regularly, every second or third night.

An advantage possessed by covering the beds is that the tubers may be dried off, so as to be at rest when they are lifted. Whenever the leaves and stalks become yellow the roots ought to be taken up, and this should be done before they have time to send out fresh root-fibres. When the tubers are lifted, they should be placed in a dry and airy place, and kept either in paper bags or in drawers provided for the purpose. A look-out must be kept for mould.

The ranunculus is propagated by division of the tubers, or by seeds. The first operation is so simple that directions are hardly necessary. After lifting the tubers, separate the offsets before they become hard and dry. To secure double ranunculuses the seeds ought always to be saved from the semi-double flowers, the best-formed blooms being selected to produce the seeds. Sow these either in February or September or October in sandy loam and leaf mould, in pans, covering slightly with fine soil. Water gently, and keep the pans in a cold frame till the seedlings appear. Allow them to remain in the pans, but give plenty of air, and about the middle of May plunge the pans in some place in the open receiving the morning sun. When the leaves are yellow withhold water, and lift the roots, treating them as recommended for old tubers, and re-plant at the proper season. They should flower in the second or third year from the time of sowing.

The raising of seedlings is recommended to those who wish flowers of the highest quality, and perfectly double. Named ranunculuses of the Persian section are seldom offered in catalogues, except in collections. Mixtures procured from a reliable firm are usually of good quality, and by the careful weeding out of inferior flowers may give satisfaction. The following selections are of good quality, and have been offered recently.

Selection of Persian Ranunculuses.

Aigle Noir, dark purple.
Capucine, deep orange.
Couleur de Paille, straw.
Commodore Napier, lemon, purple edge.
Count Orloff, rose and yellow.
Couronne de Celle, violet-blue.
Dollard, white, crimson-blue edge.
Dr. Masters, orange and yellow.
Dr. Young, rosy, red edge.
Hector, white, rose edge.
King of the Netherlands, black.
Miss Burdett-Coutts, white striped.
Mongolfier, white.
Mont Blanc, white.
Ophir d'Or, canary, black spots.
Orange Brilliant, yellow, black centre.
Princess Victoria, white, carmine spots.
William Robinson, white, violet edge.

Selection of French Ranunculuses.

Taller and more vigorous than the Persian, but not so refined.

Adonis, rose.
Duke of Norfolk, sulphur.
Empereur du Maroc, maroon.
Florian, rose and white.
La Désirée, purple.
La Grandesse, creamy white.
L'Etincelante, red.
Magenta, magenta.
Pio Nono, purplish black and crimson.
Princess Alice, primrose and chocolate.
Satella, maroon, red, and yellow.
William III., deep violet.

Selection of Turban Ranunculuses.

Very effective for bedding or groups.

Hercules (White Turban), white.
La Merveilleuse (Yellow Turban), yellow.
Prince Galitzin, yellow, scarlet spots.
Romano (Scarlet Turban), scarlet.
Seraphique, citron-yellow.
Souci doré, coffee colour.
Turban grandiflora, crimson, yellow stripes.
,, carmine, carmine.
,, Sans Pareil, scarlet and green tips.
,, viridiflora, green, red tips.

THE ROSE.

As exhibition flowers few kinds have so nearly reached the ideal of the florist as have several varieties of roses. A good rose, in the florist's eye, must have an abundance of stout petals, arranged regularly, and within a circular outline. Blooms are divided into four types as regards shape or form, viz. :—1, globular; 2, globular, with high centre; 3, cupped; and 4, imbricated.

Good examples of the globular form can be found in Senateur Vaisse (H.P.) and Madame Bravy (Tea). As examples of globular blooms, with high centres, we have Fisher Holmes, Général Jacqueminot, and Prince Arthur (H.P.s); Catherine Mermet, Maman Cochet (see page 106), and Comtesse de Nadaillac (Teas). This is the ideal form. Examples of cupped roses may be found in Baroness Rothschild, Ulrich Brunner, and Margaret Dickson. The imbricated form, especially when carrying a high centre, is also much sought after by florists. A. K. Williams and Horace Vernet (H.P.s), Ethel Brownlow and Innocente Pirola (Teas), are well known examples.

As to the features which constitute an exhibition rose, "form" may be described as the chief; next comes size, but this must never be at the expense of coarseness. Given good form, a large rose can scarcely be coarse. Brightness and freshness of colour follow. In some varieties the sweet freshness is soon past, whereas in others, such as Suzanne Marie Rodocanachi, Anna Ollivier, Maman Cochet, and Caroline Testout, this property is retained to the last.

A rose combining the good qualities indicated is almost unapproachable by any other flower. Unfortunately, too many of our best exhibition blooms are produced by plants with an indifferent habit of growth. We have Cleopatra, Souvenir d'Elise Vardon (see page 109), Comtesse de Nadaillac, Xavier Olibo, and Horace Vernet in this category, but they cannot be dispensed with. On the other hand, there is an increasing number of grand roses with equally good constitutions, such as Mrs. John Laing, Alfred Colomb, Général Jacqueminot, Charles Lefebvre, Duke of Edinburgh, Kaiserin Augusta Victoria, Caroline Testout, Anna Ollivier, Maman Cochet, Catherine Mermet, Marie Van Houtte, and Ernest Metz.

Culture.

To secure grand roses in their very best form it is necessary to afford high culture, and under such conditions many varieties do not thrive well for more than a few years. Close pruning must be practised, and heavy mulchings afforded in the autumn and spring; also thorough waterings and copious supplies of liquid manure, especially during a dry summer and with light soil. As a rule, the autumn mulchings or coverings with light manure afford sufficient protection, it being only the bottom eyes that are retained when pruning; still, it is well to slightly protect as advised elsewhere. Instructions on propagating, planting, pruning, and protecting are included on pp. 166—181, Vol. I. (which see).

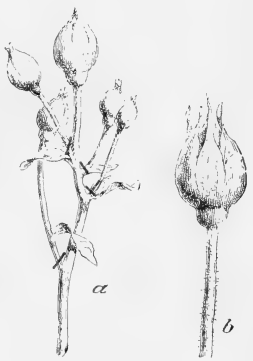

Fig. 52. Thinning Rose Buds.

References.—*a*, buds marked for removal; *b*, result of disbudding.

The spring growths need thinning where thickly produced, and the small flower buds around the centre bud pinched out as soon as they can be handled. This is to concentrate the whole of the plant's energies and strength into a few blooms. The practice is shown in the illustration (Fig. 52). In *a* the four side buds are marked for

removal, with the result that the central bud enlarges as in *b*, and under good management develops into an exhibition rose. Some of our roses would never produce the grand blooms staged by successful exhibitors unless well thinned: Madame de Watteville and Madame Cusin are good examples of this; but it is even more necessary to keep the whole plant healthy and free from insect foes. Any special class of soil is not of so much importance as giving careful attention to cleanliness, thinning, feeding, and high cultural details generally for attaining the object in view.

Exhibiting.

It is most essential that all the necessary boxes, tubes, wire, names, and other items be provided well in advance of the show day. Cutting and arranging the blossoms have to be quickly done, and nothing should be lacking to impede the work. The boxes ought to be as light as possible, consistent with the strength that is so necessary in these days of hasty travel. A deep sea-green has been found the most suitable colour for them. All the boxes should be 18 inches wide and 4 inches deep in front, their length being regulated according to the number of blooms. A handy length for twelve blooms is 20 inches. If more varieties, two of those boxes will represent twenty-four, three of them thirty-six varieties, and so on. Do not have those cumbersome boxes, now and again met with, and carrying thirty-six blooms. The easier to handle the boxes are the safer will the blooms travel and lend themselves to ready staging.

Another old-fashioned way was to have the boxes higher at the back than in front, presumably that the back row of roses might stand up more prominently. As this shape necessitated a proportionately low lid at the very point where the opposite was needed, it is little wonder the finest roses often came to grief. Let the lid and box be of the same depth all round; 8 inches is a good depth for the lid, which should consist of match-board well tongued together, or dust and wet will often fall through upon the roses during travel. Two strong sliding hinges are needed at the back, and pieces of wood in each corner of the bottom part; if these are allowed to rise an inch or so above the top, they will give much additional strength, and can be hidden by moss when the roses are staged. Strong swivel handles at each end, and of a form that will allow of their falling into a slight recess when not in use, will not only last longer but allow the boxes to be placed closer together when upon the stage. There is another great advantage in these handles: they are not so liable to be damaged when travelling.

Do not use locks and keys. The lock may get broken in transit, or the key lost or left behind. A great deal of annoyance is often caused by locks getting out of order. A stout strap around the twelve-size box, and one at each end of the others, is ample and perfectly safe, with the addition of the corner stays already alluded to, if drawn tight. Some means of ventilation must be provided, and the best plan is to have holes at the sides or back of the lids, fastening some perforated zinc inside of these.

Tubes and funnels are needed. The illustration, Fig. 53, shows the form most generally used by members of the National Rose Society. These are cheap, durable, and efficient. Mr. Foster, Ashford, Kent, is the patentee, but any nurseryman or seedsman can supply them. In addition to the funnel (*a*) and tube (*b*) figured, we also want a third tube (*c*) into which (*b*) can be dropped. The tube (*c*) should be just sufficiently large to take (*b*) easily, and should have a foot formed of zinc, about $2\frac{1}{2}$ inches square. The object of this will be seen when fixing the tube (*c*) into the boxes.

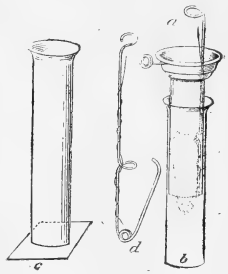

Fig. 53. Foster's Rose-Holder (reduced).

References.—*a*, funnel ; *b*, tube ; *c*, receptacle for *b* ; *d*, spring.

In fitting up these, tack three strips of thin wood lengthwise to the bottom of the box, and then slip one of the corners of (*c*) under each strip. Place the tubes four in a row for twelve blooms, six in a row for eighteen, and eight in a row for twenty-four. This is speaking of arrangements for single blooms. When fitting the boxes for trebles, or three blooms of any one variety, four strips of wood will be needed, and the tubes arranged triangularly, two of the three blooms of any one sort being in the back row. Now fill in between the tubes with shavings or any light material, and on the top of this place the very freshest and greenest moss procurable. Sprinkle this well, and the evaporation will keep both the moss and roses cool. Once the rose is fixed as will be desired in the funnel (*a*) and tube (*b*), it can be readily transferred from any of the stationary tubes (*c*), which will always be in their proper positions. Use hard water for the tubes (*b*) where procurable, and always have them filled.

There are several ways of supporting the flower stalk where not of a sufficiently stout nature to stand up well and show to the best advantage. Slip the upper part of the wire support (*d*) around the stem of the bloom, and fasten the stem with the thin wire. If the bottom of the flower stem drops into the ring halfway

up the support there will be little need of the finer wire. The rose is now dropped into the funnel (*a*), and can be readily raised or lowered, the slight spring of the lower portion of (*d*) retaining it in any desired place.

The rose may also be supported easily and well with a length of the wire used to secure corks in lemonade and other bottles. These are already cut into lengths of

Fig. 54. Tea Rose Maman Cochet.
Staged by Mr. O. G. Orpen, N.R.S. Show. (See page 103.)
(*Kindly supplied by the proprietors of the "Gardener's Magazine."*)

about 9 inches. Push one end into the pod of the bloom and then loosely twist the wire around the lower part of the stem, the flower can then be made to take almost any position or angle desired; but if Mr. Foster's patent is used, both wire supports for the bloom and name-holders are complete. This is an immense saving of time and trouble, as one can rearrange any bloom to taste, or substitute a fresh flower in a few

seconds, and have little fear of the wrong name being placed to the bloom, seeing that the whole is transferred bodily. The names may be written or printed, but with many changes in varieties the names are usually written. Pieces of cardboard 3 inches by 1 are suitable for the purpose.

So far all is plain and simple, but we now come to a phase in exhibiting roses where experience in selecting the flowers, with taste in setting them up and arranging the colours, are the chief items. Old and faded flowers should never be kept in the stand. More often than not the beginner stages his roses at home and does not make sufficient allowance for the time that must elapse before they are seen by the judges. When staged at home they may be at their highest point of beauty, but a gradual and almost imperceptible change is going on, and so it happens that many blooms have lost their freshness when judging time arrives. A large faded bloom will not count a point with good judges, but a small, fresh, and well-shaped flower will not be overlooked.

In judging roses five points are given to an extraordinary specimen, four to a very fine one, three to an average high-class bloom, two for a medium one, one point for a bloom below medium, and no point at all for a bad bloom. General evenness, variety, freshness, and arrangement carry the day in many doubtful cases. Choose young and well-formed flowers, and be certain they have a true centre; have form with freshness, even at the cost of size, as many large blooms are apt to quickly degenerate into coarseness or staleness—two very grave defects.

There is difference of opinion as regards the best hours to cut roses for exhibition. Late in the evening, just before the dew falls, is a good time to cut Teas and Noisettes; but where practicable it is generally advisable to cut the Hybrid Perpetuals early in the morning. The Teas and Noisettes seldom lose their colour so quickly as the Hybrid Perpetuals. If it be necessary to start for the show overnight, cut as late as possible and wire all of those needing it. Then, in the morning, there will be ample time to select the best twelve, or eighteen, as the case may be, before the judges come round. Circumstances often alter one's plans, and there may not be time to do the whole of the staging on the ground. In that case do as much as possible beforehand; but it will be a matter of a few minutes only to set up a stand, provided names are fixed and the roses properly wired before the journey is commenced.

The weather also makes a great difference in the cutting, as on a dull day one can commence hours before it would be prudent to do so during bright weather. In the

latter case, any flower more than three-parts expanded in the morning should be cut and stored in a cool cellar or shed, rather than go through the ordeal of a hot day. If the blooms can be staged with the remains of the morning dew upon them they will look much brighter and fresher, and, if other points are about equal, will often turn the scale in favour of the exhibitor of them.

Selection of Blooms.

Make a preliminary excursion among the plants, and then you will be better able to decide, as well as avoid cutting many to waste. Always cut with a good length of stalk and place in water as soon as possible. Just previous to putting them in the water, cut off the ends of the stems afresh. The small pores dry up very quickly in the sun and wind, and as the flowers need much water it is important that these be quite free and open when finally placed into the tubes. Use a clean and sharp knife, so that the stalk may be cut without bruising. A hot and drying wind is most trying to cut roses, and often causes them to shrink in spite of the greatest care. This is more noticeable with thin-petalled blooms and those from succulent growths. A few varieties, generally the cupped and high-centred kinds, will be better if a short piece of soft wool or worsted be gently tied around the centre petals. Etienne Levet, Victor Verdier, Gustave Piganeau, and Baroness Rothschild are examples.

Always carry some younger blooms to take the place of those first selected, as it frequently happens that the tent or room is very hot, or what promised to be a dull day proves to be a bright one. This, in addition to bad travelling, often ruins the first-selected blooms, and a few "spares" are always welcome. See that the flowers are firm in their funnels before starting. The spare flowers, being younger, can be put in an extra box containing only the tubes, when two or three can be placed in one hole; but it is better to give them room to develop. They must be firm, not only to avoid shaking and bruising, but to be certain that water is retained in the tubes. Cut off the ends of the stalks again when finally staging. It freshens the flowers very much to have the pores clear and free to absorb moisture.

Place the largest blooms in the back row, and be sure to have a good example at each corner. If the blooms are not fairly even in size, let the smallest be distributed in the front and middle of the second row. A judicious arrangement of colours heightens the effect of each bloom as well as the whole stand. Do not cramp the blooms down among the moss, but let them stand up boldly. Look over the names

once more to avoid errors, and keep a sharp look-out against duplicates. Tilt the box at the back with a small flower-pot or block of wood; and if there is still time to spare, though only a few minutes, before the judges' arrival, replace the lids and slightly block them open. Do not remove the wool from the centre of thin-petalled roses until the last; although, if in doubt about their lasting, it is well to remove it for a few minutes previously to deciding upon their retention in the competing box, afterwards replacing the tie.

Dressing the flowers is now much practised, and is allowable where the object is simply to assist a petal to a more symmetrical position. A large camel-hair brush or pencil, with a short ivory handle much resembling a budding knife, are good for this. Dressing cannot be taught on paper, and the beginner must gain object lessons from older exhibitors. Only comparatively few blooms can be improved by dressing, and the tyro is warned against over-indulgence in the practice, which would, or should, disqualify.

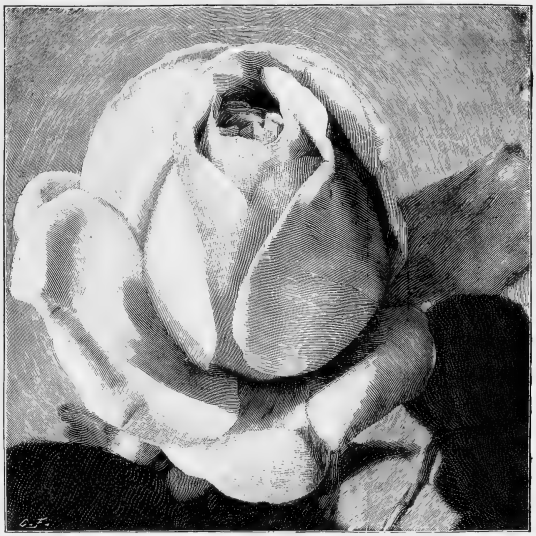

Fig. 55. Tea Rose Souvenir d'Elise Vardon. (See page 103.)
(*Kindly supplied by the proprietor of the "Garden."*)

A "bloom" or "truss" of a rose are synonymous terms, as applied to exhibiting. A rose without buds, or a bloom surrounded with buds and foliage as cut from the tree, are eligible; but there must be no addition of any kind. A treble consists of three blooms or trusses of the same variety, which in judging count as one. With the exception of wire or other support to keep the blooms upright, any other artificial aid will disqualify.

A few varieties produce better flowers upon maidens, or the first growths from the bud, than from cut-back or established plants. Horace Vernet, Dr. Sewell,

Gustave Piganeau, Monsieur Noman, and Xavier Olibo, for example, give the greatest percentage of good blooms upon maidens; while Her Majesty, Annie Wood, Eclair, and Marie Rady are indifferent bloomers in that form. Some of the Hybrid Perpetuals, too, almost refuse to thrive upon any but the brier stock; on which, however, they are provided by nurserymen. Amateurs can only find out the peculiarities of roses by experience, and it could serve no useful purpose to describe them here.

SELECTIONS OF EXHIBITION ROSES.

Forty-Eight Hybrid Perpetuals.

Dark Crimson with Maroon shadings.
‡Prince Camille de Rohan.
*Horace Vernet.
*Charles Lefebvre.
‡Prince Arthur.
‡Xavier Olibo.
*Comtesse d'Oxford.
Louis Van Houtte.
Abel Carrière.
*Victor Hugo.
†Fisher Holmes.

Dark Crimson.
*A. K. Williams.
†Duke of Edinburgh.
*Gustave Piganeau.
‡Général Jacqueminot.
‡Maurice Bernardin.
†Captain Hayward.
Madame Victor Verdier.
Eclair.
Senateur Vaisse.
†Earl of Dufferin.

Light Crimson.
†Alfred Colomb.
†Camille Bernardin.
*Dupuy Jamain.
‡Marie Baumann.
Beauty of Waltham.
†Comte de Raimbaud.
‡Comtesse de Ludre.
Marie Rady.

Cherry Crimson to Bright Rose.
*Suzanne Marie Rhodocanachi.
†Etienne Levet.
*Ulrich Brunner.
Alphonse Soupert.
†Tom Wood.
†Helen Keller.

White.
‡Margaret Dickson.
Marchioness of Londonderry.
Merveille de Lyon.

Clear and deep Pink.
*Her Majesty.
‡Madame Gabriel Luizet.
*Mrs. John Laing.
*Mrs. R. G. Sharman Crawford.
Baroness Rothschild.
Madame Eugène Verdier.

Soft Pink.
†Francois Michelon.
‡Duchesse de Morny.
†Marchioness of Downshire.
†Marie Verdier.
†Laurence Allen.

The best twelve H.P. are marked *; the next best twelve ‡; and the third best twelve †.

Thirty-Six Teas and Noisettes.

Deep Pink.
*Souvenir d'un Ami.
*Catherine Mermet.
*Bridesmaid.
Jules Finger.

Soft Pinks shaded with Salmon.
†Ethel Brownlow.
*Maman Cochet.
*Ernest Metz.
Rubens.
†Cleopatra.
†Ernest Metz.
Princess Beatrice.

White.
Niphetos.
*The Bride.
†Muriel Grahame.
†Souvenir de S. A. Prince.
Madame Bravy.
*Innocente Pirola (creamy white).

Deep Yellow.
*Maréchal Niel.
†Perle des Jardins.
Etoile de Lyon.

Pale Yellow.
*Madame Hoste.
†Marie Van Houtte.
†Elise Fugier.
†Caroline Kuster.
†Medea.
Cornelia Kock.

Salmony Copper and Apricot.
Jean Ducher.
*Anna Ollivier.
*Comtesse de Nadaillac.
†Francisca Krüger.
Princess Beatrice.

Creamy White shaded with soft Pink.
*Souvenir d'Elise Vardon.
†Hon. Edith Gifford.
Golden Gate.
Devoniensis.
Mrs. James Wilson.

The best twelve are marked *; the next best twelve †.

Eighteen Hybrid Teas.

Deep Salmon Pink.

*La France.
*Caroline Testout.
†Duchess of Albany.
†Mrs. W. J. Grant.
Mrs. W. C. Whitney.

Creamy White to Pale Yellow.

*White Lady.
†Mme. Jules Finger.
†Mme. Joseph Combet.
Gloire Lyonnaise.
*Kaiserin Augusta Victoria.
Charlotte Gillemot.

Souvenir de Mme. E. Verdier.
†Antoine Rivoire.

Creamy White flushed with Salmon.

*Lady Mary Fitzwilliam.
*Augustine Guinoisseau.
†Marjorie.
Lady Henry Grosvenor.

Best six marked *; next best six marked †.

THE STREPTOCARPUS (CAPE PRIMROSE).

Like the more familiar achimenes and gloxinias which abound in beautiful varieties, the Streptocarpus is a gesneriaceous plant, and, as its popular name denotes, is a native of South Africa. The habit of the plant is like that of our common primrose, and the leaves of many of the varieties are similar in form, but very much stouter, and some a great deal larger; the flowers are tubular, varying from 1 to 2 inches across the mouth, and borne in profusion on stems differing in height from 6 to 18 inches. The colours are most diverse, ranging from pure white, blush delicate rose-pink, to magenta and maroon; also from the palest of lavenders and mauves to the richest violet-purples imaginable, browns and terra-cottas in various shades being also represented. The beauty of the flowers is further enhanced by the chaste clear pencillings and bold contrasting markings in the throats of the majority; so that altogether it may be said of the Streptocarpus that it has given some of the most dainty floral gems to our greenhouses during the summer.

These Cape Primroses have not hitherto been placed in the category of "Florists' Flowers," but this is their right place undoubtedly, as the varieties cultivated are the direct result of manipulative skill in cross fertilisation. They are as surely flowers of art, as is the coloured plate in which some of them are represented a work of art, and which may be seen on consulting the Index. It would be impossible, however, to represent in any plate all the graduations of tints and refined markings of the flowers raised and grown; and thus it would seem that the florist is the greater artist after all.

Let us trace briefly the genealogy of such flowers as those figured. About the year 1887 Mr. William Watson, the able assistant curator of the Royal Gardens, Kew, exhibited two new varieties of Streptocarpus before the Floral Committee of the Royal Horticultural Society. They were named S. kewensis (mauve purple with

brownish stripes), and S. Watsoni (rosy purple), and justly awarded certificates. How were they obtained? By the methods described in Vol. I. (page 26 *et seq.*). S. Rexi (blue), introduced from South Africa in 1824, was crossed with S. Dunni (rose), Transvaal, 1884. This cross brought S. kewensis, which in turn, crossed with the Cape species S. parviflora (purple, white, and yellow), brought S. Watsoni.

It may be presumed that even Mr. Watson could scarcely have foreseen that his two little floral children would so soon bring in their train the marvellously diversified and beautiful varieties now so easily obtainable from seed. The progress was brought about in this way :—

About two years after S. kewensis and S. Watsoni were raised they attracted the attention of Mr. John Heal, one of the expert hybridizers in the establishment of Messrs. J. Veitch & Sons, Chelsea, who saw them planted out round the border of the large succulent house at Kew and flowering very freely. The Kew authorities gave Mr. Heal a few plants to see if he could make any improvement with them, as Kew is not an hybridizing establishment on a large scale.

No doubt the Kew people did well, as time has proved, to let others do their best. The result has exceeded the expectations of every one who takes an interest in these beautiful flowers. The grand collection exhibited by the Messrs. Veitch in the Diamond Jubilee year at the show of the Royal Horticultural Society in the Temple Gardens, London, excited expressions of admiration and surprise. Among the exhibits were splendidly floriferous plants of what must in justice be called Veitch's Hybrid Strain, arranged in distinct colours to show how true each colour will be reproduced in seedling plants as the result of careful fertilisation. There were pure whites without any trace of colouring, then white with dark blotches, magentas with rich and distinct shades, violet, purple, rose, pink, and various tints practically indescribable (see Fig. 56).

Exhibited at the same time were three other distinct strains which demand attention. The first, known as S. gratus, is very distinct. The flower stems, from 6 to 9 inches high, are very strong and freely produced, some of them bearing from twenty to seventy flowers and buds, which means a continuation of bloom for several months. The flowers are about an inch across, and the colours bright and showy, including terra-cotta and rose shades. This strain, with its several varieties, was obtained by crossing the African species S. Dunni with Veitch's Hybrids.

The second strain which merits special notice was named S. Mrs. Heal, in com-

memoration of the late lamented wife of the raiser. Mrs. Heal is in truth a beautiful and distinct Streptocarpus, and no doubt the forerunner of a new section. The flower stalks range from 9 to 15 inches high, and terminate with six to twelve flowers of a rich violet blue shaded with purple, the throat having a yellow band with maroon spots on the lower petal, the flowers being 1½ inches in diameter. It is the result of a cross between S. Wendlandi and one of Veitch's Hybrids. The plant is of good habit and floriferous with several leaves, unlike S. Wendlandi, which is remarkable for producing only one huge leaf and very tall spikes of blue flowers.

The third strain, S. pulchellus, is perfectly distinct from the others. It is light and graceful both in growth and flower. The plant is compact, and the long tubular flowers are borne on erect stems from 12 to 15 inches high, with twelve to twenty on each stem, in the most delicate lavender tints. Where light and graceful flowers are in demand, this strain will supply them. It was obtained by inter-crossing S. Fanninii and Veitch's Hybrids.

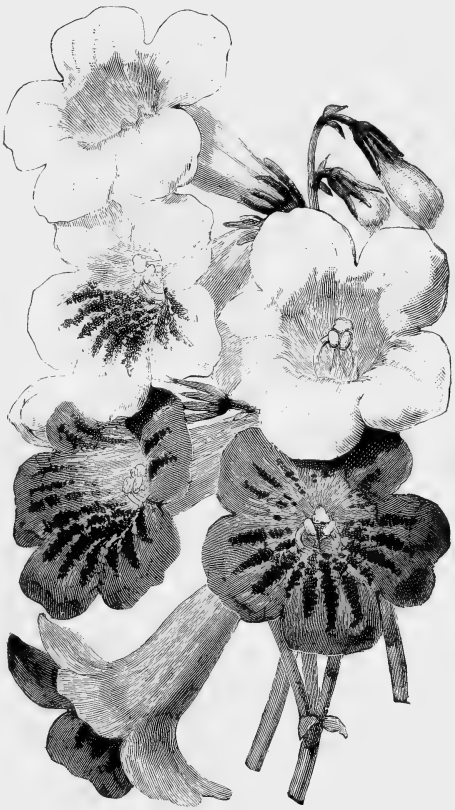

Fig. 56. STREPTOCARPUS. VARIETIES—VEITCH'S HYBRIDS. (*From the "Journal of Horticulture."*)

A new strain was exhibited at a meeting of the Royal Horticultural Society in May, 1897, which received an award of merit. It is a charming variety, called S. achimeneflora from the resemblance of the blooms to some of the small-flowered Achimenes. The colour is soft blue, with clear yellowish eye, and the

habit graceful. It originated at Chelsea from the crossing of S. polyantha with Veitch's Hybrid white with dark blotch.

Other firms are improving the Streptocarpus, and no one can foresee what the results will be, but already the plants under notice rank among the most useful for the decoration of the conservatory, greenhouse, or drawing-room during the summer months, especially when grown like those exhibited at the Royal Horticultural Society in 1896 by Mr. Beckett, of Aldenham House Gardens, Elstree, each bearing from twenty to thirty stems, with four to six flowers on a stem.

Not only will varieties of the Streptocarpus be grown in large gardens, but they are equally suitable for the amateur with his small greenhouse, in which the plants may be had in flower from April to October, as fresh stems are produced if the old ones are removed when the flowers fade. Moreover, the plants will be quite safe during the winter in a temperature ranging between 38° and 45°; but they do not require water at that season till the soil gets dry enough to crumble freely when rubbed with the finger; then sufficient ought to be given to pass to the drainage, not a drop being poured on the foliage or in the centre of the plants, but only on the soil. Damp is the enemy of the plants in winter, and if any decaying parts appear they must be promptly removed. Streptocarpi grow and flower well in cottage windows where they receive plenty of light, as they do not object to a dry atmosphere. They are best kept cool in summer, must never be over-potted, nor must the soil be allowed to become dry when the plants are flowering; they enjoy shade from the sun as its rays become powerful, these having a tendency to scorch the leaves, especially if the plants are dry at the roots. With proper care they will flower well for three or four years, each year becoming stronger under good culture and throwing up flower stems continuously.

As before stated, any desired number of plants may be raised from seed, from which new varieties will be forthcoming. Streptocarpus seed is very fine and requires special attention in sowing. Drain the pots well, and three-parts fill with a mixture of turfy loam, leaf mould, and sand, which make moderately firm. Then add half as much of the mixture finely sifted and make it perfectly smooth. If in the least dry, give a good watering through a fine-rosed can, and three or four hours afterwards scatter the seeds evenly over the surface and press them gently down, not covering with soil. Lay a square of glass over the pot, tilt it up a little, and shade during the day with thick paper to keep the light and sun from the seed. Place the pot in a tem-

perature about 65°, away from draughts, and examine it carefully every morning and evening to see that the soil does not get dry, because there the secret rests in ensuring growth: if the soil and seeds are allowed to become dry once, the endeavour to raise plants will prove a failure.

The seedlings grow very slowly at first. When large enough prick them off singly and give them a little warmth. Plants raised from seeds sown in December, January, or February will give several flowers the same year, commencing from July to September. The following spring the plants become stronger and flower freely. Re-pot in February or March in a mixture of about two-thirds turfy loam, one-third leaf mould or peat, with silver sand added. The Streptocarpus can be increased by division, also by cutting the leaves like the gloxinia, as shown on page 41, Vol. II.

During the hot weather, sometimes a small reddish thrips attacks the young foliage and flower buds, which cripples both; it can scarcely be seen with the naked eye. It is the same insect that attacks the young growth of Begonias. As soon as discovered fumigate promptly, two or three times in succession. Plants are the most liable to attack when near hot pipes; when kept cool they are seldom, if ever, visited by the pest.

Few, if any, flowers during recent years have made the same progress in public favour in so short a time as have those under notice, and it may be expected that they have a great future before them.

THE TULIP.

It is difficult to realise what the loss of the tulip would mean to our gardens and greenhouses in spring and early summer. Its brilliant or chaste beauty—as the case may be—adorns the flower beds and borders, and makes the greenhouse or window cheerful and gay. Some, who cannot know the flower properly, depreciate its beauty and call it gaudy; but used aright, with its brilliant colours toned down by the surroundings, it excites almost universal admiration.

The early-flowering tulips, so extensively employed for bedding and forcing, are exceedingly beautiful, but cannot compare in perfection of form and markings with the later-flowering kinds so long cherished by our florists. The numerous original species are very attractive also. These do not, strictly speaking, come within the scope of a reference to the tulip as a florists' flower, but may advantageously be accorded a short

notice. The selection of species given on page 123 may also be of service to those interested in the beauty afforded by nature's flowers.

The genus *Tulipa*, which belongs to the Natural Order of *Liliaceæ*, embraces upwards of sixty species, found in Europe, North Africa, West and Central Asia, and eastward to Japan. To one of these species, the brilliant T. Gesneriana, introduced from the Levant in 1577, we are mainly indebted for the present race of florists' tulips. The first varieties of these came from Holland about three centuries ago, and in a short time the tulip was extensively cultivated.

Its after history would take up too much space. For this and for what may be considered the fullest and most exhaustive information yet given on these beautiful late-flowering kinds, the reader is recommended to see the series of articles on "The Florists' Tulip," from the pen of Mr. James W. Bentley, which appeared in the *Journal of Horticulture* of October 25th, 1894, *et seq.* The writer is indebted to these uniquely valuable articles for much information. The story of the tulip-mania in Holland has also been repeatedly told; but it may be as well to mention that it is not to the Dutch but to the English florists that we owe the most perfect of all our tulips. Many of these were raised in the South of England, but the Lancashire and Yorkshire growers mainly kept up its cultivation when others neglected the flower.

Characteristics of Florists' Tulips.

These splendid tulips are, by English growers, divided into three divisions, named Roses, Byblœmens, and Bizarres, which are again subdivided into Breeders and Rectified. The *Roses* have *white* bases and ground colour, and the petals are coloured with red: this ranging from pale pink to bright scarlet. The scarlet shades are preferred. The *Byblœmens* have also white bases and grounds, and the petals are coloured with a purple shade—from lilac to almost black. Blue-black and blue-purple shades are the most admired. The *Bizarres* differ from the others by having *yellow* bases and grounds, the colouring varying from orange-scarlet to brown and black. The very dark or fiery-red coloured are the most esteemed.

The *Breeder* is a tulip before it has assumed its feathering or flaming, and may be called a florists' tulip in its chrysalis stage. All seedlings are "Breeders," and it is only after the lapse of an uncertain period that they assume the characteristic markings that invest them with value; in their early stages they are self-coloured, with the

exception of the base, which, as above mentioned, is white in the Roses and Byblœmens, yellow in the Bizarres.

When they "break," as the change is called, the colour of the base extends on to the petals, what was formerly the colouring of these forming the flaming or feathering. The flowers are then *rectified.* Breeder tulips are often very beautiful, and are highly effective in gardens in May. A strain of these has been introduced from Holland under the name of "Darwin" tulips, but these, though imposing in masses, lack the refinement of the English varieties.

Various plans have been tried to induce the tulip to "break," but no one can say confidently that any of these will produce the desired result: they remain in the self-coloured or breeder stage for ten or more years, but once they break into *flame* or *feathers* of colour, these are permanent and the flowers never revert to the original stage. It is this wonderful feature and mysterious change, found in no other flower, that render the tulip so interesting to its admirers. Flowers which "break" badly marked ought to be discarded.

In a "feathered" tulip the marking is confined to the edges of the petals; in some this is very narrow and in others much broader. A "plated" feather is "laid on" densely and ends abruptly on the lower edge. A "pencilled" feather—which is more valued—"terminates in slender streaks." The feathering, according to Mr. Bentley, ought to be "laid on evenly and without breaks throughout its whole extent, terminating gradually and imperceptibly on the lateral margins of every petal alike, at a point not nearer the stem than the commencement of the base." The breadth of the feather must not be more than one-fourth of the length of the petal. When there is a break in the line of feathering it is called a "skip." The perfect flower should have its ground colour pure and clear, without mark except the feathering already described (see Fig. 57, next page).

The "flamed" tulip, in addition to the feather, has a coloured "beam" running up the centre of each petal. This "beam" is of many different forms, the extremes being a narrow stripe running from the base to nearly the top of the petal, and a pyramidal form having its broader part nearly covering the petal at the base and having its apex gradually running into the feather. The best flamed flowers have the beam of the latter form with the centre uncoloured by the ground, and gradually sending out narrow streaks at the sides and top to connect with the feather. A flower with too much marking is called "heavy"; one showing too much of the ground colour being said to be "light." It must be observed that these remarks apply to the inside of the flower.

The bottom of the interior is what is named the base; it should extend about one-fourth up the petals, and form a smooth, clear, circular disc of white or yellow, quite free from stain or tinge. The stamens must also be of the same shade and quite stainless. A flower free from these blemishes is "pure"; one with them "stained." The anthers surmounting the stamen ought to be black and of good size; the pericarp or seed-vessel should also be of a good size.

The shape of the flower is, as may be supposed, of high importance. It must have six petals, three outer and three inner, placed alternately, close to each other, and alike in height, size, and shape; broadly rounded at the top. The petals are required to be stout and so broad as to allow the flower to expand without showing any openings between. The flower when expanded must resemble in form the half of a hollow ball or circular cup. The stem should be stout, so as to carry the flower erect, and long enough to raise it well above its leaves. The illustration (Fig. 57) shows the shape and character of a Florists' Tulip. It is a feathered variety.

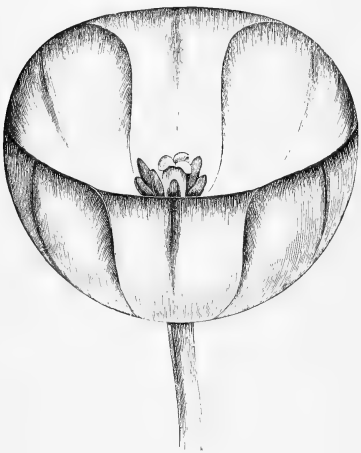

Fig. 57. Florists' Tulip—Feathered.

Planting Florists' Tulips.

Garden or decorative tulips differ entirely; they may be either in self or parti-colours, single or double, early or late. They produce a brilliant effect in gardens, also in beds in public parks, and are so cheap that they are purchased in millions every year. By favour of Messrs. Sutton & Sons, Reading, we are able to show a single and double variety of these popular tulips.

The tulip requires that good drainage be provided when forming the beds in September. These, for Florists' Tulips, must be in an open situation, but sheltered from the east and north. The bed ought to be 4 feet wide and may be of any length desired—a bed 50 feet long will hold 100 rows or 700 tulips and is more convenient than a larger one. Take out the soil to a depth of 2 feet, and put round the bed boards which will rise 6 to 12 inches above the adjoining path. This space may now be filled in with the soil. Various growers differ in their composts, but a good fibrous, rather unctuous loam made

of old decayed sods is highly recommended. Keep a good look-out for wireworms, which are very destructive and are often found in the sods. Make the soil firm and allow it to lie until the planting season, which is from about the 15th of October until the 8th of December, the first week in November being a good time.

Choose favourable weather for planting, and if the soil has sunk to 3 or 4 inches below the level of the bed rake it over slightly, and mark off the rows 6 inches apart. Use a piece of wood 4 feet long with seven marks 6 inches apart on it to place across the bed when planting, so as to keep regular distances between the bulbs. The taller-growing tulips are placed in the centre, the heights gradually decreasing to each side. A little sand may be placed below the bulbs, which are then pressed gently down so that they may keep upright. When this is completed fill up the bed to the level of the boards. One or at the most two bulbs may be placed at each station. Failing the soil recommended, any good garden soil will do, using preferably that manured for a previous crop.

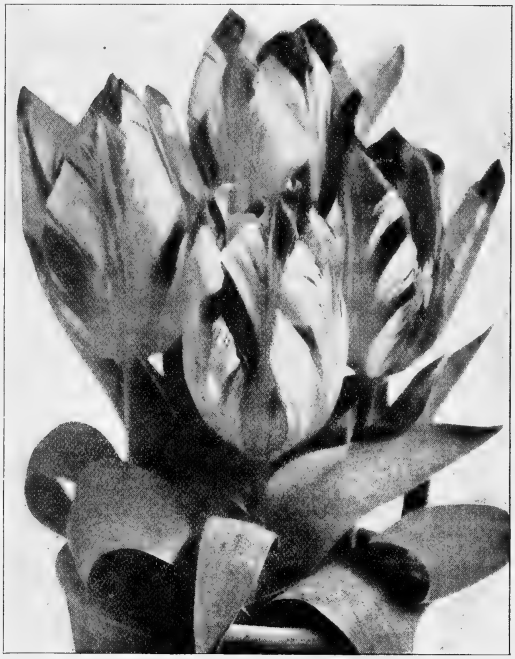

Fig. 58. Tulip, Sutton's Silver Wing.

Protecting the Beds.

After planting, the beds should be protected from heavy rains and also from the scraping of cats or dogs. For the latter purpose galvanized netting is placed round and over the beds by some growers. They also protect from rain and excessive frost by erecting a framework over the beds, covering the top either with thin oiled cloth or glass

lights; a framework about 3½ feet high at the sides will do. Should water lodge in the heart of the plants, take it out, and in frosty weather cover the sides of the framework at night with mats or canvas. This may also be done on exposed sides in very stormy weather. After the plants appear stir the earth between them very carefully, and when they begin to flower shade with thin calico from the sun. Watering is seldom needed, and when applied should be poured on the soil alone, not over the plants.

Fig. 59. Tulip, Salvator Rosa—Rose Pink.

Mr. Bentley recommends allowing the glass lights to remain over the beds until the bulbs are lifted. This may be done when the leaves become yellow and the stem can be bent almost double. Lift the bulbs with a hand-fork or trowel, taking great care of them and not taking off the stems. Place each one in its proper division in the drawer, and allow the whole to dry gradually in some place where there is a free current of air, but not too fully exposed to the sun. An enthusiastic tulip-grower always tries to possess a cabinet with the back and sides of perforated zinc for air, and with drawers. Some content themselves with keeping their bulbs in paper bags or boxes.

Preserving the Bulbs.

The cabinet contains the drawers, divided into compartments, in which the tulips are kept. In these the bulbs are placed according to the places they occupy in the beds. Each drawer has ten rows of seven compartments about 3 inches square and deep, so that

70 varieties can be kept in one drawer. In the divisions the bulbs are placed in the same way as is usually done in the beds; *i.e.*, in the first row Roses, Byblœmens, and Bizarres follow each other, beginning with a Rose; in the second row a Byblœmen comes first; in the third a Bizarre. This arrangement gives the centre of each row a flower of a different section. A book with corresponding numbers and with the names added must be kept as a key to the collection.

Should wireworms be discovered in the beds, they can be trapped by inserting pieces of potato or turnip a few inches deep, examining them daily and killing the pests. Slugs must also be searched for and destroyed.

Propagation.

Named varieties are propagated by offsets from the older bulbs. It is best to grow these in a bed by themselves, planting them in September and lifting when the leaves become yellow. They will flower in from one to four years according to the treatment they receive and their size.

New varieties are raised from seeds, which are gathered when the pods begin to open. Cut the pods with a few inches of the stem and hang in a dry room in paper bags. Sow in shallow pans or boxes of rich but light soil, cover lightly with fine soil, water gently, and place in a cold frame. Give plenty of air when the plants appear, and allow them to remain until the second year, when they may be planted out in beds. They will bloom in four or five years.

The selection of florists' tulips which follows is that recommended by Mr. J. W. Bentley for a beginner, and is composed of varieties suitable for exhibition. It will be observed that some varieties break into both feathered and flamed flowers.

Selection of Florists' Tulips.

Feathered Roses.

Modesty.
Mabel.
Heroine.
Alice.
Comte de Vergennes.

Flamed Roses.

Annie McGregor.
Mabel.
Aglaia.
Triomphe Royale or Heroine.

Rose Breeders.

Annie McGregor.
Mabel.
Mrs. Barlow.
Industry.
Queen of England.

Feathered Byblœmens.

Bessie.
Adonis.
Violet Amiable.

Flamed Byblœmens.

Adonis.
Talisman.
Chancellor.
Duchess of Sutherland.

Byblœmen Breeders.

Adonis.
Talisman.
George Hardwick
Queen of the May.

Feathered Bizarres.	*Flamed Bizarres.*	*Bizarre Breeders.*
Masterpiece.	Sir Joseph Paxton.	Dr. Hardy.
Sir Joseph Paxton.	Dr. Hardy.	Sir Joseph Paxton.
Sulphur.	Masterpiece.	Sulphur.
	Sulphur.	William Lea.
		Richard Yates.

Early Tulips.

The early-flowering tulips, which are believed to be principally descended from Tulipa suaveolens, are easily grown in a deeply dug bed or border of good rich soil. Plant about the same time as the late-flowering or florists' varieties about 3 or 4 inches deep, placing a little sand about each bulb. If potted in September, buried in ashes or other material outdoors until they have made a little top growth and filled the pots with roots, then taken indoors, they flower early and are highly ornamental. For very early flowering, at Christmas, the varieties of Duc Van Thol are extensively grown.

Selections of Single Early Tulips.

Artus, dark scarlet.	Duchesse de Parma, scarlet and gold.	Rose Superbe, rose.
Bride of Haarlem, red and white.	Keizers Kroon, scarlet, yellow edge.	Silver Wing, scarlet and white
Canary Bird, yellow.	Ophir d'Or, rich yellow.	Thomas Moore, terra-cotta.
Cottage Maid, rose-pink.	Pottebakker Yellow, yellow.	Joost Van Vondel, scarlet.
Couleur Cardinal, crimson-scarlet.	,, Scarlet, scarlet.	Joost Van Vondel, white.
Duc Van Thol, scarlet and other colours.	,, White, white.	Wouverman, purple.
	Proserpine, rose carmine.	Yellow Prince, yellow.

Selection of Double Early Tulips.

Agnes, scarlet.	Mariage de ma Fille, white, cherry stripes.	Tournesol, scarlet and yellow.
Gloria Solis, scarlet and yellow.	Rex Rubrorum, crimson scarlet.	Yellow Tournesol, yellow.
Imperator Rubrorum, scarlet.	Rose Blanche, white.	Yellow King, yellow.
La Candeur, white.	Salvator Rosa, rose and white.	Yellow Rose, yellow

May-flowering Garden Tulips.

These are of considerable variety in form, height, and colour. They are usually well adapted for growing in borders or on rockeries; their less formal flowers being much admired by many. Three of the most beautiful varieties as seen in masses early in May in Messrs. Barr's great collection at Long Ditton are Picotee, white, edged rose; macrospila, glowing crimson scarlet; and Golden Beauty, rich yellow. The "Darwin" Tulips are also stately in groups and masses at the same period of the year. The Parrot

Tulips are gorgeous plants, and from their more drooping habit of growth are often used for hanging pots and baskets.

Selection of May-flowering Single Tulips.

This selection includes several species and supposed hybrids of considerable beauty.

acuminata, yellow and red, curious.
Buonaventura, scarlet and gold.
elegans, crimson.
,, alba, white, carmine edge.
fulgens, crimson.
Gala Beauty, red and yellow.
Gesneriana Major, scarlet, black eye.
Golden Beauty, rich yellow.
Golden Crown, yellow and red.
macrospeila, scarlet, fragrant.
Picotee, white, rose edge.
retroflexa, yellow.
sylvestris, yellow, fragrant.
viridiflora præcox, green and yellow.

Selection of Parrot Tulips.

Admiral de Constantinople, scarlet and orange.
Crimson Beauty, crimson.
Large Yellow, yellow.
Perfecta, yellow and scarlet.

Selection of Darwin Tulips.

carminea, rosy carmine.
Cordelia, rosy purple.
Dorothy, mauve and white.
Erguste, bluish heliotrope.
Early Dawn, rosy lake.
Firebrand, brilliant scarlet.
Glow, bright vermilion.
Loveliness, satiny rose.
May Queen, rosy lake.
Phyllis, white, shaded lilac.
Scarlet Beauty, orange scarlet.
Sultan, rich maroon.

Selection of Tulip Species.

These flower at various times, and present much variety in habit and form.

australis, yellow.
biflora major, cream.
Clusiana, white, red stripes.
Didieri, vermilion.
,, alba, white.
Greigi, various, orange-scarlet to yellow.
Kaufmanniana, rosy white.
Kolpakowskiana, vermilion.
Leichtlini, red and white.
lanata, scarlet.
linifolia, scarlet.
maculata, crimson and black.
præcox, crimson.
persica, yellow.
saxatilis, rose.
suaveolens, scarlet.
violacea, carmine red.
vitellina, primrose.

To these may be added acuminata, Gesneriana Major, sylvestris, and viridiflora præcox, for which see list of May-flowering Single Tulips.

THE VIOLET.

"Sweet Violets" are varieties of Viola odorata, and are welcomed by every one on account of their delicious perfume as well as for the beauty of their flowers, comparatively small though these are. In winter and early spring the violet is especially acceptable, and a great deal of pains is generally taken with its culture in these seasons. For flowering during the winter under glass the double Neapolitan varieties are preferable to the Russian section. Not only do they produce far more flowers in a given time, but double violets are most appreciated. They cannot be relied upon to stand unprotected through a severe winter, whereas the Russian type is not often much injured and seldom killed outright—another good reason for giving up all the available glass

space to the more tender section. All things considered, the best of the Neapolitans for frame culture and winter flowering generally is Marie Louise, but the older and less robust true Neapolitan succeeds fairly well. Comte de Brazza is the best double white for frame culture, but it is not so popular as it was thought at one time it would be, and should not occupy nearly so much frame room as the varieties of the desired blue shade of colour. Violets are apt to fail under frame culture in the vicinity of towns. They require abundance of pure air and light, and a vitiated atmosphere is not at all to their liking. Sometimes however failures, or partial failures, are attributed to the impure air or unfavourable weather, when, in reality, the foliage damps off wholesale owing to its having been either much weakened by an attack of red spider

Fig. 60. Raising Violets.

a, thinned runners and layers; *b*, resulting plant.

during the summer, or else to imperfect ventilation. Violets require good cultivation and well repay liberal treatment. The soil should be rich but not too heavy. If of too stiff a nature, a plentiful addition of good well-decayed manure and gritty material will improve it; too light a soil will be much benefited by adding manure and clay or stiff loam. The bed must be well dug over before planting, which should be done in April or early May, using young single crowns. The situation ought to be an open but sheltered one, not near a sunny wall; a hedge being a more suitable shelter than the wall. Plant 9 inches apart and 1 foot between the rows. In a light and dry soil a north border is the best; what is known as "red spider" being very troublesome in warm and dry positions. Every attention should be given to watering, so as to promote vigorous growth, and this, with mulching the soil and hoeing between

the rows, will help to keep away the pest just alluded to. The use of the syringe or watering lightly with the rose on the watering-can, on dry evenings, is also beneficial.

Cut off nearly all the runners as they grow; only in the case of double varieties intended for flowering under glass reserving about three, with plantlets already formed on them. Peg these down into the soil as shown at *a*, Fig. 60, and in the course of a few weeks they will become strongly rooted. If left connected with the parent plants when moved into frames and pits, they will produce flowers freely

Fig. 61. VIOLET RUNNERS AND CUTTING.
c, overcrowded runners; *d*, cutting raised plant.

and be available for planting out in April. One of these young plants detached ready for planting is shown at *b* (Fig. 60), and will be found far superior for the purpose than the majority that are obtained in a more haphazard manner. When all the runners are left on a plant (*c*, Fig. 61) this means so much wasted energy, as they have to be trimmed off when moved in the autumn. Runners with plantlets attached may be taken from old plants in the spring and treated as cuttings, rooting them in gentle heat. One of these rooted cuttings is shown at *d*, Fig. 61, and these duly planted out not unfrequently surpass the older divisions or crowns, that are too often reserved when the division of old plants takes place.

For winter-flowering, lift the plants about the middle or end of September with as

much earth as possible at the roots, and place them in frames or pits having a southerly aspect and a sharp angle. The frames are prepared by filling them with one part of stable manure and two parts of decayed leaves to such a height that, with the addition of 6 inches of good soil on the top, only sufficient space is left between the soil and the glass for the plants. Plant the violets just clear of each other, and give a good watering; then put on the lights, admitting very little air for about a week, but afterwards keeping the lights off in sunny and mild weather, replacing them when it is frosty and otherwise unfavourable. Should green fly make its appearance, gentle fumigation may be resorted to. Avoid gathering the blooms too closely. One fully developed flower is worth two or three only half formed.

Double violets succeed well in pots, always provided they are not unduly coddled or subjected to much fire heat. Swing shelves in cool airy houses suit them best, or they may be kept near the glass in pits where plenty of light and air can reach them.

Selections of Sweet Violets.

Single Varieties are marked (*s*), the remainder are double.

(*s*) Amiral Arvan, purplish plum.
Clarence Castle, mauve pink.
Comte de Brazza (Swanley White), white.
(*s*) Czar, violet.
(*s*) ,, white.
Eton (Turner), clear blue.
Lady Hume Campbell, blue.
Madam Bertha Baron, indigo blue.
Marie Louise, lavender blue and white.
Neapolitan, lavender blue.
(*s*) Princess Beatrice, bright blue.
(*s*) Princess of Wales, light blue.
Madame Millet, reddish violet.
(*s*) Wellsiana, purple.

Some of the varieties mentioned are shown in the Frontispiece to Vol. I. The flowering of violets in pots will be referred to under the conservatory department of this work.

GREENHOUSES.

THE term "greenhouse" is frequently applied by the uninitiated to all forms of glazed structures which are erected for the growth of plants or fruit. By gardeners only plain buildings, intended for the cultivation of plants from temperate regions, are classed as greenhouses, as distinguished from the heat-loving plants from tropical countries which require to be grown in hothouses. In many instances greenhouses are employed in the preparation of plants for furnishing the more ornate conservatories, as well as corridors and dwelling-houses; in others they, to a certain extent, take the place of conservatories, and are kept as gay as possible all the year round. The amateur probably derives more pleasure from his greenhouse-conservatory than do most wealthy owners of large gardens from their elaborate and expensive structures, but all classes are catered for in these pages.

Plant exhibitors and some few gardeners who do not compete for prizes have their cool as well as warm greenhouses, but the great majority make no such marked distinction. It must be understood, however, that "cool" greenhouses are those principally devoted to the growth of plants of a hard-wooded nature and which require no more fire-heat than will preserve them from being frozen, and to dissipate damp. Included among these are abutilone, acacia, acrophyllum, aphelexis, boronia, camellia, chorozema, correa, daphne, desfontainea, dracophyllum, epacris, eriostemon, lapageria, leschenaultea, myrtus, nerium, phænocoma, pimelea, polygala, rhododendron, statice, and witsenia. Most of these are impatient of fire-heat, and during the colder parts of the year ought to be kept at least 5° cooler than tenderer kinds of plants. A night temperature of 40°, with an increase of from 45° to 50°, with abundance of air in the daytime, is what suits them throughout the winter.

Among the kinds of plants that thrive best in a warm greenhouse, or a temperature of 45° by night to 50° or 55° with air in the daytime, are amaryllis, arum, begonia, bougainvillea, bouvardia, campanula, carnation, clianthus, clivia, cyclamen, epiphyllum, freesia, heliotropium, lachenalia, zonal pelargoniums, primula, salvia, and vallota. If these two classes cannot be arranged in separate houses, then they ought to be kept apart in a single house, devoting the warmer

end to the kinds requiring the most heat, and the cooler and more airy part to the rest.

Forms of Greenhouses.

Greenhouses may be either span-roofed, three-quarter span, or lean-to, according to circumstances. Span-roofed structures with glazed sides and ends are the most favoured by professional gardeners and experienced amateurs, whilst they are the best that can be erected as tenants' fixtures. They are also largely constructed by growers of plants and flowers for market, these skilful cultivators being, as a rule, averse to bricks and

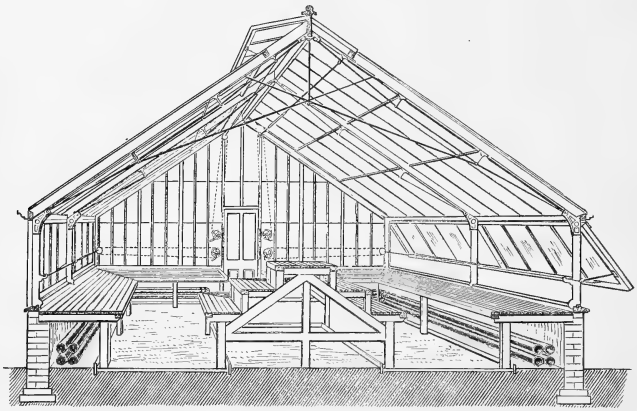

Fig. 62. Large Span-Roofed Greenhouse.

mortar—especially high back walls. In each and every case span-roofed greenhouses can be recommended for their lightness and serviceability.

A commodious structure of the kind under notice, 18 feet wide, 12 feet high at the ridge, and 5 feet high at the eaves, is represented by Fig. 62. All the working details and interior arrangements, also the amount of hot-water piping needed for a greenhouse of that description, are so plainly shown that little further description is necessary. Houses of this style may be from 30 feet to 100 feet or more in length, and should be fitted with a crank and lever apparatus for opening and closing both front and top ventilators at will or without any special effort. A house similarly constructed, only not more than 16 feet wide and 10 feet high, would answer admirably for Malmaison and winter-flowering Carnations. In this instance the central staging would have to be

narrower, or say not more than 5 feet wide, and need not be stepped, this admitting of all the plants being easily accessible—a very important matter when watering has to be done with the greatest care. The stagings in this and all other cases should be of a durable character, or constructed of material that will not quickly decay, and those at the sides ought to be rather lower than the wall plate. If they are 3 feet above the level of the floor, this will be found a good height for convenience and appearance, and there will be less likelihood of the plants being injuriously close to the hot-water pipes under them, than when the stages are lower.

Pathways are frequently made too narrow for either enjoyment or utility. They ought to be 3 feet wide—more rather than less.

In Fig. 63 we have a modest span-roofed greenhouse, which may extend to any length desired, in which also the interior arrangement of pipes and stages are shown.

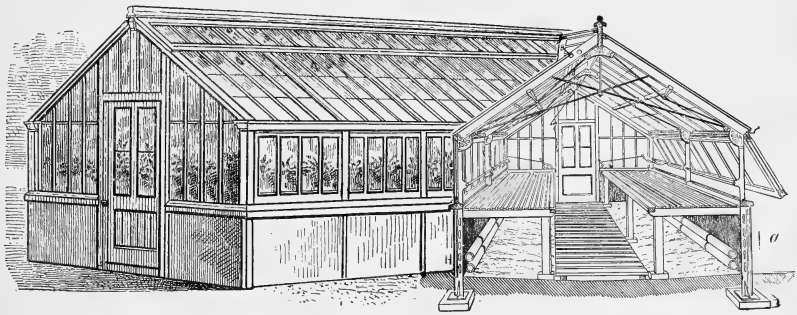

Fig. 63. Medium Span-Roofed Greenhouse. (Messenger's.)

The width of this class of house may be 12 feet to 14 feet, and the ridge 9 feet or 10 feet high. The sides may be formed of slate as illustrated, or of light brickwork, to a height of 3 feet, with side-hinged lights (*a*) 2 feet high. Houses of this description are particularly well adapted to the growth of calceolarias, cyclamens, cinerarias, primulas, pelargoniums, begonias, gloxinias, and others of a similarly free-growing nature.

If preferred, the interior arrangement may be altogether different. Market growers find these span-roofed houses of good service all the year round. In their case they are usually of considerable length, and not less than 14 feet wide (see Structures,

in chapter devoted to Commercial Floriculture). No stagings are fixed permanently, and the hot-water pipes are usually distributed, that is to say, the flow pipes are taken along the sides and the "returns" brought back on each side of the central pathway. All are blocked up just clear of the soil or border. During the spring, summer, and autumn months, tomatoes, either in pots or planted out, are in full possession of some of these houses, and cucumbers on raised mounds occupy the rest during the summer months. When the time arrives for housing carnations, cyclamens, chrysanthemums, cinerarias, zonale pelargoniums, and other winter flowering plants, temporary stagings are erected for those kinds requiring to be raised near to the glass, while the taller growing kinds, notably arums and chrysanthemums, are arranged on the borders. If amateurs and others adopt somewhat similar arrangements, they may probably derive more pleasure as well as profit from their houses than they would with fixed stagings. Especially is this arrangement desirable in the case of chrysanthemum enthusiasts, with a limited amount of house room at their disposal. Paved pathways interfere with the preparation of the beds for tomato plants. A layer of fresh coarse ashes each season after the tomatoes are planted will meet the case.

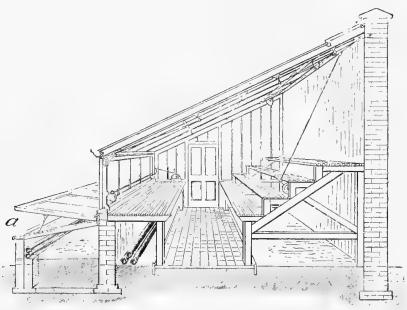

Fig. 64. Lean-to Greenhouse.

Where a suitable wall exists, plain lean-to structures may be cheaply erected and they are very useful. An end view of a lean-to greenhouse is shown in Fig. 64. The interior arrangement, shown in the illustration, meets the requirements of a very large number of persons. This class of greenhouse answers well for mixed collections of plants, the staging lending itself to effective arrangement without any of the occupants being unduly shaded. What is known as a "pit" in front (*a*) costs little, and is of enormous value for preserving and growing various kinds of small or dwarf habited plants. As already hinted, the particular houses under notice are not so desirable for the preparation of particular kinds of conservatory plants as is a span-roofed greenhouse.

It may be well to show a hip or three-quarter span house. This can be erected against a lower wall than is necessary for a span roof. It also differs from the foregoing as regards both the staging and the heating arrangements. Instead of front and back

stages there is a central stand for plants, with a border in front, while the back wall is free for covering with plants which may render it ornamental. In such a house the roof may be occupied to any extent desired by Roses or other climbing plants established in the border; or even with vines or tomatoes, if the owner desire to gratify not only the eye but the palate.

With good management and a prudent selection of plants for the position, such structure as is represented in Fig. 65 may be made, as many are, both useful and ornamental. It has to be remembered, however, that if the roof is covered densely with either vines or climbers, only shade-loving plants, such as Ferns, Palms, and others which are mainly grown for the beauty of their leafage, can thrive satisfactorily in summer; but the house may be rendered highly attractive with bulbs of various kinds and other early flowers in the spring.

Fig. 65. THREE-QUARTER SPAN GREENHOUSE.

Even in summer there are flowers of the choicest kinds that succeed under a shaded but not too densely shaded roof,—namely, orchids, of which some of the finest specimens ever exhibited have been grown in a vinery. It is a question of attentive care, good judgment, and cultural skill. A selection of cool house orchids will be given when these aristocrats of the floral world are under consideration, and fortunately many of them are so plentiful and cheap as to be within the means of most persons who can provide themselves with that enjoyable adjunct of a home—a well-built structure of the kind represented.

The back walls of such a house as is shown may be covered in various ways. We have seen them occupied with figs and tomatoes, with camellias, cytisuses, heliotropes, fuchsias, and zonal pelargoniums; also most elegantly, usefully, and even profitably, with what is known as the "Asparagus Fern," which is not, of course, a fern at all, but the South African Asparagus plumosus nanus, the fern-like leaves and sprays of which are so much in demand for associating with cut flowers. A wall covered with this plant in the best of health, with dark green fleecy leaves, is always cherished by its possessor and admired by his friends.

Constructing Greenhouses.

It is false economy to construct any greenhouse of cheap inferior materials. Only well-seasoned red deal is suitable for the woodwork, and this should have not less than three coats of good paint—one by way of priming, and two after glazing. For the roof the best Belgian 21-oz. glass ought to be used, a cheaper and lighter glass answering for the sides and ends. Glaze without top putty. If the glass is well bedded in putty, and duly "sprigged," all that is further needed is to smooth the putty neatly both above and below, and the two coats of paint will harden and case over, effectually excluding air. Where this method of glazing is adopted there is no wholesale shelling off of putty, and no loosening of glass from other causes, the economy of the practice commending it to all experienced gardeners. The staging inside the houses, in addition to being of a substantial character, ought also to be painted sufficiently often to prevent early and rapid decay of the woodwork. Iron standards or supports are desirable for the staging, and for some classes of plants, including begonias, fuchsias, and ferns, slates, with a covering of fine spar, gravel, or ashes, are of good service. Sheets of corrugated iron, galvanised, are cheaper, and largely employed, covered as suggested. Open lattice-work staging over hot-water pipes, and these often highly heated, are inimical to various kinds of plants, especially calceolarias, cinerarias, cyclamens, ferns, and fuchsias. When the stages over the pipes are not open, but close or solid, they should not be flush with the side of the house, but an inch of space ought to be left for the heat to pass upwards, next the front glass, where, otherwise, the frost might reach some of the plants in the winter.

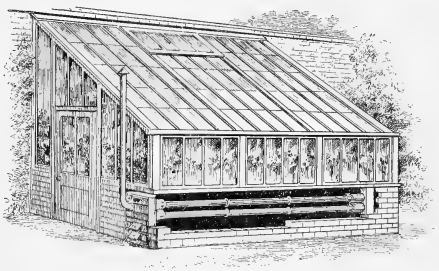

Fig. 66. Small Greenhouse.

Heating.

Heating will be discussed in connection with the construction of hothouses, but it will not be out of place to remark here that boilers not large enough to keep the water in the pipes comfortably hot without having to "drive" or stoke very hard, are the reverse of economical; and, on the other hand, a too powerful boiler is also objectionable,

burning fuel to waste, and possibly, if not probably, keeping up too strong a heat. The figures of manufacturers indicating the heating capabilities of their boilers are reliable, and afford safe guidance. Horticultural builders of repute do not hesitate to make themselves responsible for the efficiency of the heating arrangements of the structures they erect, and vendors of boilers and pipes will give the same undertaking when they fix them in position. Many gardeners and a few amateurs understand such work themselves, but in the absence of the requisite knowledge it may be a costly mistake to attempt it. For the sufficient reason that no boiler can be described as the best for all purposes and positions, no particular kind can be generally recommended; but it may be stated that the horseshoe Loughborough boiler, or those much resembling it, are the most popular among the owners of very small greenhouses. They are fixed much as shown in Fig. 66, and do their work well, burning almost any kind of small fuel without being very frequently attended to. For miniature structures there are boilers heated by gas or oil, but these cannot be safe for plants (even if frost be excluded) if the noxious fumes of combustion are allowed to enter the house.

A few words may be usefully said, for the guidance of beginners, on providing and maintaining the requisite heat in greenhouses. It has been said on page 127 that many plants, such as are there named, will be safe when the winter temperature does not fall below 40°, and more tender kinds when the minimum is 5° higher. If those temperatures are somewhat exceeded in mild weather during midwinter, no harm will be done if there is little warmth in the pipes; danger lurks in highly heating them in severe weather and forcing the temperature above the minimum named, as this weakens plants and favours their enemies—insects. The subject of excessive heating will be referred to under "Winter Management."

When frost finds entrance to greenhouses, destroying cherished plants, it is the result either of the insufficiency of the heating apparatus, or of mismanagement—often the latter. It must be remembered that the greatest cold usually occurs about day-dawn, which is just the time that greenhouse fires are apt to get low. This must be provided against by having the temperature of the house a few degrees above the minimum, say about 10 p.m., or when the fire is made up for the night. The pipes must also be more or less warm then, according to the state and prospects of the weather.

A sufficient body of fire is absolutely necessary for ensuring steady combustion after being banked up with enough suitable fuel to last through the night. Attention to these routine matters is of vital importance during severe weather, and not less so is

early morning visitation to the fire for starting it briskly, as may be needed, and it may be just in time for preventing the cold reaching the danger point. Through the fire being too low when made up at night, the pipes too cold and morning attention too late, millions of plants have fallen victims to frost in greenhouses during periods of severe weather.

Roller blinds are often employed on greenhouses in summer to shield the plants from the sun. It is to some plants beneficial, to others the reverse, and over-shading is an evil to be avoided. The blinds may be of at least equal service in winter when the weather is severe in preventing the radiation of heat from the structures, thus obviating the necessity for great heat in the pipes, and consequently effecting a saving in fuel. When pipes have to be very highly heated for several consecutive nights and days, the air is apt to be over-dried, and pouring water on the dry walls and floor near the pipes is under those circumstances desirable.

As to fuel, broken coke is well adapted for conical boilers, or in fact boilers of any shape that are fed from the top, as it falls more readily than coal does, which is apt to "cake" and cling to the sides of the boiler. For saddle boilers, or any kind with the fire underneath them, and fed through a door in the end above the ash pit, a mixture of broken coke and small coal, or breeze, is excellent, and has been found by experiment to be more economical than either coke or coal separately used, except, perhaps, in the case of anthracite coal, which is, however, only suitable for very large furnaces, where the structures to be heated are extensive.

Ventilation.

A free circulation of air is necessary to the health of all kinds of greenhouse plants, but it must be tempered to their condition and requirements. During the winter and spring months sufficient air can, as a rule, be admitted through the top ventilators without opening the front sashes at all. Sharp currents of air driving through the lower ventilators or open doors directly against plants are decidedly injurious. The whole air of a warm house can be changed in cold weather through the top ventilators alone, because the cold air sinks by its weight and pervades every part of the house as the warmer and lighter air is displaced.

Opening the top ventilators slightly and early, as the temperature rises in the morning, to prevent its rising too rapidly under the influence of the sun, is altogether better than leaving greenhouses closed too long and getting too hot, then throwing open the

ventilators widely to lower the temperature. This cannot be done without injury. Early and steadily increasing ventilation during bright mornings, to enable the temperature inside the house to rise in the same steady, natural manner as it does outside, is a golden rule to remember in the ventilation of greenhouses and other garden structures. Early closing is also very desirable, under certain conditions that will be subsequently pointed out. Only when the air is soft and genial should it be admitted in any large volume through the front sashes; and the easy mode of ventilation by opening the doors and leaving them open, is only permissible during sultry weather.

Pits.

When the term "pit" is used in gardening, it is generally understood to mean a low, comparatively flat-roofed structure with permanent brick or stone sides and ends, the roof consisting of bearers and movable glazed sashes after the manner of the old glazed portable frames. Former generations of gardeners turned these pits to good account in plant culture; but, unless heated by hot water, more than ordinary care has to be taken in protecting the occupants from severe frost. That is the reason why low span-roofed and lean-to houses without glazed sides, and frequently designated pits, are becoming so common. The sides and sometimes the ends of these low pit-houses are usually of brickwork, with the path in the centre sunk 2 feet below the ordinary ground level. A very handy form of plant pit is shown at *a*, Fig. 64, page 130. Fifty-four inches is a good width for these economically constructed pits. If made much wider the occupants are not so easily reached at the back as is desirable. The lights or sashes may either be hinged and propped open as required by the ratchet arrangement shown, or they can be made to take off as in frames, air being admitted by either blocking them up in front or at the sides, or by drawing them down slightly or considerably according to the weather. There are fewer breakages with the fixed lights, but, on the other hand, front ventilation is not always good for the plants. If box frames and sliding shutters are built into the wall between the pit and house to which it is attached, at a distance of about 2 feet apart, these, when open, answer the double purpose of admitting fresh yet not very cold air to the greenhouse, and at other times of warm air circulating from the house into the frames, a heavy covering of mats on the glass then sufficing to exclude frosts. A single hot-water pipe branching from the flow pipe in the greenhouse, taken along the front of the pit, then conducted into the greenhouse pipe at the other end of the pit, adds considerably to its usefulness.

Frames.

A supply of portable glazed frames is almost indispensable to the plant grower. In a small state many plants are not proof against the heat and dryness of greenhouse shelves and stagings, and unheated frames are the best places for them, as well as for many larger plants that require to be kept cool during the summer. Being movable, frames can be shifted from one place to another to suit the plants occupying them. The ordinary box two-light or three-light frames are still much in use, and will never be wholly dispensed with. They ought not to be large and unwieldy, but should combine durability with strength, without being actually heavy. No mistake will be made in ordering or making the lights 6 feet by 4 feet.

Span-roofed frames have of late years come to the front. There are several forms of these; that designed by Messrs. Foster and Pearson, Chilwell, Nottingham (see Fig. 67), combines all the latest improvements, and may be said to be one of the best. It has a ridge or cap ventilator, which permits moist or heated air to escape without an inrush of either cold air or rain, while the lights swing on a pivot, and can be fixed, by an ingenious arrangement, partially or widely open with little trouble on the part of those in charge of the frames.

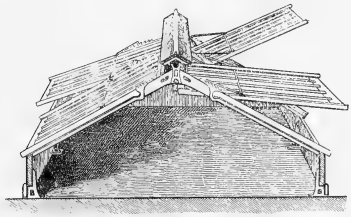

Fig. 67. Pearson's Frame.

GREENHOUSE MANAGEMENT.

After providing the means, it is incumbent that we make the best use of them. The best of means may be nullified by errors in management; and it is notorious that many persons succeed better with rough makeshift appliances than do others who are provided with the most modern conveniences. The routine to be followed necessarily varies with the seasons, and it should never be forgotten that it is by attention to small details, given at the right time, that the greatest success is achieved in the cultivation of plants as in other affairs of life. A few hints, then, bearing on the subject in hand, may be helpful to the inexperienced.

Spring.

Spring is a busy time in the garden. It is then, too, when greenhouses are usually in an attractive state. At this and at all other times cleanliness ought to prevail, and, in

particular, all decaying leaves and flowers should be removed daily, as these, in addition to being unsightly, are liable to spread decay all round. Crowding the plants together and indiscriminate mixtures should always be avoided as much as possible. Chinese primulas, Persian cyclamens, calceolarias, cinerarias, pelargoniums, and many more plants that might be named, quickly deteriorate if crowded among a variety of other kinds, and their flowering period is much shortened accordingly. Up to about the middle of May the morning is the best time of day to water plants in pots or borders, applying it freely to those showing signs of needing it. Only enough fire-heat should be afforded to keep the atmosphere comfortably warm and the house dry. The night temperature may range from 40° to 50° for the most hardy plants, such as mentioned on page 127, allowing another 5° for mixed collections. The day temperature may range from 45° to 60°, with air. Avoid admitting rushes of cold air through the front sashes, especially when the wind is in the east, as such currents are followed by mildew and other troubles. Commence ventilating slightly at the top of the house when the sun raises the temperature to 50° or 55°, and there will then be less need to afterwards set the lights open widely with a view to lowering the heat, which ought never to be required. Shade flowering plants and ferns from bright sunshine during the hottest part of the day. Whenever one insect is seen, fumigate. There will be others unseen, and waiting for more is a fatal policy.

Summer.

Early in the summer greenhouses should be cleared of the bulk of winter and spring flowering plants, as the space is wanted for the effective arrangement of tuberous begonias, cannas, erythrinas, fuchsias, heliotropes, liliums, plumbagos, and various others. A moister atmosphere may now be maintained and syringing in the case of all smooth-leaved plants resorted to with advantage, in the mornings and evenings of clear days. Closing early, or at about 4 o'clock, and syringing then, raises the temperature from 5° to 10°, and the genial, moist atmosphere created lasts for several hours. This is recommended only in the case of Indian azaleas completing their growth, fuchsias, begonias, gloxinias, and a few other plants that it is desirable shall form a clean strong growth before flowering, but is not advised to be practised with flowering plants generally. Remember that the freer the growth and the brighter the weather, the greater the amount of water will all plants need. The evening is generally the best time for watering in summer, but many plants will require a further supply before the next evening. They must have it whenever the soil crumbles and before the leaves

droop, always giving a copious supply. Permit no insects. No man can grow good plants and insects at the same time. A little top air should be left on all night long after June, admitting more very early in the morning, and increasingly, to prevent the heat rising much over 80°, as registered by a *shaded* thermometer. Hard-wooded plants may be placed on a bed of ashes out of doors, and under an awning of tiffany or cotton blinds. A heavy permanent shading is apt to make the softer plants in a greenhouse grow weakly, especially during a dull sunless summer, and for this reason canvas or cotton netting blinds on rollers are better, as these can be run up or let down at will.

If on the score of economy a permanent shading is desired, this should not be very heavy. There are various methods of providing such shading. One of the oldest is to add fresh lime to a bucket of water to form a rather thick "wash"; if this is applied, while fresh, to the roofs and sides of greenhouses with a long-handled brush, it will adhere closely till the autumn. Whiting mixed with skim milk, or made into a paste with cold water, adding a little liquid size, and enough hot water to thin it sufficiently for use, also forms a durable shading material, to be applied with a brush. Those who prefer a green tint can add a small quantity of Brunswick green to the whiting mixtures, and the following is also a good recipe for a green shading:—Ingredients: 1 lb. of wheat flour, $\frac{1}{2}$ lb. of whiting, and 1 lb. of common candle or Russian tallow. Make the flour into a paste, and then put in the candles while the paste is hot, crush the whiting into a powder, mix with cold water, and then add to the paste, also adding as much Brunswick green as needed. When required for use, warm it, and paint the glass when the sun is shining upon it. Preparations for shading greenhouses can also be bought from all horticultural sundriesmen.

Autumn.

Towards the end of September greenhouses have to be prepared for the reception of late autumn and winter flowering plants, and it is then when a thorough cleansing process is desirable. The glass and woodwork ought to have a scrubbing, and the walls a coating of whitewash. Outside, the shading material, put on with a brush or syringe, should be removed as much as possible, the time having arrived when the majority of plants require all the sunshine they can have.

Deciduous (leaf-shedding) plants, notably fuchsias, erythrinas, and plumbagos, together with tuberous begonias, even if they are unsightly, ought not to be too

suddenly "dried off," nor to be packed away in out-of-the-way places before they have shed many of their leaves in a healthy manner. Sudden changes of that kind are injurious, the wood shrivelling instead of remaining plump. In storing either deciduous, tuberous, or bulbous-rooted plants away in glazed outhouses and sheds, or under greenhouse stages, see that they receive additional protection from frost whenever this is required, and also that none of the plants become saturated by water dripping from pots above them.

Let all newly-housed plants have ample room, and they ought to be kept somewhat cool at first. Many of them will have been previously arranged on a moist layer of ashes outside, and the change to dry staging may necessitate a freer application of water than formerly. If shade is applied it ought not to be permanent, and should be given primarily with a view to preserving flowers from shrinking, large blooms of chrysanthemums in particular requiring this attention. Give water in the morning, slopping as little of it about as possible, and keeping the floors drier than formerly. If mildew appear in the form of floury specks, dust promptly with sulphur. Greenhouses other than those containing hard-wooded plants should be airy, yet comfortably warm, in the autumn, the night temperature ranging from 45° to 50°, and 55° by fire-heat on dull days, with air more or less according to external conditions. Provide a little fire-heat on cold, damp days, as well as frosty nights, the soft-wooded section of greenhouse plants standing in the greatest need of this.

Winter.

At this period of the year water must be applied to all plants requiring it in the morning, and somewhat sparingly. By "sparingly" it is not meant that driblets should be given, as these are a mistake at any time. Not till a plant is moderately dry at the roots does it require water; then enough should be given to pass to the drainage, and thus moisten every portion of the soil. So long—and no matter how long—the soil remains decidedly moist withhold water; when it becomes crumblingly dry, afford a supply. There is no other safe rule for watering plants in winter.

Judgment must equally be exercised in the application of fire-heat to greenhouse plants during the winter. If too much heat is given, weakly, premature, flowerless growth is promoted, while if artificial heat is afforded only when severe frosts are imminent, then many of the occupants of a greenhouse will suffer from the coldness and dampness of the surroundings. No harm will result if the night temperature falls

to within a few degrees of the freezing-point occasionally, but if this is often repeated the chances are that a marked deterioration in the value of the plants will soon take place. A safer rule would be to keep the hot-water pipes sufficiently warm to maintain a temperature of 40° on cold nights and 45° on mild nights, the day temperature varying from 45° to 50° according to external conditions. Enthusiastic amateurs, however, are apt to err in the direction of giving too much rather than too little fire-heat in the winter, especially when they first obtain an apparatus. A gentle warmth in the pipes keeps the air in the house genial and moving. Without it the atmosphere is stagnant, cold, and damp. A little top air ought to be given on mild days.

Plants in Pits and Frames.

Much that has been advanced as to the watering and shading of plants in greenhouses also applies to those placed for a time in pits and frames. When only a change of air is needed, or enough fresh air to dispel damp and to keep down the temperature somewhat, raise the cap ventilators of span-roofed frames, and in all other cases either block up the lights at the back or slide them down a few inches. Blocking them open in front admits a rush of cold air to an injurious extent, and if the temperature cannot be kept sufficiently cool by raising the lights higher at the back, block them up at the sides rather than in front.

During the hottest part of the year plants will thrive the most satisfactorily when set on a cool moist bed of ashes, but when the days are shorter and the nights longer, the majority may well be raised on wooden stagings or inverted flower-pots, so as to bring them near the glass, where they will get more light and warmth and be less liable to damp off. It economises fuel to mat over heated pits in severe weather; those not heated, and frames generally that contain greenhouse plants, should have a heavy protection of mats and strawy litter as well, the sides also having some of this banked against them. Never uncover till the frost is quite out of a pit or frame, and if by chance the occupants are found in a frozen state, syringe them freely with cold water and keep them heavily shaded till they are recovered. Sudden thaws are ruinous.

PLANTS FOR GREENHOUSES.

So numerous are plants adapted for growing in greenhouses that a complete list is impracticable, and indeed if given would not be serviceable to the majority, who need information that they can turn to useful account. A selection, therefore, will be made of kinds that are likely to give the most satisfaction to cultivators, treating those the most fully which are in the greatest demand. It will be convenient to take them in alphabetical order.

ABUTILONS.

Varieties with ornamental foliage of these greenhouse evergreen shrubs receive every attention at the hands of those who are responsible for the beautification of the flower garden in summer, but as much cannot be said in respect to varieties which are cultivated for the beauty of their flowers. Yet they fully deserve a more general and extensive recognition. Starvelings are principally met with, and these convey a poor idea of the merits of flowering abutilons. Unless well grown the plants soon present a shabby appearance, in which condition the rubbish-heap is the best place for them. Strong young plants give the best results. They can be flowered satisfactorily in 6-inch pots, but are to be seen at their best planted out in a greenhouse or conservatory, and allowed to grow naturally. Properly speaking, abutilons are summer and autumn flowering plants, but young plants raised from cuttings in the summer, and vigorous old plants, will generally continue to flower freely well into the winter and again in the spring.

Propagation.—Abutilons may either be obtained from cuttings or raised from seed. The first method is the most common. If stock plants have been kept cool and dry during the winter, they may be lightly pruned in the spring and started into active growth in a moist heat. When the young shoots are about 3 inches long they may be taken off with a heel of old bark and wood attached, and inserted thinly round the sides of well-drained 5-inch pots, filled with a mixture of loam and either peat or leaf soil, with sharp sand added. They will root freely if kept in a close frame with bottom heat and duly shaded from sunshine. Before they have made much progress remove them to a more exposed position, and a week later divide and place them singly in 3-inch pots. Young shoots with a heel, or only tops shortened to a joint, may be rooted during the summer and autumn months, these plants flowering in the winter and spring.

Seedlings are also easily raised. In March prepare either pans or well-drained

6-inch pots by filling with fine soil as recommended for cuttings, making this firm and level, and watering prior to sowing the seed. Place in a brisk moist heat, cover with a square of glass, and shade heavily till the seedlings appear, afterwards gradually exposing these to the light and sunshine. Prick the seedlings into small pots and keep them in gentle heat till growing freely, after which a warm greenhouse shelf will suit them.

Choice abutilons may be grafted on commoner varieties or seedlings, but this is not often done. The one noteworthy exception is in favour of the pendulous or trailing variety—A. vexillarium igneum — pretty standards of this being had by grafting it on clean straight stems of any vigorous erect-growing variety.

Fig. 68. Sutton's Prize Abutilon.
(Kindly supplied by Messrs. Sutton & Sons, Reading.)

Cultural Details.—Plants with a single branching stem are the most ornamental and floriferous, and for this reason little or no topping of either seedlings or plants raised from cuttings is desirable. Before the young plants become much root-bound, shift them into 6-inch pots—a good size to flower them in—employing a compost of two parts fibrous loam to one of either peat or leaf soil, or a mixture of both, with a little well-decayed manure and sand added. Pot firmly. Arrange the plants either on a shelf in a light greenhouse or on a bed of ashes in a shallow pit or frame. When flowering assist them with liquid manure. A warm greenhouse is needed for those which are desired to flower late, and the more weakly growers should have a stake to support them. The illustration represents an excellent seedling abutilon.

While resting during the winter abutilons ought to be kept cool and dry, giving only enough water to prevent the wood shrivelling. In the spring prune freely, cutting back all side growths to within two or three joints of the main branches or central stem, as the case may be, also shortening the leader—treating those planted out similarly. Enough water must be applied to start the plants into active growth, and directly they commence moving shake the roots nearly clear of soil, shorten them somewhat, and return to pots a size smaller than they were in previously, a shift to be given before the soil is crowded with roots. Feed liberally when in flower. It must, however, be repeated that quite young plants are the best for flowering in pots. Any planted out should also be annually pruned, and they pay for lifting and re-planting in fresh soil, especially if the border is narrow.

Selection of Abutilons.

Admiration.—Light pink, shaded salmon.
Anna Crozy.—Dwarf; deep pink, shaded lilac.
Boule de Neige.—Vigorous and free; white.
Canary Bird.—Robust, free flowering; primrose yellow.
Emperor.—Vigorous; claret crimson.
Golden Gem.—Dwarf; floriferous, canary yellow.
Grandiflorum.—Sturdy; deep orange.
Lustrous.—Very free; bright red.
Purity.—Good habit; pure white.
Rosæflorum.—Salmon rose, veined crimson.
Sanglant.—Robust; reddish scarlet.
Scarlet Gem.—Dwarf; brilliant red.

Ornamental Foliaged.

Darwini tesselatum.—Stiff growing, fine leaves, mottled with yellow.
nævium marmoratum.—Marbled green and yellow.
Sellowianum marmoratum.—Large maple-like leaves, much mottled with yellow.
Souvenir de Bonn.—Leaves margined white; distinct and effective.
Thompsoni.—Vigorous; leaves blotched with yellow.
vexillarium variegatum.—Dwarf; leaves prettily blotched with yellow.

ACACIA.

The Acacia family is an exceptionally large one, comprising about 400 species, but of this number only a comparatively few are cultivated in greenhouses in this country. They are admired for their closely-set small globular flowers, which have a charming effect when seen in bountiful profusion. They are imported in enormous quantities from Southern Europe in the spring and sold in the flower markets under the name of "Mimosas," which belong to the same family, but another tribe of *Leguminosæ*. A few species of Acacias, which are the most extensively grown in Britain, will be appended, and when represented in the best condition, with deep green leaves and myriads of sparkling flowers, they are worthy of a place in all greenhouses and conservatories.

Raising Plants.—Acacias are propagated by means of cuttings; also by seeds—when these can be procured. Short cuttings of half-ripened wood taken off during the summer with a heel, are the most reliable. These should not be allowed to flag before they are inserted, and in readiness for them have filled either heavily drained pots or pans with fine peat and sand, surfaced with pure sand, making all smooth and firm. Insert the cuttings so that they stand just free from each other, taking care that they touch the bottom of the holes made with a small dibber for their reception; well fix them in position, and give a gentle but good watering through a very fine-rosed can. They will not succeed in heat, but must be placed in a shady part of a greenhouse. When the cuttings have dried after watering, but before flagging takes place, cover them with a bell-glass, shade from the sun and keep the soil steadily moist till they are rooted. There ought to be no undue delay in placing the rooted cuttings singly in 2-inch pots, using a peaty compost, and they should be kept close and moderately warm for a few days after potting. A greenhouse shelf or shallow cool frame will suit them for the next few months.

Fig. 69. Acacia lineata.

Unless acacia seed is sown directly it is ripe, it is liable to become very hard and to germinate indifferently, soaking the seed in moderately hot water till it is soft not always proving a remedy. When possible, therefore, sow the seed directly it is ripe, in sandy peaty soil and a brisk heat. Cover with squares of glass and shade heavily till the seedlings appear. When large enough to handle, place these singly in 2-inch pots, and thenceforward treat similarly to cutting-raised plants.

Culture.—In order to make the young plants bushy they ought to be topped occasionally, and should further receive a shift into larger pots according as they require it. For these later shifts and for large plants generally, stronger soil than previously

recommended ought to be employed. This may consist of two parts fibrous loam to one each of leaf soil and peat—the latter not being indispensable—with sharp sand freely added. In each and every case pot firmly. The taller-growing species are most suitable for clothing pillars and rafters in greenhouses and conservatories, but may be kept fairly compact by topping the more advanced growths during the summer. Pruning should take place soon after the plants have flowered, or not later than the early part of May. It ought to be carried out somewhat severely with a view to having abundance of fresh young wood for flowering the following spring. When the plants start growing afresh, or about a fortnight after pruning, they ought to be turned out of the pots, have the old balls of soil and roots reduced in size considerably, and then returned to nearly or quite the same sized pots they were in previously. When recovered from this severe treatment and growing freely, arrange them, as well as quite young plants, on a bed of ashes in a sunny position, and take good care they never suffer through want of water, acacias requiring liberal supplies of this. It is a good plan to shield the pots from very hot sun. The plants ought to be housed early in October, and if well furnished with firm, ripened shoots, abundance of flowers should result, under ordinary greenhouse treatment, during the following spring.

Selection of Acacias.

ARMATA, a native of Australia; height, 6 to 10 feet; flowers, yellow, produced singly: April.

DRUMMONDI, Swan River; height, 8 to 10 feet; flowers, pale lemon yellow, produced in drooping spikes: April.

LONGIFOLIA MAGNIFICA, Australia; height, 10 feet; flowers, yellow, in loose spikes: March.

GRANDIS, West Australia, dense growth; height, 6 to 12 feet; flowers, yellow, globular in form and numerous: February to May.

PLATYPTERA, Swan River; height, 3 feet; flowers, yellow, in solitary heads: March.

LINEATA, Australia; height, 6 to 10 feet; flowers, yellow, globose, in arching sprays: March.

ACROPHYLLUM VENOSUM.—This New South Wales shrub is worthy of inclusion in the more extended collections of greenhouse plants. It is an evergreen, of a neat, erect habit of growth, but in its natural habitat attains a height of 6 feet; flowers pinkish white, in dense axillary spikes, freely produced from April to June inclusive. It is propagated by cuttings of half-ripened shoots, these being inserted firmly in pans or pots of sandy peat soil, placed in a greenhouse, covered with either a hand-glass or bell-glass, and kept properly shaded. When rooted, pot singly, using 2-inch pots and peaty soil. Top, if necessary, to make the plants bushy, and shift into larger sizes according as the plants require more root room, doing this in February. Use the same kind of soil as for acacias, and press it down firmly. During the summer they may be

set out in the open with other hard-wooded plants, housing in October. They must never become dust-dry at the roots, and will lose their leaves if thrips are allowed to gain an ascendency. Syringing, and occasional fumigations or vapourising with nicotine preparations, will keep them clean.

ADENANDRA.—Of this small family of South African shrubs only two species are recommended for general culture. These are A. fragrans, height 1 to 2 feet, flowers rose-colour and fragrant, produced on long peduncles (May); and A. umbellata speciosa, height 1 to 2 feet, flowers pink, in terminal umbels (June). Both are attractive and beautiful, though far from being common. Cuttings made of the young tops just before these begin to develop their buds, and treated as advised for acrophyllum, will root freely. They require a mixture of equal parts of light fibrous loam and peat, with silver sand freely added, to grow in, and must have this made firm about the roots; large shifts are unwise. If grown in the open during the summer, see that no worms find their way into the pots. Winter in a warm greenhouse.

AGAPANTHUS.—Agapanthus umbellatus, or African Lily, is quite an old favourite for flowering in greenhouses, and also for arranging in entrance porches, on terraces, alongside ponds, water-courses, or carriage drives, and may often be seen on balconies. It is a native of the Cape of Good Hope, and nearly hardy. There are eight or more varieties in cultivation, most of which produce bold umbels of flowers, supported by long and stiff scapes, in June or later, according to circumstances. Height 1½ to 3 feet. The flowers of the original species, A. umbellatus, are bright blue, the variety known as A. u. flore pleno differing only in the doubling of the flowers. A. u. maximus is an improvement on the original type, both as regards vigour of plant and size of flowers, but A. u. albidus, an attractive white form, is not so robust and is also somewhat shy flowering. A. u. variegatus has white and green striped narrow leaves, and, though neither strong-growing nor free-flowering, is yet attractive.

Agapanthuses are increased by offsets, and these should not be over-potted at first nor subjected to strong heat. A rich compost, or a mixture of two parts good strong loam to one part each of leaf soil and decayed manure, with sharp sand added, is suitable. After strong plants have been gradually shifted into large pots, or, better still, strong circular oak tubs, they need not be turned out of them again for several years, but those plants which are strongly rooted should have weak liquid manure supplied to them during the flowering and growing period, with abundance of water, gradually withholding this in the autumn with a view to partially drying and resting the plants. It

is only by growing the plants strongly, taking care not to over-pot the weakly growers, well maturing the crowns in the full sunshine, and resting as advised, that they can be relied upon to flower freely the following summer. During the winter, store them under greenhouse stages or in other cool quarters, and keep them moderately dry. In the spring, assign them a lighter position before a feeble leaf growth is caused by shade, and give a thorough soaking of water, not letting them suffer through lack of adequate supplies throughout the growing season.

AKEBIA.—Akebia quinata (Chusan) is a nearly hardy twining shrub, and the only species cultivated. It produces purplish flowers freely in March, and when seen at its best seldom fails to please. It is increased by division of the roots in October, and by cuttings inserted in sandy peat soil in a cold frame in September. A mixture of loam, peat, leaf soil, and sand is suitable for growing the plants. All the pruning necessary is the shortening of growths after flowering. It succeeds in a cool greenhouse, and survives the winter in the open air in sheltered positions in the south of England.

ALOYSIA.—Aloysia, or Lippia citriodora, commonly called Sweet-scented Verbena, is a very old favourite. It is a deciduous shrub, a native of Chili, and is grown for the pleasing lemon-like scent of its leaves. Cuttings of young growths taken off the plants in the spring can be rooted quickly in a close, warm frame, after the manner of true verbenas. Neat plants are formed the same season by placing the newly-rooted cuttings singly in 2-inch pots, and giving them the benefit of gentle heat till well established, shifting them into 5-inch pots, and topping often enough to make the plants bushy. In the autumn the wood should harden and the leaves fall, when only enough water ought to be given to prevent the branches shrivelling. Winter in a cool, dry place, or with fuchsias, and early in the spring prune rather severely. Start them in the warmest part of a greenhouse, and as soon as they commence growing, which, after watering, they will do in about a week, turn them out of the pots, reduce the old soil, trim the roots lightly, and return to pots large enough to hold them comfortably. A moderately rich, loamy compost is suitable for either small or large plants. Topping the growths, more especially all with a tendency to outgrow the rest, will make them branch freely, and a shift should be given before the plants become stunted in growth. Syringe freely after hot days, to keep down red spider, a pest that is very liable to cause the loss of all the older leaves. Large standard or pyramid plants in pots or tubs are appreciated in gardens, and they grow better outdoors than under glass during the summer months.

AOTUS.—A. gracillima, a native of New Holland, is the species usually cultivated and recommended. It is a pretty little shrub which may attain a height of 3 feet, and produces long graceful spikes of small yellow and crimson flowers in early summer. A. villosa (Fig. 70) is more compact and free branching, with similar flowers. Cuttings of firm shoots in pots of sandy peat soil, duly covered with a bell glass and shaded from bright sunshine, emit roots in a temperature of about 55°. After being established in quite small pots, gradually shift into larger ones, the soil used consisting of equal parts of fibrous loam, peat, and sand, with a small portion of charcoal. The pots must be well drained, and the soil pressed down firmly. Water freely during the summer, but it must not be given to excess in the winter. Cool greenhouse.

Fig. 70. AOTUS VILLOSA.

APHELEXIS.—When slow-growing hard-wooded plants were more appreciated than is the case now-a-days, aphelexes (also known as helichrysums) were frequently seen. They require careful treatment, and soon show the ill effects of faulty watering. Well-grown plants are very beautiful, as may be seen occasionally at exhibitions, and as the flowers are of a persistent character, the same plants may be taken to several flower shows in one season. A. humilis (Cape of Good Hope) and its varieties are or were the most popular. The

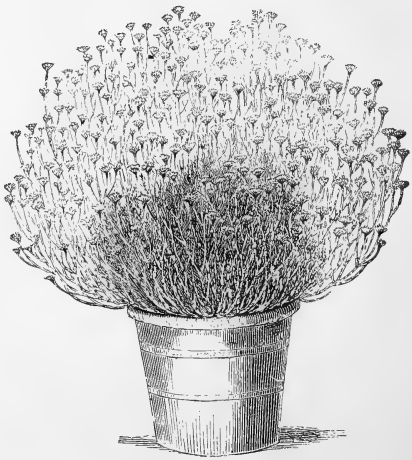

Fig. 71. APHELEXIS (HELICHRYSUM) HUMILIS.

original species has pink flowers. A. h. grandiflora has rosy purple flowers; A. h. purpurea, also known as A. macrantha purpurea, dark purple flowers; and A. h. rosea—synonym A. macrantha rosea—rose-coloured flowers, all expanding in April. Short half-ripened shoots, inserted in well-drained pots firmly filled with sandy peat, covered with a bell glass, set on stage in cool greenhouse and properly looked after, will emit roots during the summer. Pot singly and very carefully in thumb pots, and grow the plants on a greenhouse shelf during the winter. If they fail to branch naturally, top them, treating larger plants the same if necessary. February is the month during which the re-potting of small or large plants should be done, and only a small shift ought to be given in any case. Suitable soil consists of good brown fibrous peat two parts, leaf soil one part, with silver sand and small nodules of charcoal freely added. Use clean, carefully-drained pots, and pack the soil firmly. It is of importance that the old ball of soil, crowded with fibrous roots, be in a moist state when the shift is given, also that the depth of the rim of the pot be allowed for watering purposes. These fibrous-rooted, peat-loving plants ought never to become really dry at the roots, and when water is given there should be enough to well moisten every particle of soil. These plants must be grown in the full sunshine, and never arranged where worms can have access to the pots. Little or no pruning is needed, but the plants should be trained in semi-globular form, distributing the young flowering growths evenly. Cool greenhouse treatment suits the aphelexis and its near ally, Phænocoma prolifera Barnesi.

AZALEA.

Of the many hard-wooded plants in general cultivation few are more popular than the gorgeous Indian Azalea (A. indica). The original species was introduced from China in 1808, and described as scarlet in colour, but this has been superseded by a remarkable array of varieties, both single and double flowering, mostly raised by Continental florists. During the dullest months in the year our greenhouses and conservatories may be kept gay with azaleas. A moderate amount of forcing brings some of them into flower in November, while during the spring months they will flower freely in an ordinary greenhouse, the display lasting into June by means of retarded plants. These azaleas may easily be kept in compact bush form by pruning and training, and may be either globular or pyramidal in shape, to suit the tastes of their owners. Azaleas are not difficult of cultivation. It is true that thousands are annually lost, and

many more are the reverse of presentable, but this is due to faulty treatment, and not to any inherent weakness in the plants.

Raising from Seed.—Raising new varieties from seed is comparatively easy. Crosses may be effected by amateurs. The flowers of a chosen variety for bearing seed should have the anthers removed before they burst, and pollen applied to the stigma, this being taken from another variety different in colour. Immediately protect the flower thus fertilised with fine gauze to prevent insects conveying pollen—it may be from an inferior variety, thereby spoiling a well-planned cross. The seed must be gathered when ripe, and may be sown in February in shallow pans filled with fine sandy peat, and placed in heat; cover the pans with a square of glass, and shade heavily till the seedlings appear and lightly afterwards. When they have formed two or three leaves, carefully transfer the seedlings to other pans of sandy peat, disposing them an inch or two apart, and grow them in gentle heat, taking care to shade from bright sunshine. Early in the following spring place them singly in 2½-inch pots, gentle heat and a moist atmosphere hastening their growth. Top once to make the plants branch, and flower them in small pots for testing the varieties, increasing the more meritorious by grafting.

Propagation by Cuttings.—Some of the free-growing varieties succeed well on their own roots, and these may easily be raised from cuttings and grown into flowering plants. Select half-ripened shoots not quite 3 inches in length, trim off the lower pair of leaves, and cut the stems cleanly below a joint, as shown in Fig. 72 (*a*). Prepare a pan or pot by well draining, then partly and firmly filling with sandy peat, with 1 inch of silver sand on the top of this (see Fig. 73), and insert the cuttings just deep enough to rest on the soil, while the base of the leaves touch the sand. Water gently, cover with a bell glass, place in a temperature of 55° to 60°, shade carefully, and wipe the glass dry every morning. When the cuttings are rooted transfer the pots to a greenhouse shelf for about a fortnight, covering with the bell glass during the daytime only. After this preparation, separate the plants with great care, not breaking a root, and place them singly in 2-inch pots, pressing down the sandy peat soil firmly. Keep them in a warm close frame till they have formed fresh roots, then gradually expose to more light and air, but not subjecting them to quite cool treatment. Top the growths from time to time to make the plants dwarf and compact, and give a small shift as required.

Propagation by Grafting.—Most of the Indian azaleas grown in this country are grafted plants. When weakly-growing varieties are established on vigorous stocks a free-growing habit is imparted; grafting also affords a ready means of raising a large

number of the best azaleas for all purposes. The old A. indica alba, A. i. phœnicia, and other strong growers are well adapted for stocks, and these may either be obtained from seed or from cuttings. The stocks are ready for grafting when about 6 inches high and have been for some time established in small pots. The stems, also the young growths to be attached to them, ought to be moderately firm at the time of the operation.

The process consists in removing the leaves and shaving off a portion of the bark from the stock and scion where they are to be joined together. This should be done neatly, the barks fitting together at one side at least, binding somewhat tightly with

Fig. 72. Azalea Cutting for Insertion.

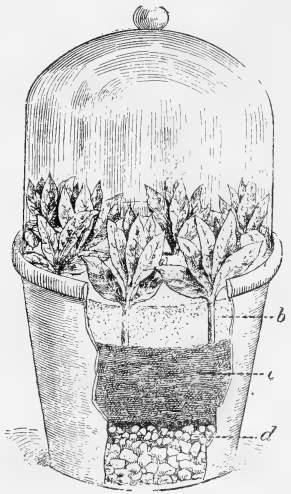

Fig. 73. Azalea Cuttings inserted.
References:—*b*, sand; *c*, sandy peat; *d*, drainage.

worsted as shown in Fig. 74 (next page). Keep the worked plants in a close, moist heat of 65°, guarding particularly against exposing them to strong sunshine and currents of dry air. When the union is nearly perfect, and before the worsted cuts into the bark, remove it and tie afresh, only less tightly. When the union is complete, neatly cut away the upper portion of the stock, and soon after top the scion—the part attached—to form the future plant.

The result of topping is seen in Fig. 75. The removal of the top at *h* has given rise to four branches, and topping these in turn after they have made three or four leaves results in other growths, as foreshadowed in the figure. The ends of the shoots should

be removed, while they are soft, at the points marked across the stems. Those millions of azaleas annually grafted in Belgium are grown rapidly in a warm, genial temperature, or they could not be exported so cheaply. Large, healthy bushes of an inferior variety of azalea may also be grafted in much the same way as recommended for the small plants, and be converted into more valuable specimens accordingly.

Treatment of Established Plants.—In most instances the cultivation of azaleas commences with plants well furnished with flower-buds. If a portion of those with the most prominent buds are, late in September or early in October, placed in a temperature

Fig. 74. Grafting Azaleas.
References:—*e*, base of stock; *f*, top to be severed—after *g*, the graft or scion, is united.

Fig. 75. Azaleas—Forming Plants by Topping at *h* and subsequently.

of 55° to 65°, they should be in flower during midwinter. The old Fielder's White and the popular Deutsche Perle are among the best for the purpose, and plants forced in the preceding season would be the first to flower in the following winter. A succession may be maintained by the introduction of more plants into heat every three weeks. Azaleas, whether forced or allowed to flower naturally, keep in beauty the greatest length of time in a dry atmosphere and a temperature not rising much above or falling much below 45°, taking care to keep the roots constantly moist, and the flowers shaded from bright sunshine.

As the flowers wither, not only remove them, but also at the same time the incipient seed-pods at their base. This is important, and often too long neglected. Nor should there be any delay in returning the plants to a forcing-house or other moderately warm quarters, where they can be syringed every morning and afternoon, to accelerate their growth. Omitting to attend to this precaution has led to innumerable failures. The best time to regulate the growth of the plants by freely shortening unruly shoots is early in the spring, while the training may be done in the autumn or winter.

Re-potting is a most important cultural detail, too often performed either badly or at the wrong time. It should be done (when needed) within a month after flowering, as the roots are then the most active. Large specimens in 12-inch pots do not require a shift oftener than every third year or more; in fact, they may remain in the same pots for a much longer period provided they are assisted with weak liquid manure during the growing-time. Exception must, however, be made in favour of plants which have been rendered unhealthy by imperfect drainage and soured soil, evils which must be removed. Even the smaller plants do not always require to be re-potted every season, but any much root-bound or in pots small in proportion to the size of the plants should be given larger sizes.

In no case ought a large shift to be given, 1 inch of fresh soil all round the mass of roots being ample. The orthodox potting mixture consists of two parts good fibrous peat, broken finely for small pots, and coarsely for the larger sizes, to one part each of brown fibrous loam and leaf soil, with sharp sand and crushed charcoal freely added. The plants should be in a moist state at the roots when turned out of their pots, and be further prepared by having the drainage crocks removed, and the sides carefully loosened with the aid of a pointed stick; also any surface soil unoccupied by roots cleared off. Use clean, carefully-drained pots, and ram down the soil very firmly, keeping the collar of the plants high, but allowing adequate room from the rim of the pot to the soil for water. Filling the pots anything like level with the rims is a great mistake. Any plant found in an unhealthy state at the roots owing to over-potting, worms, or other causes, should have all the soured soil picked away from what live roots there may be, trimming these and returning to smaller pots (if possible) than they were in before, and the fresh compost and heat will usually lead to improvement.

When the early summer growth is completed remove the azaleas to a cool, airy greenhouse, and, if the room can be spared, keep them there till they are again wanted to flower. The more common practice is to stand them in a sheltered place outdoors

with the other hard-wooded plants, shading from strong sunshine during the summer, and housing in October; but unless great care is taken worms find their way into the pots, these souring the soil and having a most prejudicial effect upon the health of the plants. Even if worms are kept out of the pots by means of ashes and other contrivances azaleas are yet liable to show signs of having received a check, the older leaves dropping soon after housing. The premature falling of leaves is also liable to take place if the plants are wintered in too low a temperature. It is in a warm greenhouse where they remain in the best state of health, and from first to last the plants must not be allowed to become really dry at the roots before water is given. The most successful cultivators are those who exercise the best judgment in watering the plants.

Insects.—The worst enemy of azaleas is a minute insect (finer than the point of a needle) known as thrips, and these, if allowed to gain the upper hand, will cause the leaves to drop in shoals. The fumes from tobacco paper, if made too hot or strong, are liable to have the same effect, but nicotine vapour is a safe remedy. Red spider must be kept down by frequent and forcible syringings with clear water throughout the spring and summer months.

SELECTIONS OF AZALEAS.

Twelve Single-Flowered Varieties.

Charmer.—Rich amaranth.
Comtesse de Beaufort.—Rich rose.
Duc de Nassau.—Rosy purple.
Flambeau.—Glowing crimson.
John Gould Veitch.—Lilac rose, bordered white.
Louis Von Baden.—Pure white; fine.
Madame Van Houtte.—Flaked crimson and rose.
Marquis of Lorne.—Brilliant scarlet.
Mrs. Turner.—Pink, margined white.
Princess Alice.—Purest white.
Sigismund Rucker.—Rose, crimson blotches.
Wilson Saunders.—White, striped with red.

Twelve Double-Flowered Varieties.

A. Borsig.—Pure white.
Alice.—Deep rose, blotched vermilion.
Bernhard Andreas.—Violet purple.
Bernhard Andreas Alba.—Pure white; fine, late.
Deutsche Perle.—White; early.
Dr. D. Moore.—Deep rose.
Empereur de Brésil.—Rose, edged white.
François de Vos.—Clear red; fine.
Niobe.—Ivory white.
punctulata flore pleno.—Creamy white, striped scarlet.
Souvenir de Prince Albert.—Rose, striped white; late.
Vervæneana.—Rose, edged white.

Good Forcing Azaleas.

Baronne de Vriere.—White; single.
Deutsche Perle.—White; double.
Fielder's White.—Single.
indica alba.—White; single.
narcissæflora.—White; double.
Raphael.—White; double.

Hybrid Azaleas.

Lady Musgrave.—Light carmine.
Miss Buist.—Pure white.
Mrs. Carmichael.—Rich magenta.
Prime Minister.—Soft pink.
Princess Beatrice.—Light mauve.
Princess Maude.—Magenta, shaded rose.

The above hybrids, obtained by crossing Azalea indica with A. amœna, produce small flowers in great profusion early in the season by gentle forcing.

Babingtonia (or Bæckia).—In B. camphorosmæ we have a pretty greenhouse evergreen shrub of easy culture, and interesting, if not particularly showy. It is a native of Australia, where it attains a height of 7 feet. The flowers are freely produced during the summer in long terminal racemes; colour pinkish white, with a scent not unlike camphor. Propagation is effected by means of cuttings of young non-flowering shoots under a bell glass in gentle heat. From the pans or pots in which they are rooted the plants should be placed singly in small pots, in which they may remain on a greenhouse shelf all the winter. Early in February top them, and three weeks later give a small shift. Established plants must be topped or lightly pruned to make them branch, and be given a shift in March or April. A mixture of equal parts of fibrous loam and peat, with sharp sand added, suits these plants, and during the summer they ought to be grown in cold frames where they can be freely ventilated and lightly shaded.

Begonias (tuberous).—See "Florist's Flowers," page 309, Vol. I.

Beaufortia.—A small family belonging to the myrtle tribe, succeeding well and flowering freely under warm greenhouse treatment. B. decussata (New Holland) grows from 3 to 8 feet in height, flowers scarlet—May; B. purpurea, also from New Holland, colour purplish red; and B. sparsa, scarlet (West Australia), are the three species cultivated. They are propagated by cuttings of firm shoots in sandy soil under glass in a temperature of 55° to 65°. March is the month in which to prune and regulate the growths, doing what potting is needed soon afterwards. Compost suitable: equal parts of fibrous loam, peat, and leaf soil, with sand freely added. Pot firmly.

Bomarea.—About five species of bomareas are in general cultivation, and, where properly treated, they seldom fail to give pleasure. All are herbaceous perennials, twining in growth, and producing pendulous, alströmeria-like flowers in clusters during the summer. B. Carderi is a native of Columbia; B. frondea, B. patacocensis, and B. Shuttleworthi were introduced from Bogota, and B. Williamsi from New Grenada. Warm greenhouse treatment is required by all of them. They may be propagated by seeds, sowing in March in sandy soil in a temperature of about 65°, potting the seed-

lings singly when 3 inches high. When well established either shift into larger sizes or plant them in a narrow border. Old plants may be divided when on the point of growing in the spring; take care to save some roots with each division, and establish them in pots, subsequently shifting into larger pots, or plant out. Compost suitable: equal parts of fibrous loam, peat, and leaf soil, with abundance of sharp sand to ensure porosity.

BORONIA.—These rank among the most elegant hard-wooded plants in cultivation, and it is a pity they are not more generally cultivated. B. Drummondi (New Holland), height 2 feet, flowers rosy pink, abundant in spring and summer; B. elatior (Western Australia), height 4 feet, flowers in dense clusters along the ends of the branches, rosy carmine, fragrant, May; B. megastigma (Western Australia), height 1 foot, slender and twiggy, flowers maroon purple, yellow inside, deliciously fragrant; B. serrulata (Port Jackson), height 1 to 5 feet, flowers deep rose, sweet-scented, July; and B. tetrandra (New Holland), height 1 to 4 feet, flowers pale purple and produced singly, May, are the best of the species. Propagation is effected by cuttings of firm young shoots during the summer, inserted in pans or heavily-drained pots filled with sandy soil, in a greenhouse or temperature of about 55°, covered with a bell glass and shaded. The bell glass should be dried every morning as a safeguard against the cuttings damping, and water must be applied carefully round the rim of the pot, without disturbing the glass. When rooted, the young plants ought to be placed singly in very small pots and plunged in cocoa-nut-fibre refuse or other material free from worms. Frame culture answers well for these small plants during the following summer, and they must be topped frequently to lay the foundation of neat bushes. Give a small shift as required, using a compost of equal parts of light fibrous

Fig. 76. Boronia tetrandra.

loam and peat, to which sand and powdered charcoal are freely added, potting firmly. Well-established plants require to be re-potted every year, doing this directly after top growth ceases; but avoid overpotting. Top all loose growths with a view to keeping the plants in a bushy state. During the summer they ought to be arranged either in shallow cold pits or in frames raised off the ground by bricks or flower-pots, shading from strong sunshine for a time, and sheltering from drenching rains, at all other times drawing off the sashes. Transfer to an airy greenhouse in September. When well rooted, they should be freely watered during the summer, and carefully during the winter.

Bouvardias.—See "Commercial Floriculture," Vol. III.

browallia.—Browallia elata, native of Peru, is a blue flowering annual that is admirably adapted for pot culture, and may easily be had in a showy condition during the summer, late autumn, and winter months. Plants raised by sowing seed in gentle heat in March will flower in the summer, but for a late display more seed should be sown in July. Establish three seedlings in each 5-inch pot, using a moderately rich loamy compost, and grow them in frames. Top two or three times, feed the plants with liquid manure, and syringe occasionally to keep down red spider. No further shift need be given, unless extra large plants are required. Transfer the plants to their flowering quarters—a light greenhouse—in September. The beautiful plant known as Browallia Jamesoni will be alluded to under "Streptosolen."

burtonia.—These plants are heath-like in character, and, when properly managed, attractive. B. pulchella—syn. B. scabra—height 2 feet, flowers purple, April; and B. villosa, height 18 inches to 2 feet, flowers purple, May, are both natives of West Australia. They are propagated by cuttings, inserted in sandy peat under a bell glass, in a cool house. When rooted, they are placed singly in 2-inch pots, using a mixture of equal parts of loam, peat, leaf soil, and sand, draining the pots very carefully. Small shifts should only be given, and the potting must be done firmly. In other respects treat similarly to Ericas, which see.

Calceolarias.—See "Florist's Flowers," page 313, Vol. I.

callistemon.—The Callistemon is included among those old-fashioned, hard-wooded plants that have largely given place to more easily grown showy kinds, yet meriting better treatment. The three species most frequently grown are C. linearis (New South Wales), height 4 to 6 feet, flowers scarlet, June; C. salignus (Australia), height 4 to 6 feet, flowers straw-coloured, June to August; and C. speciosus (West

Australia), height 5 to 10 feet, flowers scarlet, March to July. They all have myrtle-like leaves, and develop their flowers from the firm or matured wood in masses, bottle-brush fashion. Propagation is effected by cuttings of ripened wood inserted in sand and covered with a bell glass. The small plants, made bushy by topping, are duly shifted into larger pots as they require them, using a mixture of loam, peat, and sand, potting firmly. Callistemons flower freely, and when they attain something like their full size are decidedly ornamental.

CAMELLIA.

Without actually having outlived its popularity the Camellia may yet be said to have lost the great hold it once had in the affections of plant growers as a body. Originally introduced from Japan in 1739, C. japonica became extremely popular—thanks to the number of excellent double varieties that were raised from it. There are few or no more noble conservatory and greenhouse plants than well-grown camellias, and they can be had in bloom during the dullest months in the year.

Propagation.—It is possible to raise plants from seed, as well as from cuttings, and to further increase the stock of good varieties by either inarching or grafting them on stocks prepared for the purpose. Seed should be sown in March in pans of fine sandy peat, and given the benefit of brisk moist heat, keeping the soil moist and shading heavily till the seedlings appear. Keep them growing in gentle heat and a humid atmosphere. Seedlings make excellent stocks for grafting named varieties on; but if they are raised with a view to obtaining novelties the flowering would be considerably forwarded by grafting the tops on to well-established bushes.

Choice camellias do not thrive satisfactorily on their own roots, and are usually grafted on a free-growing single or semi-double variety. Cuttings of these latter are not difficult to strike. Select firm healthy young growths about the end of June, and make the cuttings 5 inches long, severing the ends transversely. Cut just below a joint and trim off two-thirds of the leaves. Fill well-drained 6-inch pots with sandy loam and peat, making this firm and covering heavily with silver sand. In this insert the cuttings up to the leaves thickly and firmly. Plunge in a frame over a nearly-spent hotbed, shade heavily, and keep the soil and atmosphere moist. They ought to form roots in about two months. Place singly in $2\frac{1}{2}$-inch pots, using peaty soil, and return the plants to the frame in which they were rooted, keeping them close and shaded till well established, after which they should be more exposed. Winter them

Fig. 77. Camellia—Countess of Orkney.

in a cool greenhouse, but when growing afresh give them the benefit of genial warmth and moisture, and they ought then to become large enough for grafting in the following season.

Grafting may take place from September to February, but the latter month is preferable, just before top growth commences. Side-grafting is usually practised, using firm young tops for scions, taking care to fit the edges of the bark neatly together on one side, as in the case of Azaleas (page 152). Bind securely, and case over with grafting wax. Large old plants may be shortened severely, and cleft-grafted. Grafted plants must be kept warm, moist, and shaded till the union of stock and scion is complete. Inarching, or grafting by approach, is a surer method of increasing the stock of "worked" plants than ordinary grafting. It should be done in April, and in order to have the sap active in the stocks, start them in gentle heat a fortnight earlier. When ready for use, arrange them round the bush of the variety to be inarched, and duly bring down the branches so as to be able to connect the points or growing ends with the stocks, by taking a slice from each and binding both together. When the union is complete, detach the inarched shoots from the parent plant, and support with stakes till they are firmly united, and not liable to be broken off the stocks by their own weight.

Treatment of Established Plants.—Most of the failures with camellias may be traced to faulty treatment at the roots. Sufficient pains are not taken to keep worms out of the pots, and a sour soil is fatal to healthy root action. Much depends upon the time of re-potting and the kind of soil used. The proper time to re-pot is directly the plants have ceased growing, and are hardening preparatory to forming buds. Continuous supplies of blooms are more desirable than a heavy display at one time. Anything like hard forcing, however, must not be attempted. The safest and best method of securing blooms in the autumn is to forward the plants in the spring in a vinery or other structure where gentle forcing is going on, keeping them there till the buds are becoming prominent, and the flowers will expand in November without any forcing. Successional plants may be similarly treated. Only the very latest, or those intended to flower in May or June, should be left in cool quarters to form their growth; but all should be rested in either a cool, shaded house, or under a thin canvas awning on a bed of ashes in the open. The potting must be done as the plants have completed their growth, and before the buds are larger than radish seed. Opinions vary as to the kind of soil that ought to be used. Some growers pin their faith on peat principally, others are equally confident that fibrous loam is the best material, with sand in either case. Loam answers well if it does not contain lime; but, as a rule, a mixture of equal parts of brown fibrous loam, broken up roughly, and fibrous peat, with sharp sand

and nodules of charcoal added, answers well. The drainage must be good, as the plants require abundance of water during the growing season.

Healthy plants do not require to be re-potted oftener than every second or third year, and they should never have a large shift, a somewhat limited root-run favouring the formation of short-jointed, floriferous growth. Any that have been over-potted or are unhealthy should have most of the old soil forked away from the roots, and be given fresh compost, placing them in pots only just large enough to hold the roots comfortably. In every case pot firmly, camellias failing in loose soil. Return all newly-potted plants to gentle heat, syringing them twice or thrice daily, and apply enough water to keep both the old and new soil moist.

Camellias succeed admirably planted out in conservatories and greenhouses. If they fail, this may be attributed to either poorness or staleness of the border, looseness of soil, or too little water, the old ball of soil and roots becoming dust-dry owing to the water drawing away, it may be, through the loose soil surrounding it. A dry atmosphere, such as suits many flowering plants in conservatories, is not enjoyed by camellias, and these should be syringed oftener accordingly. The old-fashioned plan of growing them in tubs might be followed with advantage in conservatories where camellias either fail when planted out, or where it is desirable that a complete re-arrangement of plants shall often take place.

Formal training is not recommended, but camellias can be kept in a pyramidal form by pruning, also tying down the stronger growths. Pruning should take place two months before the flowering period rather than afterwards. Camellias may be severely headed down when badly furnished with flowering wood, and if the roots are healthy fresh growths will push freely, and, so to say, make old plants young again. Worms must be rigorously excluded from the pots at all times. The blooms will open freely and well in a temperature of 45° to 50°. Plants inclined to be too floriferous will be benefited by an early removal of some of the buds, also by liquid manure during the flowering period. Excessive dryness at the roots during the summer causes the buds to drop in the spring.

Insects.—Brown and white scale are the most troublesome pests. Scrub the hard stems with a brush, and sponge the leaves, using in each case hot soapy water, to free them of either kind of scale. Syringing with hot water and petroleum is a quicker and, in careful hands, the most effective remedy. In each 3-gallon can of water heated to 120° dissolve a lump of soap about the size of a hen's egg, and then add three wine-glassfuls of

petroleum. The oil is liable to collect on the surface of the water, and as an overdose may prove fatal, this must and can be prevented by keeping the oil and water mixed by forcibly returning every second syringeful to the can. Petroleum and hot water will not injure the roots, but it is the usual practice to lay plants in pots on their side when they are syringed, and also to syringe camellias and other smooth-leaved shrubs with clear water three hours after wetting them with the petroleum mixture. Shading from bright sunshine is advisable for two or three days after cleansing the plants.

VARIETIES OF CAMELLIAS.

AUGUSTINE SUPERBA.—Clear rose.
BEALI ROSEA.—Deep crimson.
COMTESSE LAVINIA MAGGI.—White, flamed rosy-cerise.
COUNTESS OF DERBY.—White, striped rose.
COUNTESS OF ORKNEY.—White, flaked pink.
DONCKELAARI.—Rich crimson; semi-double.
DUCHESSE DE NASSAU.—Light pink.
FIMBRIATA ALBA.—Pure white, notched edges.
C. H. HOVEY.—Bright crimson.
MRS. HOVEY.—Delicate pink.
IMBRICATA.—Deep carmine.
JUBILEE.—White, marbled rose.
LADY HUME'S BLUSH.—Flesh colour.
LEEANA SUPERBA.—Salmon red.
MATHOTIANA ALBA.—Pure white.
PRINCE ALBERT.—White, flaked crimson.
REINE DES BEAUTÉS.—Clear rose.
THOMAS MOORE.—Carmine, shaded crimson.
WILDERI.—Soft rose.

CAMPANULA.

There are three species of campanula or bell-flower that are well adapted for pot culture, and these, at their best, are remarkably showy and beautiful. C. isophylla, of which there is a white form—C. i. alba—is a perennial of a trailing habit of growth, and one of the most attractive summer-flowering basket plants imaginable. It is this species that is often met with as a window plant. C. medium, or the old Canterbury Bell, has now been largely superseded by C. m. calythema, or cup-and-saucer flower, so called from the fact of the flowers in their conformation much resembling a cup and saucer. These flowers are principally in three distinct shades of colour—blue, white, and rose, are much larger than the type, and produced in tall spreading pyramids in May and June. There is also a tendency to doubling of the flowers observable, but though more serviceable for cutting, these double flowers are not so handsome as the single ones. C. pyramidalis blue and C. p. alba white attain a height of 4 to 6 feet, and when well grown are grand plants for conservatory decoration.

CULTURE.—C. isophylla may be either raised from seed or increased by division and cuttings. If seed is sown in gentle heat in April and the seedlings are duly transplanted an inch or two apart in pans or boxes, or placed singly in small pots of light loamy soil, the

plants may eventually be shifted into 5-inch pots and be strong enough to flower freely the following season. Old plants may be divided early in the autumn or soon after flowering. In February and March young tops can be rooted in gentle heat. These may be flowered either singly in 3-inch pots or three to five in each 5-inch pot, topping all young plants once or twice to make them spread. Greenhouse shelves and cool frames will be found to suit them well from the time they are established in small pots. Any with their pots crowded with roots should have weak liquid manure frequently. The white variety is particularly charming for the margins of stages and groups of plants of contrasting colours, and is a favourite for window boxes.

C. medium calycanthema is a biennial of the easiest possible culture. Sow the seeds thinly in pans or boxes, not later than April, covering lightly with fine soil, and placing either in gentle heat, a close frame, or under a hand-light to germinate. Transfer the seedling when large enough to handle to other pans or boxes of soil; a cold frame will be suitable for the plants, not shading them after they are recovered from the check given in transplanting. From these pans or boxes the plants may either be planted 9 inches apart in rows 12 inches asunder in the open ground, lifting and placing the requisite number in 8-inch or 9-inch pots in the autumn, or they may be placed first in 4-inch pots and from these be early shifted into others, 7 inches in diameter—a good size for flowering them in. A moderately rich loamy compost and firm potting suit these campanulas, and they ought to be kept constantly moist at the roots. Winter them in cold frames or pits, affording additional protection in severe weather. When throwing up flowering growths feed the plants liberally, and avoid undue crowding. They can be flowered a second season, but it is best to treat this species as a biennial.

C. pyramidalis should also be raised from seed or from cuttings of firm growths. In this instance a longer period of preparation of the plants is necessary. They may be raised exactly as advised in the case of C. medium, but in order to have the plants strong enough to produce grand pyramids of flowers a second season's growth is needed. At the same time no class of plants better repay for the labour and time expended on their production. Frame and cool greenhouse treatment should be accorded the plants in their early stages, but strong plants in preparation for flowering succeed in the open air during the summer, provided worms do not enter the pots.

CANTUA.—This class of greenhouse shrubs are rarely seen in private gardens nowadays, having shared the fate of so many other old-fashioned plants. C. buxifolia,

better known as C. dependens, a native of the Peruvian Andes, is, however, worthy of a place in most collections of hard-wooded greenhouse plants. It is of pendulous habit, and if grown with a stem 3 feet high and kept to a clear head, will be found most effective, each long branch producing corymbs of funnel-shaped pale red flowers in April. Cuttings of half-firm flowerless shoots may be inserted in nearly all sand under a bell or hand-glass any time during the summer, these rooting quickly in a temperature of 50° to 55°. From small pots shift into larger sizes according as the plants require more root room, using a compost of two parts fibrous loam to one of leaf soil with silver sand added, potting firmly. Support the young plants with stakes, not topping the leading growth till 3 feet high, but remove side-shoots as they form. Prune after flowering, and during the summer arrange the plants out of doors with other greenhouse shrubs. Winter them in a slightly heated greenhouse. Abundance of water should be given during all but the dullest part of the year, and liquid manure freely to well-established specimens.

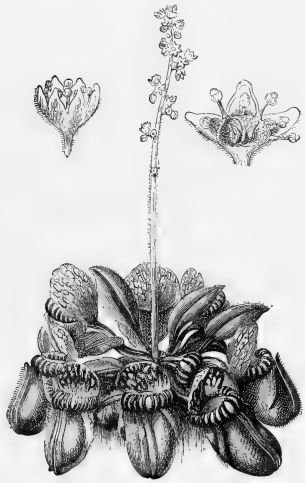

Fig. 78. CEPHALOTUS FOLLICULARIS.

CASSIA.—C. corymbosa is the only species considered worthy of greenhouse and conservatory culture. It is a native of Buenos Ayres, grows to a height of 6 to 10 feet, and produces corymbs of yellow, pea-shaped flowers in great profusion during the summer. Its cultural requirements are of the simplest description. Cuttings of half-ripened shoots inserted in sandy soil in March may be rooted in a brisk heat of about 80°. From small pots gradually shift the plants into larger, doing this before they become stunted in growth for want of more root room, using a compost of two parts fibrous loam to one of peat, with a little sharp sand. Top the plants to make them bushy, and mature the young wood in the full sunshine. Winter them in a warm greenhouse. Strong plants may be pruned into the desired form in February and soon afterwards re-potted. Feed them liberally at the roots during the flowering period. Rest, but do not wholly dry off the plants during the winter. They are suitable for planting in lofty conservatories, or glazed corridors from which frost is excluded.

CEPHALOTUS.—C. follicularis, miniature Pitcher-plant, is a native of West Australia,

and may be described as curiously attractive. Flowers white, but the leaves are the chief feature, especially those which assume a pitcher-like form, with lid and striped rim; colour dark green with purple shading and pink veins. A greenhouse herbaceous perennial, it is easily increased by division before new growth commences, and should be grown in a mixture of sandy peat in lumps and chopped sphagnum moss. The pots or pans used should be half filled with drainage, as it is essential that water be freely applied and pass readily away. A humid atmosphere is imperative, and in order to be certain of this, cover the plants with bell-glasses. Winter them in a cool greenhouse and give much less water than during the growing season.

CELSIA.—C. cretica (Crete), is hardy in some districts, but is more generally seen in greenhouses, which are brightened, early in the summer, by its long spikes of clear yellow flowers. It may be grown either as an annual or biennial. If the seed is sown early in February in gentle heat, and there is no undue delay in pricking out the seedlings and subsequently shifting them into 5-inch pots, the plants will flower freely the same season. Extra strong plants can be had by sowing the seed in June in a cold frame, the seedlings resulting, after being duly prepared, being forward enough to shift into their flowering pots in the following March. Any good loamy mixture will suit this celsia, and the plants may be wintered in a cool greenhouse or pit. They should have abundance of water and liquid manure in the spring.

CERATOSTEMMA.—C. longiflorum (Andes of Peru), is a pretty little greenhouse evergreen shrub with crimson flowers, and C. speciosum (Ecuador), orange-red flowers, is a good companion. Short cuttings inserted in sand and covered with a bell-glass strike root readily; sandy loam and peat in equal portions form a suitable compost.

CESTRUM, see HABROTHAMNUS.

CHOISYA.—C. ternata, known as the Mexican Orange Flower, is a handsome and nearly hardy evergreen shrub, which attains a height of 6 feet. The flowers produced in the spring, on the tops of the branches, are white and sweet-scented. Cuttings of firm young tops, 3 inches long, inserted in sandy soil and covered with glass, emit roots freely in a gentle heat of 55° to 65°. Place the young plants singly in pots just large enough to hold the roots, using a compost of equal parts loam, peat, leaf soil, and sand, and gradually shift into larger sizes. They may be kept growing in cool frames or arranged with the larger plants quite in the open during the summer. In common with most other coarse-rooted evergreens, the choisya requires abundance of water all through the warmer parts of the year, and ought never to be allowed to

become dry at the roots. Use stronger soil for flowering plants. Prune after flowering, but only shortening long growths, and winter in cool greenhouse. This beautiful flowering shrub passes the winter safely against sunny walls in the South of England.

CHOROZEMA.

These bright-flowered, hard-wooded plants must be included among numerous other old favourites that have been largely superseded by more easily grown soft-wooded genera. They are yet quite worthy of retention either for greenhouse or conservatory culture, for which they are well adapted, growing them in pots and training over globular trellises, or they may be planted in narrow borders and trained up pillars and the walls of cool plant houses generally. The flowers are pea-shaped, bright in colour and abundantly produced, the chorozema when at its best being among the most attractive greenhouse plants.

Fig. 79. Chorozema cordatum splendens.

Culture.—Plants are more easily raised from seed than from cuttings. Seeds should be sown in March in sandy, peaty soil and placed in a temperature of 65° to 70°. Cuttings of firm young shoots can also be rooted in the summer under a bell-glass in ordinary greenhouse temperature. Both seedling and cutting-raised plants must be placed singly in 2½-inch pots and grown first on a greenhouse shelf, then in a cold frame. They may be either topped or allowed to branch naturally. From these small pots gradually shift the plants into larger sizes, using a mixture of equal parts of good fibrous loam and peat, with sharp sand freely added, always potting very firmly. If the larger plants are neatly trained to trellises, little or no pruning is necessary, but those grown more loosely may be shortened back directly after flowering. When a

shift into larger pots is needed this may be given in March in the case of young plants; or in June when those pruned are forming fresh shoots.

Perfectly clean well-drained pots should be employed, and no plant ought to be given a shift before it is seen that the old ball of soil is quite moist throughout. After potting, enough water must be given to keep the older portion of the soil steadily moist, without, however, unduly saturating the new compost. Chorozemas must not be allowed to become very dry at any time, as, should the young root-fibres perish, nothing will save the plant. By the end of July the growth on plants in pots should have been completed, when they ought to be arranged outdoors on a bed of ashes with various other hard-wooded plants. Place them in a cool greenhouse at the end of summer, before the soil becomes saturated with cold rain. Those firmly planted in narrow borders should be kept well supplied with water, and in particular must not be neglected during the summer. If mildew shows on the points, as it is apt to do if too much water is applied to the roots, dust freely with flowers of sulphur, and give less water than formerly.

SELECTION OF CHOROZEMAS.

ANGUSTIFOLIUM.—West Australia; height 1½ feet; flowers orange-red; April.

CORDATUM SPLENDENS.—West Australia; height 2 feet; flowers red and yellow; April.

DICKSONI.—West Australia; height 3 feet; flowers scarlet-yellow; May to September.

DIVERSIFOLIUM.—West Australia; height 2 feet; flowers orange-red; May to July.

HENCHMANNI.—West Australia; height 2 feet; flowers scarlet; April to June.

ILICIFOLIUM.—Height 3 feet; flowers yellow; March to October.

RHOMBEUM.—West Australia; height 2 feet, flowers yellow; April and May.

VARIUM (syn. C. CHANDLERI).—Swan River; height 4 feet; flowers yellow and red; June.

CINERARIAS.—See "FLORIST'S FLOWERS," page 7, Vol. II.

CITRUS.—See "CONSERVATORIES," Vol. III.

CLETHRA.—C. arborea (Madeira) is a handsome evergreen shrub, attaining a height of 8 to 10 feet, and affords a profusion of white flowers in the autumn. It is sometimes seen in greenhouses, but more often met with in large conservatories, and when properly grown finds many admirers. Cuttings of half-ripened wood inserted in sandy soil under a hand-glass, or in gentle heat, produce roots freely. Naturally of a bushy habit of growth, little or no topping or pruning is needed. Shift into larger pots in February, using a compost of two parts loam to one each of peat and leaf soil, with sand added. Press it down firmly, give abundance of water and some liquid manure during the growing season, and keep the soil moist in the winter.

CLIANTHUS.

Although not often met with, owing to some persons finding the plants difficult to cultivate satisfactorily, there are two species of clianthus that are very beautiful and well worthy of a trial. C. Dampieri, the Glory Pea of Australia, grows to a height of 2 feet, and in the spring produces drooping racemes of large pea-shaped flowers, red, with a black or dark purple blotch at the base of the standard, freely. C. D. marginata is considered an improved form of this species. C. puniceus, Parrot's Bill, New Zealand, is hardier and more robust, especially in the case of C. p. magnificus, which produces racemes of large boat-shaped scarlet flowers in April and May.

C. Dampieri is the most unreliable, successes with this species being few and far between, but when seen always admired. It is raised from seed, and, owing to the plant's impatience of disturbance at the roots, the seed should be sown singly in well-drained 5-inch pots, filled with a compost of two parts loam to one of leaf soil, adding sharp sand. If this is done in March, a brisk, moist heat will be needed for starting the seeds; but cooler treatment should be given the young plants. Some of the most successful growers sow their seed in August, and leave the plants undisturbed in 5-inch pots through the winter. Treated in this way they are stronger than those spring-raised, and are less likely to fail when shifted into 8-inch pots—the size to flower them in. In re-potting disturb the roots as little as possible, and use the loam in a roughly broken-up state. Subsequently keep the plants close in a frame till they have well recovered from the check of removal, syringing daily. They will flower the same season in a greenhouse or conservatory.

C. puniceus is propagated from cuttings, inserting these in sandy soil and brisk moist heat in March or April. From small pots the plants may be shifted into the 7-inch or 8-inch size, and in other respects treated similarly to C. Dampieri. This species succeeds well planted out in greenhouses or conservatories, and trained up either pillars or walls. In any case abundance of water and liquid manure must be given when the plants are growing strongly, and the syringe freely used to keep down the most troublesome pest—red spider. In April all side shoots on large plants should be pruned to within 2 inches of the old wood.

CONVOLVULUS.—The Mauritanian Bindweed (C. mauritanicus) is admirably adapted for growing in hanging baskets, and fairly popular for this particular purpose. Flowers blue, with a white throat, and produced abundantly in the summer. It is a perennial,

and may be readily increased either by cuttings, division, or by seeds sown in March or April.

COPROSMA.—C. Baueriana variegata, a New Zealand species, when well grown, forms a handsome plant, thriving and retaining its variegation in a cool greenhouse. It is propagated by cuttings in March. These should be taken off with a heel of old wood, inserted in well-drained pots filled with rich sandy soil, and placed in a close frame in which a temperature of about 85° is maintained. Water ought to be sparingly applied, and the glass dried every morning as a preventive of damping. Top the small plants to make them branch, and when shifts into larger pots are given, employ a compost of two parts peat to one of loam, with sand added, pressed down firmly. Old plants may be pruned into a desired form in March, and re-potted a few days later. The plants are grown for the beauty of their glossy variegated leaves.

CORDYLINE.—Cordylines are usually grouped with dracænas, which will be alluded to under "conservatory plants." One exception must be made in favour of the true C. indivisa, a species with bold, broad, recurving leaves from New Zealand. When at its best this species is of considerable value for exhibition purposes. It is of comparatively slow growth, differing greatly in this respect, as well as in appearance, from the ordinary Dracæna indivisa and varieties. Attempting to hasten growth has led to the ruin of many plants, and C. indivisa must be constantly treated as a warm greenhouse species, building up the specimens slowly. It well repays waiting for. For other cultural details see greenhouse dracænas.

CORONILLA.

The half-hardy C. glauca is a bright and serviceable hard-wooded plant for greenhouse and conservatory decoration. This species, of which there is a form with variegated leaves, is a native of South Europe. In habit it is dense, and produces a long succession of yellow clover-like flowers in the spring and early summer months.

Plants may be raised from seed sown early in March, and placed in a brisk moist heat to germinate, but are more generally propagated by cuttings of firm young shoots. Insert these in well-drained 5-inch pots filled with a mixture of loam, peat, and sand in a greenhouse or frame, covering them with a bell-glass and shading carefully till the cuttings are callused, when they should be transferred to brisk heat to hasten root action. Before the roots become matted together place the young plants singly

in 2½-inch pots, and grow them in frames. Top to make them bushy and shift into larger pots before they become root-bound.

After either young or older plants have ceased flowering they may be arranged on a bed of ashes in the open, soon afterwards pruning them into the desired form. When breaking afresh they should be turned out of the pots, and after having their balls of soil and roots considerably reduced they may be planted out in good garden soil to complete their growth; re-pot in the autumn, or return the plants to the same-sized or slightly larger pots than they were in formerly. A rich loamy soil suits this free-rooting plant, and when growing freely up to the end of the flowering period they must never be allowed to become dry at the roots. Winter the plants in a cool greenhouse, and apply liquid manure freely to all that are well established in their flowering pots.

Fig. 80. Correa cardinalis.

CORREA.

Correas, or, as they have been called, South African Fuchsias, are among the prettiest of cool greenhouse, hard-wooded plants. The few species usually grown are of a neat, erect, branching habit, and produce their brightly coloured tubular flowers freely from the autumn to the spring. They are not difficult to cultivate, and when in good condition are so very attractive that it is a matter for regret that correas are not so frequently seen as they used to be. Cuttings of firm young shoots inserted firmly in a mixture of loam, peat, and sand, placed in a greenhouse and covered with a bell-glass, seldom fail to root, but are slow in developing into serviceable plants. The choicer species succeed best when grafted on stocks of C. alba—the plan adopted by nurserymen who supply these plants.

If the start is made, as it well may be, with small plants already well established in 5-inch pots: lightly prune these after flowering, and in the course of a fortnight give a small shift, using clean, well-drained pots, and soil consisting of two parts peat to one of fibrous loam, with sharp sand added, re-potting carefully and firmly. Instead of attempting to train correas, top unruly growths sufficiently often to form bushy heads, and support with a single stake if needed. During the summer, or after the plants have been assisted to form strong growth, they may be arranged in the open under a light canvas awning with other hard-wooded plants. In succeeding years very similar treatment should be given.

Selections of Correas.

CARDINALIS (syn. C. SPECIOSA). — Height, 3 feet; growth slender; flowers bright scarlet, tipped with green; March. Of this species there are several varieties.

HARRISI.—A garden hybrid of branching, moderately strong habit of growth. Flowers bright scarlet.

MAGNIFICA.—Another seedling form of free growth. Flowers white and abundant.

PULCHELLA. — Tall-growing; flowers produced singly; white; April.

VENTRICOSA.—Of a neat, twiggy habit of growth. Flowers bright crimson.

VIRENS.—Flowers greenish, and not very attractive.

CRASSULA.

Of this family only two species are recommended for general greenhouse culture. These are C. coccinea (also known as Kalosanthes coccinea) and C. jasminea.

C. coccinea is a native of the Table Mountain, and is an old favourite both with growers of exhibition plants and also for greenhouse and conservatory decoration. Plants well furnished with large trusses of bright scarlet tubular flowers present a very showy appearance, and large well-rounded specimens are particularly attractive in the show tent during June or July. Propagation is effected by means of cuttings, formed of either short lengths of firm growths or, preferably, of the tops in June or July. As crassulas are of a succulent nature these cuttings should be exposed to the sun for a day or two for the cuts to dry. Insert them thinly in well-drained pots filled with a mixture of loam, leaf soil, and sand, and place on a greenhouse shelf. Water sparingly till the cuttings are rooted. If five or six strong tops are rooted together early in the summer these need not be separated nor topped, but should receive a shift into a larger-sized pot, and be grown in the full sunshine. Thus treated each plant ought to produce a fine flower head the following May or June.

Neat little plants can be formed from cuttings in one season by not topping them,

but these young plants will not flower the following year. It is the same with old plants. If they flower freely one season, forming few or no stout flowerless large growths, there will be no flowers produced the following year, and those who would have a display of this crassula every summer should grow two sets of plants, flowering them alternately, a practice worthy of general adoption.

Fig. 81. Crowea saligna major.

After a plant, whether large or small, has done flowering, it should be kept somewhat dry at the roots for a few days and then cut down, shortening the stems to within 2 inches of where they started from. When the plants recommence growing, turn them out of their pots and shake much of the old soil from the roots prior to re-potting them. They may be placed in nearly or quite the same-sized pots they were in formerly, taking care to give good drainage. A compost of two parts fibrous loam to one of leaf soil, with sand and brick rubbish freely added, suits them well. Apply water sparingly for a time after potting, and during the rest of the summer arrange the plants in a sunny position in the open air. Winter them in a light, cool, airy greenhouse, and avoid over-watering. The following summer they must again be well attended to, and fully exposed to the sun and air, this strengthening and preparing the growths for flowering during the next season. The flowering may be retarded somewhat by placing the plants in the open after all danger from severe frosts is past, and this exposure also causes the flowers to become a richer scarlet in colour than is the case with any wholly developed under glass. Fine specimens may be grown in 8-inch pots.

C. JASMINEA, or the jasmine-flowered crassula, bears only a very slight resemblance to C. coccinea. It is of a dwarf, neat habit of growth, and produces small trusses of white flowers, void of scent, in April and May. Only the early formed strong growths will flower the following spring, the species in this respect resembling C. coccinea, and requires much the same treatment, with this material difference, that 5-inch pots are large enough for the majority of plants.

CROWEA.—These greenhouse evergreen shrubs are very nearly related to Correa and Eriostemon, and in common with these plants fully deserve inclusion in select collections. C. angustifolium (West Australia), height 1 to 3 feet, flowers red and solitary, and C. saligna (New South Wales), height 1 to 3 feet, flowers clear pink, are the two species principally grown. Cuttings inserted in sand under a bell-glass in gentle heat during March or April root freely, and neat plants can be grown by occasionally topping them. Much the best plants, however, result from grafting on either Correa alba or Eriostemon buxifolia, according them the same treatment recommended for Correas.

CYCLAMEN, see FLORIST FLOWERS, page 10, Vol. II.

CYPERUS.

Of this large family of grass or rush-like herbs three species only, all of which are ornamental, serviceable, and easy of culture, are selected for growing in greenhouses, C. alternifolius, or umbrella plant, is perhaps the best known. It is a native of Australia, and of this there is a dwarf compact variety, C. a. nanus, and a handsomely variegated form, C. a. variegatus. C. laxus, from the West Indies, grows from 1½ to 3 feet in height, and is most ornamental when in flower. C. natalensis, an elegant species from Natal, has come into prominence of late years, and is deservedly popular for greenhouse and conservatory decoration as well as for the flower garden.

Although all are easily propagated by division this is not often resorted to except in the case of C. a. variegatus. The most perfect plants are raised from seed. This should be sown in pans in March or April, germination soon taking place in a brisk moist heat. The most elegant pots of plants are obtained by moving small patches of seedlings out of the seed pans into 2½-inch pots, rather than by growing the plants singly. Keep the small patches of plants growing in gentle heat till well rooted, when they may be transferred to cooler quarters. Before they become stunted in growth shift into 5-inch pots, a mixture of two parts loam to one of leaf soil with sand added

answering well for the green-leaved varieties, but for the variegated form a poorer mixture, largely composed of sand, should be used, or the variegation may disappear. Abundance of water is required by all the species, and the warmer part of a greenhouse suits them best during the winter.

CYRTANTHUS.—A small family of greenhouse bulbous-rooted plants, nearly allied to Amaryllises. Those most generally grown are hybrid forms and C. sanguineus, the flowering period varying from February to August. They can be raised from seed in the same way as Amaryllises (see page 289, Vol. I.), and propagated by offsets taken off the old bulbs when these are re-potted in the autumn. Deep, well-drained pots are recommended for Cyrtanthuses, and a compost of two parts good fibrous loam to one of leaf soil with sharp sand added. Arrange them on greenhouse shelves, and while growing apply water freely, but from October to March they must be kept dry at the roots.

CYTISUS.

Three species of cytisus are suitable and desirable for greenhouse and conservatory decoration. The best-known and most generally cultivated is C. racemosus, said to have been brought from the Peak of Teneriffe. It is an evergreen shrub, of a branching habit of growth, and affords a profusion of terminal spikes of yellow, pea-shaped, sweetly scented flowers in the spring. C. r. elegans is of a neater and more compact habit of growth, while C. r. Everestiana differs from the type only as regards the deeper shade of yellow in the flowers. C. canariense, from the Canary Islands, is less robust than C. racemosus, and is chiefly valuable on account of its being later in flowering. In C. filipes we have a species altogether distinct from the foregoing, and more nearly resembling the White Broom, C. albus. Grown as a standard it forms a very beautiful conservatory plant, especially in March and April, when the elegant weeping growths are studded with white flowers.

Both C. racemosus and C. canariense are frequently raised from seed; sowing, after softening in warm water, in brisk heat in March. Better plants are, however, raised from short cuttings of young wood taken off with a heel in March or April, inserted in sandy soil, covered with a bell-glass, and placed in a temperature of about 75°. When rooted slightly harden by exposure to more light and air and then top them. Directly they break into fresh growth place them singly in small pots, and arrange in a warm frame. Give one shift before they become root-bound and top a second time. Thus treated and wintered on a greenhouse shelf, neat plants are had for

flowering in the following spring. Another good plan is to root cuttings in a close cool frame in August, ready for potting early in spring.

After either young or older plants have ceased flowering they should be cut back moderately, and if possible placed in moist gentle heat. Re-potting ought to take place directly they are starting into growth. At this time they may have their old balls of soil and roots considerably reduced, returning the weaker of the plants to the same-sized pots they were in formerly, and the more robust to pots a size larger than those they previously occupied. They are not fastidious as to soil, but succeed best in a mixture of two parts of fibrous loam to one of peat broken up roughly, adding sharp sand. Pot firmly, and for a few weeks keep the plants in a genial temperature of 55° to 60°. Top all shoots which seem disposed to take an undue lead. During the summer arrange the plants on a bed of ashes in the open, and winter them on a stage in a light greenhouse. When the pots are well filled with roots cytisuses should have abundance of water, varied with an occasional supply of weak liquid manure.

C. filipes is best grafted on clean straight seedling stocks of the common laburnum. The crimson-winged Genista Andreana is also beautiful when similarly treated.

DAPHNE.

Daphnes are delightfully fragrant—hence their popularity. A single plant of either of the greenhouse species when in bloom is capable of perfuming a large conservatory, or a single truss of flowers any ordinary room in which it is placed. D. indica, of which there are red and white forms, D. i. rubra and D. i. alba, was introduced from China, and is cultivated for the beauty and fragrance of its flowers. D. japonica variegata is also worthy of culture, the foliage being prettily variegated. All are evergreen and succeed in ordinary greenhouse temperature.

Cuttings of short side-shoots inserted in the autumn in well-drained pans or pots filled with sandy peat should be placed on a greenhouse stage and covered with a bell-glass. During the winter these will form a callus, roots following soon after introducing them into heat in the spring. When well rooted pot singly and keep the plants growing in gentle heat. Top to make them bushy and shift into larger pots, as they well fill the smaller pots with roots. Winter on a cool greenhouse shelf. Unfortunately plants on their own roots make but slow progress, and these daphnes are more robust and serviceable when grafted on either D. laureola or D. pontica, both of which are comparatively free-growing. These stocks may be raised from cuttings as advised

in the case of D. indica, and duly established singly in small pots, grafting them in the following spring in a manner similar to that recommended for Azalea indica (see page 152). Top the plants often enough to induce the formation of neat heads, but owing to the slow growth of daphnes no annual pruning is necessary.

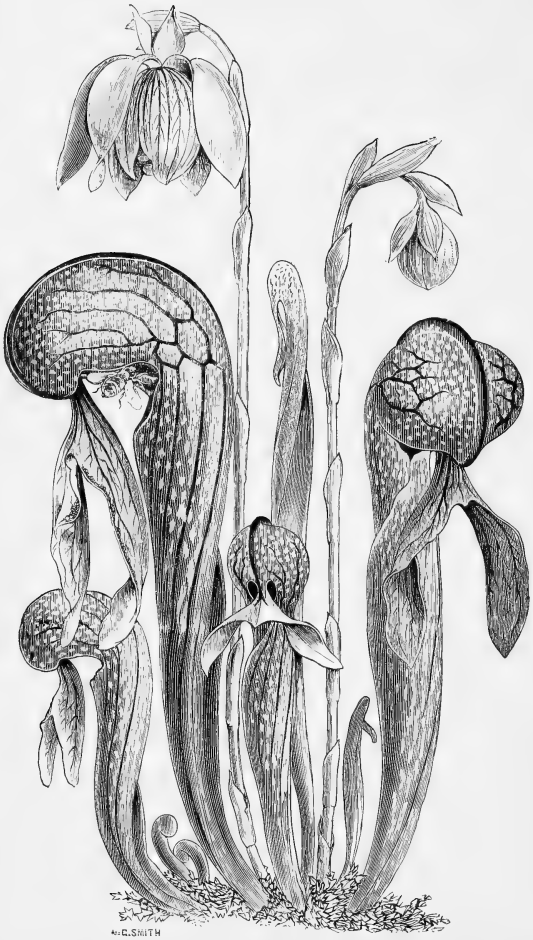

Fig. 82. Darlingtonia californica.

The plants do not require much root room, and may be potted in a mixture of equal parts of good fibrous loam and peat, with sharp sand added. After old plants have completed their growth they may be arranged on a bed of ashes in the open until the autumn. Winter them in a cool greenhouse and avoid over-watering, daphnes soon turning yellow and losing their leaves if the soil about their roots becomes soddened and sour.

DARLINGTONIA. — D. californica, commonly termed the Californian Pitcher Plant, is a good companion for sarracenias, drosera, and other greenhouse genera that are well worthy of culture on account of their quaint and interesting forms. Plants can be raised from seed. Prepare pots by filling with fibrous peat, charcoal, chopped sphagnum

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