

Flowers of Liliaceae and Related Families Grown  
in Southern Arizona Gardens

by  
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J. H. Thumler . May 12, 1936  
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### Abstract

A careful botanical study has been made of numerous rare or little-known bulbous flowers of chiefly the Liliales Order, growing on the campus of the University of Arizona and in southern Arizona gardens. Correct scientific names as well as the common names are included. Seasons of planting and growth, methods of culture, and soils best suited to their successful growth have been recorded.

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## Introduction

This is a study of the Lily and related families, growing in gardens of southern Arizona and the Southwest generally. The flowers are easily recognized by their narrow, parallel-veined leaves and flower parts which are in threes or sixes. Because of their bulbous character and fleshy leaves and stems, they are very suitable to the Southwest. Many of our finest flowers are included in this group, some blooming in the summer, others in the winter. Their ornate and lasting qualities make them excellent for cut flowers. The Lily, Amaryllis, Iris, Canna, and Calla Lily are worthy of a place in every garden. All the included Taxonomic descriptions have been secured from plants which are actually growing in gardens in southern Arizona. No other Order has flowers which are more vividly colorful, more floriferous or more impressively beautiful.

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Liliaceae. (Lily Family)

Lilium Parryi Wats. Lemon Lily.

Rhizome scaly, irregular, 4 to 4 inches long, scales small, many, pale yellow; stem 2 to 5 feet long, smooth, glossy, yellow-green, about 1/2 inch in diameter; leaves 2 to 9 inches long, 1/2 to 1 inch wide, whorled or scattered, seven veined with three veins distinct, sessile, medium green, oblong-lanceolate to lanceolate; inflorescence of three to ten flowers terminating the stem, flowers 2 1/2 to 3 1/2 inches long, 2 to 3 1/2 inches across, fragrant; pedicels 2 to 5 inches long, medium green; perianth segments six, 3 1/2 to 3 3/4 inches long, 5/8 to 3/4 inches long, 5/8 to 3/4 inches across, lanceolate to acuminate, margins entire, apex acute, hairy, recurved, pure lemon-yellow; inside spotted with purple-grown raised dots; stamens six; filaments orange-red; anthers 3/8 inch long, 1/8 inch in diameter, oblong, orange-red 2-celled; ovary 3/4 to 1 inch long, 1/8 inch in diameter, oblong, 3-angled, orange colored, 3-loculed, with many ovules; styles not exceeding the perianth segments, 1 3/4 inches long, violet-orange, somewhat 3-angled; stigma capitate, 3-lobed, the margins glandular-hairy.

Lilium Parryi grows wild in the Hauchuca and Santa Rita Mountains of southern Arizona. The rhizome can be planted in the early fall in neutral soil, to about twice the depth of the bulb. It should have partial shade and

adequate drainage. The plants bloom in June and July. The fragrant, lemon-yellow flowers can be used in many different ways in the yard, either as a mass or grouped with other flowers. This is perhaps the finest of our mountain flowers.

Lilium elegans Thunb.

Stem 14 inches long,  $1/4$  to  $3/8$  inches in diameter, light green, 5-angled, the angles sharp and roughened; leaves many, sessile, 4 to  $4\ 1/2$  inches long,  $5/8$  inches across, distance apart on stem  $3/8$  to  $5/8$  inches, linear-lanceolate acuminate, five to seven nerved, margins entire, medium green, the midrib prominent on lower face, leaves at base of pedicels,  $3\ 1/2$  inches long, 1 inch across, broadly lanceolate-acute; inflorescence terminal, four flowers in a cluster, flowers 3 inches long,  $5\ 1/2$  inches across, spreading, pedicels 1 to  $1\ 3/4$  inches long,  $1/4$  to  $3/8$  inches in diameter, glandular and lightly pilose, rounded triangular, bright green, ovary superior, oblong, 3-angled, 6-ridged, glabrous, yellow-green, 3-loculed, with many ovules, 1 inch long,  $1/8$  inch in diameter; style exceeding other flower parts, 2 to  $2\ 1/4$  inches long,  $1/8$  inch in diameter, 3-angled, orange to red-orange; stigma capitate, 3-lobed, with marginal-glandular hairs that are red; perianth segments six,  $3\ 1/2$  inches long, 1 to  $1\ 3/8$  inches wide, oblong-spatulate obtuse, orange-red with the middle of blade orange, spotted with violet-red, apex re-

flexed with age, inner surface roughened by projections of segments with external midrib face prominent, tuft of hairs at green apex of midrib, inner segments with external midrib face prominent with deep groove on each side; stamens six, attached at base of ovary, 2 1/2 inches long, tapered to apex, compressed on one side, light orange to deep red; anthers 1/2 inch long, versatile, oblong, 2-celled; pollen orange-red.

Lilium longiflorum Thunb. White Trumpet Lily or Easter Lily  
Stem 1 to 2 1/2 feet long, 3/8 inch in diameter, erect, smooth, green-violet suffused, violet at base; leaves many, 6 to 7 inches long, 1/2 to 5/8 inches wide, scattered, narrow lanceolate-acuminate, those at base of pedicels about 5 inches long, 1 inch across, lanceolate-acuminate, smooth, medium green with entire margins; pedicel 4 to 5 inches long, with one leaf about half way up, light green, glabrous; inflorescence consisting of three pedicels terminating the stem, flowers horizontal, fragrant, trumpet-shaped, 6 inches long, 4 1/2 inches across; perianth tube formed by the converging segments, 3 to 3 1/2 inches long, slender and widening little from the base to the middle; perianth segments six, inner ones 6 inches long, 1 11/16 inches wide, broadly oblanceolate-obtuse, outer segments 6 3/8 inches long, 1 1/3 inches wide, narrow oblanceolate-obtuse, apex recurved, waxy white, tinged with green along midrib and near the base; ovary superior, 1 1/2 inches long, 3/16 inch in diameter,

3-angled, 6-ridged, oblong, yellow-green, 3-loculed, with many ovules in two rows in each locule; style not exceeding the segments, curved upward, 3 1/2 inches long, 3/32 inch in diameter, expanded above, light green, triangular; stigma capitate, 3-lobed, about 1/2 inch across, surface viscous-white; stamens six, attached at base of ovary, 4 1/2 inches long, tapered above, compressed, waxy-white tinged with green; anthers 5/16 inches long, 2-celled; pollen bright yellow.

Lilium:

The lily occupies a distinctive place in the song, story, and artistry of all peoples. It has been praised and loved by all men, even before the Christian Era. Good garden loam with plenty of sand is satisfactory soil for lilies. Manure, well decomposed, may be used as fertilizer if it does not touch the plant stems, and also an artificial fertilizer containing potassium is desirable. The soil should be moist and well drained. A little sand may be placed around the bulb when it is planted. The bulbs are set from 2 to 10 inches deep, according to their root form. The base-rooting lilies should be planted only about twice the depth of the bulb; the stem-rooting ones may be planted three and one-half times the depth of the bulb--on an average of 8 to 10 inches deep; they may be planted in the spring or fall. They should not be disturbed after they are planted, but allowed to multiply. When the clumps be-

come over-crowded, they may be lifted, separated, and re-planted immediately. Partial shade is better for them than full sunlight, but they welcome some protection to shield them from the wind. They will display their loveliness better if placed against a green background of foliage. There is a wide range in color and height. Lilium elegans, blooming in May and June, is a hardy variety which is particularly suited where a bright splash of color is wanted. Lilium longiflorum--White Trumpet Lily or Easter Lily--flowers in April to June. When forced it will bloom at Easter time. This variety is growing nicely on the east side of a home in Tucson.

Tulipa Gesneriana var. Darwinia Bailey. Darwin Tulip.

Basal leaves larger than stem leaves, 5 to 13 inches long, 2 to 3 inches wide, broadly lanceolate-acute and mucronate, erect, margins entire, prominently nerved, medium green; stem terete, 13 inches long, 3/8 inch in diameter, yellow-green; flowers solitary, cup-shaped, 3 3/4 inches long, 3 1/2 inches across; perianth segments six, outer ones 4 inches long, 3 inches wide, obovate-retuse, margins involute, waxy-white, inner ones 3 3/4 inches long, 3 1/2 inches wide, obovate, margins involute, apex notched for 1/2 to 7/8 inches, waxy-white; stamens six, attached to base of inner segments, 5/8 inch long, 3/16 inch in diameter, tapered to the apex, base compressed, ivory-white; anthers 11/16

inch long,  $5/32$  inch across, oblong, 2-celled; pollen dark purple; ovary superior,  $1\ 1/16$  inches long,  $1/8$  inch in diameter, 3-angled, 3-carpellary, 3-loculed, with many ovules; stigma 3-lobed, white,  $7-16$  inch across, these rounded, their margins viscous.

The tulip is native of the Mediterranean region, and across Asia to Japan. About 1591 it was introduced into Europe from the Orient, having been cultivated as early as 1580. From 1634 to 1637 the "tulip mania" occurred in Holland, during which time enormous sums of money were paid for single bulbs. Although tulips are traditional flowers of Holland, they grow wild on the northern shores of the Mediterranean, in the Caucasus, in northern Africa, Persia, and occasionally in Asia and Japan.

Tulip bulbs may be planted from October to January in moderately rich, well drained, light loam. The ground should not be wet, but must be kept moist and never allowed to dry after the bulbs sprout. If the soil is enriched, the fertilizer should be well under the bulbs and not around them; the exact depth of planting is not fixed, but usually they are placed so that their bases are about 5 inches under the ground and 6 to 8 inches apart. They may be taken up every year but this is not necessary unless exact designs are wanted for effect; once in three or four years is often enough to divide them. This should not be done

until the leaves have died down naturally, although the plants are not attractive during this period. However, if annuals are planted among them, the brown leaves will be screened from view. Tulips bloom from March to May according to the variety. A sunny location is desirable but they do best when protected from the all-day glare. The best specimens I have found grew along a high wall which shades them from the hot afternoon sun and also protects them from our sand and wind storms. Tulips adjust themselves to formal or informal gardens by being planted in straight rows or scattered in the grass. Because the height, color, and flowering season are so well established they are suited for massed borders to display the colors blending from pinks, roses, reds, lavenders, yellows, and bronzes. Sometimes when confined to neat beds they lose much of their natural charm. If profusely strewn under and among trees they take on a woody charm all their own and if only white ones are planted the contrast of the white silhouettes against the dark trunks and shadows gives a picture of loveliness.

Tulips are excellent for cut flowers, lasting from 10 to 17 days. Among the more highly recommended standard varieties are Darwin, Breeder, and Cottage.

Calochortus aureus S. Wats. Yellow Mariposa lily

Corn coated.

Leaves 2 to 5 inches long, 5/16 to 3/8 inches wide at

base, tapered to the apex, linear-lanceolate with acuminate apex, deflexed, base surrounds stem, medium green, glaucous, upper face concave, margins entire, white or brownish-orange; inflorescence terminal, two to three flowers in terminal cluster, flower  $1 \frac{3}{8}$  to  $1 \frac{1}{2}$  inches long, 15 to 16 inches across, erect, partly closed, campanulate; pedicel  $1 \frac{3}{8}$  to  $1 \frac{5}{8}$  inches long,  $\frac{3}{32}$  to  $\frac{5}{32}$  inches in diameter, expands toward apex, base violet suffused, glaucous, yellow-green; perianth segments six; outer lobes sepal-like,  $1 \frac{1}{8}$  to  $1 \frac{3}{16}$  inches long,  $\frac{1}{2}$  to  $\frac{9}{16}$  inch wide, ovate-lanceolate, apex acute-spreading, external face yellow-green with upper part red-suffused, veins green, margins entire, translucent, light yellow, internal face reddish-brown, velvet, spot at base of segment, middle yellow-green to lemon-yellow above, margins translucent-white to yellow; inner lobes three petal-like,  $1 \frac{1}{2}$  inches long,  $1 \frac{1}{4}$  inches in diameter, cuneate-fan-shaped, apex truncate-denticulate, external surface yellow-green base to yellow upper part; internal surface base yellow, globose gland with dense, reddish-brown hairs, gland in center of maroon blotch, upper part with long, club-shaped, reddish hairs, diffused, upper two thirds of segment bright-yellow; stamens six, filaments attached to base of perianth segment,  $\frac{1}{8}$  inch long,  $\frac{3}{32}$  inch in diameter, base taper to apex, compressed, yellow to red; anthers  $\frac{5}{8}$  inch long,  $\frac{1}{16}$  inch in diameter, lanceolate, innate, reddish; pollen reddish; ovary superior,  $\frac{11}{16}$  to  $\frac{15}{16}$  inch

long,  $1/8$  to  $3/16$  inch in diameter, 3-angled, grooved down each side, yellow-green, glaucous, violet-red above, oblong, 3-capellary, 3-loculed, many ovules; stigma sessile, 3-lobed, each lobe  $3/16$  inch long, lobes recurved, margins of opening glandular hairy, yellow.--

Red clay mesa slopes, near Madera Canyon--Santa Rita Mts.  
Reddington, San Pedro Valley  
Empire Ranch

Calochortus Nuttallii Torr. Sego Lily.

Corm 1 to  $1\ 1/2$  inches long, about 1 inch in diameter, ovoid-oblong, brown, purple tinged; scales 3 to 4 inches long, continuing up from bulb and surround the stem which is erect, 5 to 18 inches tall,  $1/8$  inch in diameter, terete, yellow-green to green, and violet suffused at the nodes; leaves few, 5 to 10 inches long,  $1/2$  inch wide, linear to lanceolate-acuminate, their base surrounding the stem and are sometimes entirely united, green with white, entire margins; inflorescence 2 to 4 flowered, flowers  $1\ 1/2$  to  $2\ 1/2$  inches across; pedicel  $1\ 3/4$  to 3 inches long, similar to stem; outer perianth segments three, 1 to  $1\ 1/4$  inches long,  $1/4$  to  $3/8$  inch wide, ovate-lanceolate to lanceolate-acute, margins translucent-violet suffused, external surface yellow-green to greenish-tan, violet suffused, internal surface cream-yellow with a red spot at base; inner perianth segments three,  $1\ 3/8$  to 2 inches long, 1 to  $1\ 3/8$  inches wide, obovate-cuneate to cuneate, with apex rounded-truncate and sometimes terminating in an acute point, white tinged

with lavender, base red-violet, gland with dense orange hairs, yellow around gland, sparsely covered near base with brown hairs; ovary superior,  $5/16$  to  $1/2$  inch long,  $3/32$  to  $3/16$  inch in diameter, oblong, 3-angled, light yellow-green, the angles violet suffused, 3-carpellary, 3-loculed, ovules many; stigma 3-lobed, recurved, red-violet; stamens six; filaments attached to base of inner segments,  $5/16$  inch long,  $1/16$  inch in diameter, tapered to the apex, base rose shading up to red-violet; anthers  $1/4$  to  $3/8$  inch long,  $3/32$  inch in diameter, oblong-obtuse, innate, 2-celled, cream colored; shades of flowers in blue, pink, lilac, yellow, white.- Grows in foothill country around Oracle, Arizona, in the Santa Rita Mountains at an altitude of 5,000 feet in the "red country", also at Duncan, Arizona in protected places in the hills, and also throughout central and northern Arizona.

Calochortus Gunnisoni s. wats. Lavender Mariposa Lily

Bulb small,  $3/4$  inch long,  $1/2$  inch in diameter; stem terete, 4 to 8 inches long,  $1/16$  to  $3/32$  inch in diameter, medium green; leaves  $1\ 1/2$  to 7 inches long,  $1/2$  to  $3/2$  inch wide, linear-acuminate; inflorescence two to three flowered, flower  $2\ 1/4$  inches across; outer perianth segments  $1\ 1/8$  to  $1\ 1/4$  inches long,  $5/16$  to  $3/8$  inches wide, lanceolate to oblong-lanceolate-acuminate, margins translucent white-scarious, base with spot of violet, external

surface violet suffused; inner perianth segments 1 1/2 inches long, 1 1/4 inches wide, cuneate-obovate, apex rounded and terminating in obtuse point, light blue-almost white, lower half delicate yellow-green, purple band-sparsely hairy near base, oblong gland of purple hairs in center of band; ovary 1/2 inch long, oblong, smaller at apex, violet; stigma sessile, 3-lobed, recurved; stamens six; filaments attached at base of segments, 1/4 inch long, filiform; anthers 3/8 inch long, acute, violet.-Much like C. Nuttallii. Tucson Mts., Santa Catalina Mts.-Mt. Lemmon Road, alt. 5000 feet.

Calochortus Kennedyi Porter. Desert Mariposa; Orange Mariposa Lily

Bulb small, ovoid, 5/8 to 1 inch long, 3/4 to 5/8 inches in diameter; stem terete, 5 to 9 1/2 inches long, 1/8 inch in diameter, medium green, violet suffused; leaves 2 to 3 1/2 inches long, linear-acuminate to linear-lanceolate, spreading, margins entire white, medium green, base violet-red suffused; inflorescence of two to three flowers in an umbel; flower campanulate, 1 1/2 to 2 1/4 inches across; pedicel 1 to 3 1/2 inches long, 1/16 to 1/8 inches in diameter; outer segments three, 1 inch long, 7/16 inch wide, broadly lanceolate-acute, margins entire, translucent external surface yellow-green, violet suffused, internal face orange with a basal spot of purple; inner segments three, 1 1/2 to 1 3/4 inches long, 1 3/8 inches in diameter,

cuneate, red-orange with an orbicular gland near base of segment internally, gland with hairs-violet-red, lower fourth of leaf violet, sparsely pilose; ovary  $\frac{3}{8}$  to  $\frac{5}{8}$  inch long,  $\frac{1}{8}$  inch in diameter, oblong, narrowed above, 3-angled, orange, violet suffused; stigma 3-lobed, recurved,  $\frac{3}{16}$  inches in diameter across lobes, orange, margins of lobes viscous, glandular hairy; stamens six; filaments attached at base of perianth segments,  $\frac{1}{8}$  to  $\frac{5}{32}$  inches long, filiform, orange; anthers  $\frac{3}{8}$  to  $\frac{5}{16}$  inches long,  $\frac{3}{32}$  inches in diameter, 2-celled, violet-red. Takes well to pot culture.--Foothills of Ajo road, Tucson Mts.; Catalina Mts., growing in gravelly, red clay soil.

Calochortus: Mariposa or Butterfly Lily. "(Calochortus: from Greek words for beautiful and grass.)" Bulbous plants native of western America. Ordinary clay soil with good drainage is for Mariposa lilies. The corms may be planted from September until November, 3 to 4 inches deep and 4 to 6 inches apart. They like sunshine and plenty of water during their growing and blooming seasons but after this they should be left in the ground without irrigation. They bloom from April through June. Propagation is by natural increase and seed dispersal. The plot of ground in which they are planted should be as nearly like their natural habitat as possible. I can understand why they were named Mariposa, after seeing them sway in the breeze like fluttering butterflies.

Broadiaea Capitata var. pauciflora Torr. Covená; Papago  
Blue Bell

Corm  $\frac{3}{4}$  inch long,  $\frac{7}{8}$  inch in diameter; leaves 24 to 30 inches long,  $\frac{1}{4}$  to  $\frac{3}{16}$  inch wide, linear-acuminate, margins entire, translucent, hairy, base surrounds the scape, whitish, medium to dark green, near base violet suffused, inner surface glabrous, medium green, concave; scape 1 to 2 feet long,  $\frac{1}{8}$  inch in diameter, glaucous, terete, base white, green and violet suffused; inflorescence of eight to eleven flowers in an umbel, flower  $\frac{9}{16}$  inch long,  $\frac{3}{16}$  inch across, campanulate; bracts at base of pedicels, 4 to 6 parted, coalescence of bracts, apex acuminate,  $\frac{1}{2}$  inch long, scarious; pedicels  $\frac{5}{16}$  to  $\frac{7}{8}$  inch long,  $\frac{1}{32}$  to  $\frac{1}{16}$  inch in diameter, terete, light green-violet suffused; perianth tube  $\frac{1}{4}$  inch long,  $\frac{3}{16}$  inch in diameter, lavender-blue, outgrowth from the apex of the tube, appendages  $\frac{1}{8}$  inch long, translucent, nearly covering the anthers; perianth segments six, spreading,  $\frac{3}{8}$  inch long, outer segments  $\frac{1}{8}$  inch in diameter, inner segments  $\frac{3}{16}$  inch in diameter, lavender-blue, outer lobes narrow-elliptical-acute with tuft of hairs at apex, inner lobes elliptical-obtuse; stamens six, filaments attached to throat of perianth tube, opposite perianth segments, anthers unequal, those opposite inner segments  $\frac{3}{16}$  inch long, sagittate, innate, 2-celled; those opposite outer segments  $\frac{1}{8}$  inch long, broadly linear, adnate, introse, 2-celled; pollen yellow; ovary superior,

3/16 to 7/32 inch long, 1/8 inch in diameter, elliptical, dark green, 3-carpellary, 3-loculed, many ovules; style 3/16 inch long, 1/16 inch in diameter, triangular, white; stigma capitate, 3-lobed, margins with short, translucent hairs, viscous.

Brodiaea laxa Wats.

Corm 1/2 inch long, 5/8 to 3/4 inch in diameter; leaves 12 to 16 inches long, 3/8 to 3/4 inch across, radical, two, linear-acuminate, glossy-green, upper face concave, margins entire, lower face- midrib acute, prominent; scape 1 foot long, 3/32 to 1/8 inch in diameter, medium green, finely ridged; spathes four at base of pedicels, 1 1/8 to 1 1/4 inch long, 3/8 inch wide, lanceolate-acute, yellow-green, margins translucent; inflorescence an umbel of nine to fourteen flowers; flower funnel-shaped 1 3/8 to 1 1/2 inches long, 1 1/2 inch across; pedicel 2 inches long, 1/16 inch in diameter, enlarged at apex, green; perianth tube 13/16 inch long, 3/32 inch across base, expands half-way up to 5/16 inch at apex, base white, expanded part lilac, green nerved; perianth segments six, 3/4 inch long, 5/16 inch wide, outer segments and 3/8 inch-wide inner segment, lanceolate to broadly lanceolate, apex recurved, delicate lilac, with mid-vein of green, inner lobe apex acute, lilac glandular hairs; outer lobe acute, white glandular hairs at apex, outer face apex appendaged; standard for ovary 1/2 inch long, 1/16 inch in diameter, yellow-green to ivory; ovary 1/4 inch long,

3/32 inch in diameter, obtusely-triangular bluish-lavender to delicate orchid, 3-loculed, many ovules, 2-rows in each locule; style 3/16 inch long, 1/32 inch in diameter, delicate orchid; stigma capitate, white, glandular hairs on surface; stamens six, filaments orchid, attached to perianth tube, those opposite the inner segments are longer; 3/16 inch free length, those opposite outer segments are as long as the perianth tube, 5/32 inch free length; anthers 7/32 inch long, linear, 2-celled, versatile, attached one-third their distance from the base, introse, orchid; pollen bluish cast.

Brodiaea: bulbous herbs native in Western North America. They revel in hot dry places and can be planted in any garden soil-best in sandy, clay soils. The corms may be set 3 to 4 inches deep in September. Brodiaea laxa shows its charming blue flowers from April to May, and blooms for about a month. These are most lovely when cultivated in masses rather than mixed with other flowers. Brodiaea capitata- Papage Blue Bell, makes a hardy flower for the garden. When growing on the desert it blooms in March. It can be used to great advantage in yards that have natural desert growth, for it needs little care.

Leucocoryne ixioides var. odorata Hort. Glory of the Sun.

Bulb 7/16 inch long, 3/8 inch in diameter; scape 7 to 8 inches long, 1/16 to 3/32 inch in diameter, terete, medium green, streaked with reddish-violet; inflorescence an umbel

flowers fragrant,  $\frac{5}{8}$  inch long,  $1\frac{5}{8}$  to  $1\frac{3}{2}$  inches across, salver-shaped; bracts two at apex of scape,  $\frac{7}{8}$  inch long,  $\frac{1}{8}$  inch wide at base, lanceolate, scarious, reddish-violet; pedicels three, terminating scape,  $\frac{1}{4}$  to  $\frac{7}{8}$  inch long,  $\frac{1}{32}$  to  $\frac{1}{16}$  inch in diameter, medium-light green, perianth tube  $\frac{3}{8}$  inch long,  $\frac{3}{32}$  inch in diameter, green, reddish-violet suffused; perianth segments six,  $\frac{13}{16}$  inch long,  $\frac{5}{16}$  inch wide, narrow obovate-obtusumucronate, lavender-blue shaded lighter near base to green at base with lavender line down center of lobe, apex recurved; stamens three, filaments very short; anthers attached to the wall of the perianth tube so that the apex is slightly visible at the mouth of the tube,  $\frac{3}{32}$  inch long, versatile, deep yellow; staminodia three, alternate with stamens,  $\frac{1}{4}$  inch long,  $\frac{1}{16}$  inch wide at base, tapered to apex, attached at mouth of tube; ovary superior,  $\frac{5}{32}$  to  $\frac{1}{8}$  inch long,  $\frac{1}{16}$  inch in diameter, light green, grooved, 3-carpellary, 3-loculed, many ovules; style entirely submerged in the perianth tube,  $\frac{3}{32}$  to  $\frac{1}{16}$  inch long,  $\frac{1}{32}$  inch in diameter, white; stigma capitate.

Leucocoryne ixioides var. odorata. Glory-of-the-Sun.

These are an introduction from Chile. The bulbs should be planted 2 inches deep in garden loam. They like the sun and the ground should be kept moist but not wet. Because of their sweet fragrance, the long and wiry stems, and

the lasting quality of the blooms- two weeks or longer, they make excellent cut flowers for table decorations.

Allium neopolitanum Cyr.

Bulb tunicated, leaves about 1 foot long,  $1 \frac{3}{4}$  to  $2 \frac{1}{8}$  inches wide, lanceolate-acuminate, margins entire, coriaceous, medium green, the base surrounding the scape and basal leaves; midrib prominent on external surface, sharp edged; scape  $1 \frac{1}{2}$  inches long,  $\frac{3}{16}$  to  $\frac{1}{4}$  inch in diameter, one side rounded other compressed, upright, medium green, inflorescence of twenty to forty-five flowers in an umbel; flowers  $\frac{5}{16}$  inch long,  $\frac{9}{16}$  inch across, cup-shaped, fragrant, spathes at base of pedicel, three joined together at base,  $\frac{5}{8}$  inch long,  $\frac{3}{8}$  to  $\frac{9}{16}$  inch wide, ovate to broadly-lanceolate-acute, translucent, scarious, green-nerved; pedicel  $\frac{7}{8}$  to  $1 \frac{1}{4}$  inches long,  $\frac{1}{16}$  inch in diameter, enlarged at apex, triangular, bright green; perianth segments six,  $\frac{11}{32}$  to  $\frac{5}{16}$  inch long, inner lobes  $\frac{3}{16}$  inch wide, outer lobes  $\frac{1}{4}$  to  $\frac{5}{16}$  inch wide, elliptical, to broadly elliptical, apex obtuse, margins entire, white with midvein on external face greenish; stamens six, filaments opposite perianth lobes,  $\frac{5}{32}$  to  $\frac{7}{32}$  inch long,  $\frac{1}{32}$  to  $\frac{1}{16}$  inch in diameter at base tapered to apex, attached at base of ovary, white, anthers  $\frac{3}{32}$  inch long, sagittate, introse, versatile, attached near the base, green; ovary superior,  $\frac{3}{32}$  inch long, and as broad, light green 3-car-

pellary, 3-loculed, ovules 6; style  $3/16$  inch long,  $1/32$  inch in diameter tapered to stigma, white; stigma truncate.

Allium neapolitanum is very hardy, easily grown, and well adapted to rock gardens. The bulbs should be planted 2 inches deep in any garden soil in a sunny location. They are very decorative in wild gardens and blossom early in spring. It propagates by seed and by offsets of the bulbs.

Ornithogalum thyrsoides var. aureum Hort. Golden Chincheree.

Bulb  $5/8$  inch long,  $1/2$  inch in diameter; plant about  $7\ 1/2$  inches tall; leaves basal, opposite, pairs alternate,  $1\ 1/8$  to 2 inches long;  $5/16$  to  $3/8$  inch wide, dark green, surrounds scape, lanceolate, apex acute to obtuse, thick, margins entire-translucent and very finely ciliated; scapes,  $4\ 1/2$  to  $6\ 3/4$  inches long,  $1/16$  to  $1/8$  inch in diameter, terete, erect, glaucous-green; inflorescence of ten flowers in a raceme, flower  $1\ 3/8$  to  $1\ 1/2$  inches across; pedicel  $7/8$  to  $1\ 7/8$  inches long,  $1/16$  inch in diameter, terete, somewhat expanded above, yellow-green; bract at base of pedicel,  $5/16$  to  $3/4$  inch long,  $1/4$  inch wide, lanceolate-acuminate, margins entire-translucent, yellow-green; perianth segments six,  $11/16$  inch long,  $5/16$  inch wide, elliptical-acute, basal third yellow-green, upper part orange; stamens six opposite perianth segments, filaments  $3/16$  inch long, yellow, base yellow-green, expanded below, compressed; anthers  $3/32$  inch long, versatile, introse, 2-celled; pollen

yellow; ovary  $\frac{3}{16}$  inch long,  $\frac{1}{8}$  inch in diameter, oblong-globose, 3-angled, green, 3-carpellary, 3-loculed, many ovuled; style short; stigma 3-lobed, lobes  $\frac{1}{16}$  inch long,  $\frac{3}{32}$  inch across lobes, each one divided, margins glandular hairy, amber colored.

Ornithogalum arabicum Linn.

Bulb large, globular,  $1\frac{3}{4}$  to 2 inches long,  $1\frac{3}{4}$  to 2 inches in diameter, white or nearly so; basal leaves 12 to 24 inches long,  $\frac{3}{4}$  to  $1\frac{1}{8}$  inches wide, linear-acuminate, glaucous-green, margins entire, scape  $1\frac{1}{2}$  to 2 feet long, glaucous, green to yellow-green; inflorescence of 8 to 16 flowers in an umbel, flowers star-shaped, 2 to  $2\frac{1}{2}$  inches across; bract at base of pedicel, translucent-white to tan, long-acuminate, with translucent margins; pedicel 1 to 2 inches long, terete, glabrous, yellow-green; perianth persistent, segments six, white, inner ones  $\frac{13}{16}$  inches long, oblong-acute, apex with tuft of white hair; outer ones  $1\frac{1}{4}$  inches long, oblong-mucronate; stamens six, attached at base of ovary, opposite the perianth segments, about  $\frac{1}{2}$  inch long, tapered to apex, compressed, white, anthers  $\frac{3}{16}$  inch long, versatile, yellow; ovary superior, about  $\frac{1}{2}$  inch long, globose, 6-grooved, 3-angled, lower half green, upper half black-green, 3-carpellary, 3-loculed, with many ovules; style

3/16 inch long, lower half dark green, upper white; stigma 3-lobed, margins glandular-hair, surface viscous.

Ornithogalum: "Greek bird's milk, probably alluding to egg-like color of flowers of some species." The Ornithogalum does very well in this section of the country.

They should be planted 3 inches deep and 6 inches apart in well-fertilized loam. Ornithogalum aureum is more distinctive when used as a border plant or in masses. It produces a small orange flower which comes March and through April. Ornithogalum arabicum, blooming from April to May, brings beauty and fragrance to any garden. Cut flowers will stay beautiful for a month. If they are desired as house plants they may be set in pots containing "one-fifth of old dairy manure to one-fifth sand and three-fifths rich loamy top soil." The bulbs should be planted one inch deep and about 2 inches apart and many may be planted in the same container. The flowers close at night.

Scilla hispanica Mill. Spanish Jacinth, Wood Hyacinth,

Bulb tunicated; leaves basal, 6 1/2 to 7 1/2 inches long, 1/4 to 11/16 inches wide, linear-acute to acuminate, coriaceous, glabrous, midrib prominent on external face, internal surface of midrib grooved, base yellow-green to medium green; scape 9 1/4 inches long, 3/16 inch in diameter, circular, bright green, violet suffused; inflorescence of fourteen flowers in raceme, flowers alternate, 5/8 inch

long,  $\frac{5}{8}$  to  $\frac{7}{8}$  inch across, campanulate, fragrance delightful; pedicel subtended by two bracts; bracts  $\frac{3}{4}$  to 1 inch long,  $\frac{3}{16}$  to  $\frac{1}{4}$  inch wide at base tapered to apex, linear-lanceolate-acuminate, center with five light-green nerves, margins translucent orchid; smaller bracts linear,  $\frac{7}{16}$  inch long,  $\frac{1}{16}$  inch in width, tapered to apex; pedicel  $\frac{5}{16}$  inch long near top of raceme to  $\frac{1}{2}$  inch near base,  $\frac{1}{16}$  inch in diameter, yellow-green, glabrous, those near apex are light green-lavender suffused; perianth segments six, adnation at base only,  $\frac{5}{8}$  inch long, inner lobes  $\frac{3}{16}$  inch wide, outer lobes  $\frac{1}{4}$  inch wide, delicate orchid with midrib of external face darker, margins entire, inner segments apex recurved, obtuse, outline oblong, outer segments apex obtuse, mucronate, oblong-lanceolate in outline; stamens six, filaments those opposite inner segments  $\frac{3}{8}$  inch long, attached to midrib of lobes; free  $\frac{3}{32}$  inch, those opposite outer segments  $\frac{1}{2}$  inch long, attached at base to midrib of lobes, free  $\frac{3}{16}$  inch, tapered to apex, orchid; anthers  $\frac{3}{16}$  inch long, versatile, introse, oblong, orchid, 2-celled; ovary superior,  $\frac{3}{16}$  to  $\frac{1}{4}$  inch long,  $\frac{1}{8}$  inch in diameter, ovate, light yellow-green, orchid suffused, 3-carpellary, 3-loculed, central placenta, many ovules; style  $\frac{3}{16}$  inch long,  $\frac{1}{32}$  inch in diameter, 6-ridged, orchid, stigma 3-parted, surface glandular hairy, viscous.

Scilla hispanica- Wood Hyacinth, is an early spring bloomer -from February through March. They should be planted in moderately fertilized loam or average garden soil 3 inches deep and 4-6 inches apart, and partial shade is preferred to direct sunlight. The bulbs, if left undisturbed for several years, will multiply rapidly. In beds, borders, or under trees they are very attractive; however, they find their chosen place in rock gardens. The blue, lilac, pink and white varieties harmonize with other rock garden plants. Convallaria majalis Linn. Lily-of-the-Valley.

The plants grow from prone pips, erect, to heights of about 7 inches; leaves three, one above the other 6 to 7 inches long, about 2 to 4 1/2 inches across, margins entire, enclosing the bases of the other leaves, base yellow-green, enclosed in sheath, broadly lanceolate-acute, ridged, sheaths basal, scarious, violet-red, numerous; scape single, secund, 6 to 7 inches long, tapered to apex, erect, bright green, 3-angled, one side flat with sharp margins; inflorescence of about twelve flowers in a raceme; pedicels 1/4 to 1/2 inches long, curved downward, bright green, bract at base of pedicel, lanceolate, scarious, tan-colored; flowers pendent, fragrant; white, campanulate, 3/8 inch across, lobes six, apex acute, recurved; stamens six, 1/32 inch long, attached to base of perianth; anthers 1/16 inch long, very light green, sagittate, dehiscing through lateral pores near the top of the

anther, 2-celled; ovary superior,  $1/8$  inch long, globose, 3-carpellary, 3-lobed, ivory-white, with many ovules; style white, 3-angled,  $3/32$  inch long; stigma 3-lobed, margins glandular-hairy, with the surface viscous.

Convallaria: Lily-of-the-Valley

This well-known flower is native of Europe to East Asia and also in the mountains of Virginia to South Carolina. The plants do not grow here with any great success unless potted; the pips can be planted in November and December, in sand or bulb fibre. Cold storage pips may be gotten and by periodical planting they will bloom over a long season. They flower 18 to 27 days from planting. They must be kept moist and never allowed to dry out. The dainty fragrance and the graceful bells of the Lily-of-the-Valley enhances the charm of any room.

Hemerocallis flava L. Common Yellow Day-Lily

Leaves 12 to 15 inches long,  $3/4$  to  $7/8$  inch wide, linear-lanceolate-acuminate, margins entire, midrib prominent and sharp on the lower face, finely ridged, bright green; bracts on stem  $1/2$  to  $2\ 1/2$  inches long,  $3/8$  inch wide, ovate to lanceolate-acute, margins translucent, bright green; scape 21 to 24 inches long,  $3/16$  to  $1/4$  inch in diameter, terete, erect, hollow, stout, bright green; inflorescence of five to ten flowers terminating the stem, these  $3\ 1/2$  to 4 inches long,  $4\ 1/2$  inches across; pedicels  $3/4$

inch long,  $1/8$  inch in diameter, terete, bright green; ovary superior,  $1/4$  inch long,  $1/8$  inch in diameter, yellow-green, 3-loculed, many ovules; style  $4 \frac{3}{8}$  inches long, yellow to light orange; stigma slightly 3-lobed with margins covered with white hairs; perianth tube  $1 \frac{1}{4}$  inches long,  $3/16$  inch wide, cylindrical, green at base, upper part yellow-green; perianth segments six, outer segments three,  $3 \frac{1}{4}$  to  $3 \frac{3}{8}$  inches long,  $3/4$  inch wide, yellow at base to orange above, margins entire somewhat fluted, narrow oblong-acute, apex green, mucronate with a tuft of hairs on the internal surface; inner segments  $3 \frac{1}{2}$  inches long,  $1 \frac{1}{8}$  to  $1 \frac{3}{16}$  inches wide, internal surface yellow near the base, red at the center to orange with red nerves, midrib convex and yellow, external surface yellow to orange, midrib concave, margins crinkled, narrow oblanceolate-obtuse; stamens six, filaments  $2 \frac{3}{8}$  to  $2 \frac{1}{2}$  inches long, of uneven alternate lengths, curved, deep yellow to red at apex, obtusely compressed; anthers  $5/16$  inch long, linear, 2-celled, versatile, attached near the base, black; pollen orange-yellow.

Hemerocallis: Day-Lily "(Greek beautiful for a day.)"

They are descendants of the few wild species found throughout the north temperate zone from Central Europe to China and Japan, and of easy cultivation for they grow in ordinary garden loam. They enjoy moist shady places but will do well in

the full sun if they get plenty of water. Since they are able to withstand great heat they should be a popular flower in the gardens of southern Arizona. They are hardy, vigorous, and free from disease. The tuberous roots may be planted from September to March about 3" deep. Propagation is by offsets from the roots, which increase very rapidly. The blossom will not reach its fullest capacity the first year. If the varieties are chosen for succession of flowering time, one may have Daylilies from May until September. *Hymenocallis fulva* blooms in this section of the country in May. The clumps of *Hymenocallis* may be left from 4-6 years without dividing the roots. They will grace the garden whether planted in beds, clumps, borders, or in combination with other flowers. They are especially valuable where tones of yellow and orange are desired since the colors shade from pale waxy yellows to ox-blood red. Superior varieties have been introduced through hybridization. The blossoms are fragrant and splendid for cut flowers; however they last but a day.

*Milla biflora* Cav. Mexican star, Mexican star of Bethlehem, Floating star.

Bulb  $5/8$  to 1 inch long,  $1/2$  to  $3/4$  inch in diameter, covered with brown scales; leaves few, 5 to 11 inches long,  $1/16$  to  $3/32$  inch wide, linear, radical, medium green, somewhat violet-suffused at base; bracts  $3/8$  inch long, narrow lanceolate, 5 to 6 at base of pedicels of the umbel; inflor-

excence of 5-flowers in terminal umbel, the flower star-like, fragrant, 2 to 2 1/2 inches across; scape 6 to 10 inches long, 1/16 to 3/32 inch in diameter, terete, erect, glabrous, yellow-green, violet suffused, lower part rough-hairy; pedicels 1 to 5 terminating the scape 2 to 3 inches long, 1/16 inch in diameter, smooth throughout; perianth tube 7/16 inch long, 1/4 inch in diameter at apex, nerves from segments continue down tube; segments of perianth six, 1 to 1 1/2 inches long, 1/4 to 7/16 inch wide, unequal, alternate, oblong-lanceolate acute, waxy-white, midvein 3-nerved, green with blue margins; stamens six; anthers nearly sessile, more series around apex of perianth tube, 1/8 inch long, sagittate, 2-celled; ovary 3/8 inch long, 5/32 inch in diameter, oblong, 3-loculed, ovules many; style 3/8 inch long, 1/32 inch in diameter; stigma capitate, 3-lobed, surface glandular-hairy. - S. Arizona and New Mexico to Central Mexico; Santa Rita Mountains; Bisbee, Arizona; Huachudas Mountains; Chiricahua Mountains, Sonoita, Arizona.

Milla biflora: a native of Arizona, New Mexico, and Mexico. They thrive with about the same culture as Brodiaea. The bulbs should be planted early in spring and they will bloom in summer. The star-shaped, waxy-white blossoms are excellent for cutting and last several days.

Amaryllidaceae (Amaryllis Family)

Amaryllis Belladonna L. Belladonna-Lily

Commonly growing in clumps; grows from bulbs, with no leaves at the time of flowering, leaves appearing the previous year or early in spring; scapes 18 to 24 inches long, apparently several from a bulb, compressed-cylindrical or oval, about a half inch in diameter, glabrous, indistinctly transversely mottled pale yellow-green and dull pink, the greater diameter keeled, solid, terminating in a cluster of 7 to 12 flowers, with a 2-bracted sheath which is translucent, light pink, membranous and withered. Bracts  $2 \frac{1}{2}$  to 3 inches long, and  $\frac{3}{4}$  to  $\frac{7}{8}$  inch wide near the base, ovate-lanceolate-acuminate; pedicels 1 to  $1 \frac{1}{8}$  inches long, terete, yellow-green slightly suffused with pink, elliptical-compressed,  $\frac{1}{8}$  inch diameter; ovary obovate,  $\frac{1}{4}$  to  $\frac{3}{16}$  inch long, glabrous, dull yellow-green, 3-carpellary, 3-loculed, central placenta, ovules several; style exerted, incurved near the tip, below cream-white, above light pink,  $3 \frac{1}{2}$  inches long; stigma lobes 3; flowers with an unpleasant odor, funnel-shaped; perianth lobes united near the base, the perianth  $3 \frac{5}{8}$  to  $3 \frac{3}{4}$  inches long,  $2 \frac{3}{4}$  to 3 inches across, sepals and petals similar, the tips recurved, acute, at their broadest point  $\frac{3}{4}$  to  $\frac{7}{8}$  inch wide, in outline broadly oblanceolate, light pink in color; stamens six, of slightly different lengths, incurved toward the tips, inserted,  $1 \frac{3}{4}$  to  $2 \frac{1}{4}$  inches long, filaments glabrous, attached near their bases of the perianth lobes,

slightly deflexed or bent to the lower side of the flower.

Amaryllis: Belladonna Lily "(handsome lady, the name bestowed by Linnaeus.)" The bulbs should be planted during the fall in rich, moderately fertilized loam, about 10 to 12 inches apart. The earth should barely or not quite cover them for deep planting prevents them from blooming for a time. They like the sun and the delicate colors of white to rose-pink blends well with other garden flowers. The leaves appear after if flowers in August to September. Because they are fragrant and keep well they may be used as cut flowers. If potted, should be in a small container, leaving the crown exposed, and with only 1 1/2 to 2 inches of sandy soil between the bulb and the pot. In the spring it may be placed where it will get plenty of sunlight.

Lycoris radiata Herb. Bulbous; leaves appearing after the flowers, linear, glaucous; scape solid, 1 foot long, base 5/16 inch to apex, 3/16 inch in diameter, somewhat triangular, slightly grooved, yellow-green to medium green; spathes two at the base of the umbel, 1 1/4 inches long, scarious, linear-lanceolate; inflorescence a loose umbel of five or more flowers, flower 2 1/8 inches across, facing outwards; pedicel 1/2 inch long, 3/32 inch in diameter, triangular, yellow-green; perianth tube 3/16 inch long, 1/4 inch in diameter, triangular, light yellow-green; perianth segments six, outer segments six, outer segments 1 1/2 inches long, 3/32 inch wide at base, 1/4 inch wide through middle, linear-acute, apex

revolute, mucronate, with small tuft of white hairs, margins fluted, midrib prominent and yellow-green on external face, external surface rosy-red, internal surface red, glistening, inner segments  $1\frac{1}{2}$  inches long,  $\frac{3}{32}$  inch at base to  $\frac{1}{4}$  inch wide at the middle, linear-obtuse, apex revolute with tuft of white hairs, margins fluted, midrib prominent on external face -yellow-green with red striations, rosyred, one segment extends downward and the rest with the outer segments extend upward; stamens six, filaments attached from the base to the rim of the perianth tube, those opposite inner segments are longer,  $2\frac{1}{2}$  to 3 inches long, base  $\frac{1}{16}$  inch in diameter tapered to apex, slightly compressed, rosy-red; anthers  $\frac{3}{32}$  inch long, versatile; pollen granular, yellow; ovary inferior,  $\frac{5}{32}$  inch long,  $\frac{3}{16}$  inch in diameter, triangular, yellow-green, glabrous, 3-carpellary, 3-loculed, central placenta, ovules few; style long, protuding, tapered to apex, upper half curving upward, triangular, glabrous, rose-red; stigma scarcely thicker than the style, with hairy surface.

Lycoris: (a name in Greek mythology.) Nature from China and Japan. It grows well in garden soil in a somewhat protected place. In early spring the leaves appear, which grow, mature, and disappear. The flowers bloom from October to November. They are highly esteemed in China and Japan and justly so, and a garden is brightened with the umbel of red flowers from Lycoris radiata.

Hippeastrum vittatum Herb.

Leaves precede flower stalk, 6 to 14 inches long,  $1\frac{3}{4}$  to 2 inches broad, broadly linear-obtuse, upper face concave, margins entire light green, yellow-green to medium green, coriaceous; scape  $1\frac{1}{2}$  to 2 inches long,  $\frac{1}{2}$  to  $\frac{7}{8}$  inch in diameter, hollow, erect, glaucous green; bracts terminating scape,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches long, about  $\frac{3}{4}$  inch wide at base, lanceolate, few, linear, lower part violet-red suffused, upper part scarious; inflorescence of six flowers in an umbel, flowers  $4\frac{3}{4}$  inches long,  $4\frac{3}{8}$  to 5 inches across; pedicel 2 to  $2\frac{1}{2}$  inches long,  $\frac{1}{4}$  inch in diameter; ovary  $\frac{5}{8}$  inch long,  $\frac{1}{4}$  inch in diameter, obtusely 3-angled, yellow-green, 3-loculed, 3-carpellary, many ovuled; style not exceeding the perianth,  $4\frac{1}{4}$  long,  $\frac{1}{16}$  inch in diameter, curving upward, yellow-green to red; stigma 3-lobed, the lobes recurved, surface viscous,  $\frac{1}{8}$  inch long; perianth tube  $1\frac{1}{8}$  inches long, base  $\frac{3}{16}$  inches to apex,  $\frac{7}{16}$  inch across, yellow-green, margins of outer segments red, free; perianth segments six,  $3\frac{1}{2}$  to  $2\frac{3}{4}$  inches long,  $\frac{3}{4}$  inch wide, lower segment narrow oblanceolate, upper segment broadly oblanceolate, upper segment broadly oblanceolate,  $1\frac{1}{2}$  inch wide, side segment is oblanceolate,  $1\frac{1}{8}$  inches wide, apex recurved, acute, with hairs; outer segments with mucronate apex, external face, red with base of midrib yellow-green, internal face red with base of yellow-green, and midrib white half way up segment.

Hippeastrum vittatum Herb. (Hybrid Form.)

Bulb globose, large; leaves basal, 33 to 36 inches long, 2 1/2 inches wide, linear-acute, margins entire, medium green, equitant; scape hollow, 2 to 3 feet long, at base 1 1/2 inches to apex 1/2 inch in diameter, glaucous, medium green, terete; inflorescence of four flowers in an umbel, flower 5 to 5 1/2 inches long, 6 to 7 inches across, funnel-form, odor unpleas-  
ant; spathe at base of pedicel 4 inches long, ovate-acumin-  
ate, brown-violet, suffused, scarious; pedicels about 2 inches  
long, base 3/8 inch to apex 1 1/4 inches in diameter, margins  
of outer segments free on the tube, mouth with ragged membrane;  
perianth segments six, outer segments unequal, top one 4 1/4  
inches long, side segments 4 1/2 inches long, 3 1/2 inches  
wide, obovate-mucronate, margins entire, apex recurved, red-  
suffused, tuft of hairs, external surface smooth, internal  
crinkled, glistening, texture somewhat succulent, top one  
with external face white, base of midrib light green, upper  
part red suffused, internal face white, base bright green,  
red radiating bands on each side of broad midrib, side seg-  
ments with radiating red only on upper side of midrib; inner  
segments of perianth 4 3/8 inches long, side ones, and 4 5/8  
inches long the bottom one, 2 1/16 to 2 1/2 inches wide, the  
side ones being the broader, margins entire and slightly  
fluted, apex obtuse, red and recurved, side segments narrowly-  
obovate, external surface white, with base yellow-green,  
light red radiating stripes from edge of broad midrib,

internal surface white, base light-green, radiating red stirpes from edges of broad midrib, bottom segment narrowly obovate, external face white, midrib light yellow-green, upper part red suffused, internal face white, base light yellow-green, red sparsely suffused; stamens six, filaments opposite perianth segments, attached at mouth of perianth tube,  $3 \frac{1}{4}$  to  $3 \frac{1}{2}$  inches long, those opposite inner segments are the longer,  $\frac{1}{8}$  to  $\frac{5}{32}$  inch in diameter, base tapers to apex, apex curves upward, white, base light yellow-green, somewhat compressed; anthers versatile,  $\frac{5}{16}$  inch long; pollen yellow; ovary inferior, bent at right angle to pedicel,  $\frac{1}{2}$  inch long,  $\frac{3}{8}$  inch in diameter, 3-carpellary, 3-loculed, central placenta, many ovules with two rows in each locule; style curved upwards,  $5 \frac{1}{16}$  inches long,  $\frac{1}{8}$  inch in diameter, compressed on one side, base light yellow-green, upper part white; stigma 3-branched, branches  $\frac{3}{16}$  inch long, white, recurved.

Hippeastrum: "Knight or horse, and star, from some fancied resemblance in perhaps the star-shaped corolla-opening." It is native in the tropics of the western hemisphere. It is quite hardy and may be grown in warm, sheltered gardens. The best soil is one composed of fibrous loam, leaf-mold and sand. They bloom from February to May. When planted the tips of the bulb should be exposed. They thrive best when not disturbed for several years. The range of color is from white through all shades of orange to flame and to red,

with stripes or mottled designs. They should be planted in groups or against a background of greenery because of their large size and dominant colors. When grown in pots they are very satisfactory for porch and patio decorations. Two or three bulbs may be potted in a small container of loam free from decayed vegetable matter. The upper third of the bulb should extend above the soil. The roots should be kept cramped and not disturbed until it is necessary. I have found, in a Tucson home, a *Hippeastrum* which blooms in February or May, according to the exposure of the plant to the sun. They are kept on an open porch and if placed in the sun, will bloom early and if kept in the shade will put forth flowers in May. The foliage is retained throughout the year. The bulbs are divided about every fourth year. *Hippeastrum vittatum* is smaller and more delicate than the large gaudy ones seen in hot-houses.

*Clivia miniata* - *nobilis* Lindl. (Hybrid form)

Roots fleshy, leaf bases expanded bulb-like; leaves from common base, 15 to 28 inches long, base  $1/2$  to 2 inches to middle,  $1\ 1/4$  to 3 inches wide, opposite, linear-acute to obtuse, margins entire, base encircling the scape, parallel veins prominent, coriaceous, dark-green, persisting, ever-green; scape 15 inches long,  $1\ 1/8$  inches at base to  $3/4$  inch at apex in diameter, compressed, medium green, eleven to fourteen flowers terminating a scape; spathe at base of pedicel,  $1\ 3/4$  inches long,  $5/8$  inch wide. oblong-obtuse,

translucent, margins entire, apex mucronate, midrib made by the joining of the scale; pedicels  $1 \frac{1}{4}$  inches long,  $\frac{3}{16}$  inch in diameter, triangular, flattened on one side, bright green; flowers fragrant, 3 to  $3 \frac{1}{2}$  inches long,  $2 \frac{5}{8}$  to  $3 \frac{1}{8}$  inches across; perianth segments six, united at the base to form a tube  $\frac{1}{2}$  inch long; outer segments not including tube  $2 \frac{1}{2}$  inches long, base  $\frac{1}{4}$  inch across to near apex  $\frac{5}{8}$  inch wide, spatulate-obtuse, margins entire, midrib thick, apex recurved with tuft of white hairs, external face coral, internal face coral with midrib near base cream and above a deeper coral; inner segments  $2 \frac{5}{8}$  inches long, base  $\frac{1}{8}$  inch wide to near apex 1 inch across, obovate-spatulate-emarginate, margins entire, midrib thick, apex recurved with small knob on external face, external surface coral with the basal third cream, internal surface deep coral with the basal third cream; stamens six, filaments inserted in throat of the perianth tube, free at neck of tube, those opposite the inner perianth segments are the longer, 2 to  $2 \frac{1}{8}$  inches long,  $\frac{1}{16}$  to  $\frac{3}{32}$  inch in diameter tapered to apex, slightly compressed, deep cream; anthers  $\frac{3}{16}$  inch long, versatile; pollen bright yellow; ovary inferior,  $\frac{1}{2}$  inch long,  $\frac{1}{4}$  inch in diameter, triangular with one side flattened more, bright green, 3-carpellary, 3-loculed, central placenta, many ovuled; style  $3 \frac{1}{16}$  inches long,  $\frac{1}{16}$  inch in diameter, tapered to apex, rounded, deep cream; stigma 3-branched, greenish; fruit  $1 \frac{1}{8}$  to  $1 \frac{3}{4}$  inches long,  $\frac{1}{2}$  to  $\frac{3}{4}$  inch in diameter, single seed, red, elliptical.

Clivia: (a Duchess of Northumberland, of the Clive family.) It is an African herb. The leaves remain evergreen so that it makes an attractive porch or patio ornament. The plants should be left in the same pots for several years, and water should be practically withheld during the resting period. The gorgeous umbels of booms come forth the last of February or first of March, and they remain for several weeks.

Zephyranthes carinata Herb: Bulb  $5/8$  to  $2\ 1/16$  inches in diameter; leaves 11 to 16 inches long,  $1/4$  to  $3/8$  inch wide, linear-acute, margins entire, near base edges involute, medium green, striated, lower part suffused red-violet; scape single, 8 to 10 inches long,  $1/4$  inch in diameter tapered to  $3/16$  inch, glabrous, yellow-green, medium green to red-violet suffused at base, striated; continuation of scape jointed,  $1\ 1/4$  to  $1\ 3/4$  inches long,  $1/8$  inch in diameter, light yellow-green, scale leaf completely encircling this portion, violet-red, translucent; inflorescence solitary, flower 3 inches long,  $3\ 1/4$  to  $3\ 1/2$  inches across, tubular-campanulate; perianth segments six, joined at base to form a tube, tube about 1 inch long, base  $3/16$  inch to  $3/8$  inch in diameter at apex, yellow-green suffused with violet-red; outer segments  $2\ 3/8$  inches long, base  $1/4$  inch to middle  $3/4$  inch wide, recurved, oblanceolate-obtuse, apex with a tuft of hairs, margins entire, translucent, upper part delicate orchid-rose, rose-striated, base light yellow-green, inner segments  $2\ 1/4$  inches long, base  $3/16$  inch to  $5/8$

inch wide, broadly oblanceolate-obtuse, recurved, margins entire, translucent, glistening, upper part light yellow-green to delicate orchid-rose, rose striated; stamens six, filaments joined to the perianth tube the entire length, those opposite outer segments with 1 inch free length, those opposite inner segments with 1 1/8 inches free length, 1/16, inch in diameter at base tapered to apex, compressed, ivory white; anthers 5/8 inch long, versatile, split lengthwise, yellow; pollen yellow, granular; ovary 5/16 inch long, 3/16 inch in diameter, rounded-triangular, medium green, 3-carpellary, 3-loculed, central placenta, ovules many; style 2 1/2 to 2 5/8 inches long, 1/16 inch in diameter, light yellow-green to ivory at apex; stigma three, and each branched, recurved, light yellow-green, viscous.

Zephyranthes candida Herb. Little Star of Bethlehem; Bulb 1 inch long, 3/32 to 1/8 inches wide, tapered to apex, linear-obtuse, medium green, slightly compressed at base and apex, subterete, persistent through winter; scale leaves 1 1/16 inches long, 1/4 inch wide, lanceolate-acuminate, transparent, papery, slightly suffused with violet; inflorescence 1 flower to each scape, flower 1 3/4 to 1 7/8 inches in diameter; scape 3 1/2 to 6 inches long, 3/32 to 1/8 inch in diameter, somewhat smaller at apex, slightly compressed at one side, yellow-green; ovary inferior, 3/16 inch long, 1/8 inch in diameter, triangular, with many ovules; style 3/4 inches long, apex enlarged with yellow base, white upper part;

stigma 3-lobed, white; perianth segments six, united at base for  $\frac{3}{32}$  inch their length,  $1\frac{3}{16}$  to  $1\frac{1}{2}$  inches long,  $\frac{3}{8}$  inch wide, oblanceolate-obtuse, with violet tuft of hairs at apex, base yellow-green, ivory white-striated; stamens six,  $\frac{7}{16}$  to  $\frac{1}{2}$  inches long, those opposite outer segments shorter, attached to perianth cup; anthers  $\frac{1}{4}$  inch long, yellow, versatile.

Zephyranthes: fairy lilies- (Greek wind flower.) These are natives of Central and South America. They are well adapted to this climate and flourish in almost any garden soil. The bulbs should be planted about 3 inches deep in a sunny spot. The leaves appear before the flowers which bloom from spring to autumn. Zephyranthes carinata, "Flowers of the West Wind," with blooms of pink or rose-red from May to October; Zephyranthes candida with white flowers, blooms from June to October. Since the bulbs multiply rapidly large beds of these delightful flowers may be had, and many charming effects can be obtained when they are used to edge borders of beds or planted in rock gardens. Zephyranthes longifolia has bright yellow flowers, coppery outside, and grows wild in Arizona. This species is delightful for the garden, but has a short blooming period.

Crinum Longifolium Thumb. Bulb flask-shaped, with short tapering neck; leaves sessile, from base of scape, 31 to 35 inches long,  $1\frac{1}{2}$  to  $2\frac{1}{4}$  inches wide at base, to  $\frac{5}{8}$  to  $2\frac{5}{8}$  inches at middle, linear-lanceolate-acuminate to acute,

recurved, concave, margins entire yellow, medium silvery-green, striated darker green, base yellow-green, glaucous; scape 26 inches long,  $\frac{3}{4}$  inch in diameter below,  $\frac{5}{8}$  inch in diameter at apex, pithy, compressed with one side flattened and the other rounded, bright silvery-green, base light yellow-green; inflorescence of ten flowers in a cluster terminating the scape, flower tubular campanulate, 7 inches long,  $2\frac{1}{2}$  inches across, with heavy fragrance; pedicels  $1\frac{1}{4}$  inches long,  $\frac{1}{4}$  inch in diameter, triangular, glabrous, yellow-green, glaucous; perianth tube 4 inches long,  $\frac{1}{4}$  inch in diameter, slightly expanded at apex, triangular, deeply ridged, yellow-green; outer perianth segments three,  $3\frac{1}{8}$  to  $3\frac{1}{4}$  inches long,  $\frac{1}{4}$  inch wide at base, to  $\frac{3}{4}$  inch wide at middle, oblanceolate-acute, margins entire, midrib pronounced, broad at base and tapered to apex, yellow-green, apex slightly recurved, with tuft of hairs, waxy-white, inner perianth segments three,  $3\frac{1}{4}$  inches long,  $\frac{3}{16}$  inch wide at base, to 1 inch wide at middle, broadly oblanceolate-obtuse, margins entire, midrib pronounced, broad at base and tapered to apex, light yellow-green, apex recurved, tuft of hairs on inner surface, waxy-white; stamens six, filaments attached at base of perianth segments, joined to segments for  $\frac{1}{8}$  inch, those opposite outer segments about 2 inches long, those opposite inner segments  $2\frac{5}{8}$  inches long,  $\frac{1}{16}$  inch in diameter tapered to apex, slightly compressed, yellow-green at base to white at apex; anthers

13/16 inch long, 3/32 inch in diameter, versatile, attached to filament near the middle, splitting lengthwise, linear, curved, crescent-shaped with obtuse ends, ivory; pollen granular ivory-colored; ovary inferior, 5/8 inch long, 3/8 inch in diameter, obtusely-triangular, glabrous, medium yellow-green, 3-carpellary, 3-loculed, central placenta, many ovules; style 7 5/16 inches long, 1/16 inch in diameter, tapered to apex, triangular, spirally twisted, light yellow-green; stigma capitate, 3/32 inch across, ivory, roughened.

Crinum Powellii variety album Hort. Leaves 21 to 36 inches long, 1/2 to 1 3/4 inches wide linear to ensiform, apex long-acuminate-scarious, margins translucent, finely serrulated, bases encircling the other leaves and dry and broken; lower face finely ridged, upper face concave; peduncle about 17 inches long, 9/16 to 3/4 inches in diameter, somewhat compressed, yellow-green, glaucous, enlarged at apex, erect, 4 3/8 to 4 3/4 inches long, base 1 3/4 to 1 1/16 inches wide, lanceolate-acute, margins at apex involute, translucent, light yellow-green at base, upper part scarious; bracts 3/4 to 1 3/4 inches long, linear; pedicels about 12, 3/4 to 1 3/4 inches long, glabrous, yellow-green; flowers solitary, terminal, 6 1/2 to 6 7/8 inches long, 2 1/2 to 3 inches across, tubular funnel-form, with unpleasant odor; ovary about 1/2 inch long, 3/8 inches in diameter, oblong, obtusely-triangular, green to medium green, 3-carpellary, 3-loculed, with many ovules in two rows in each locule;

style reaches to the apex of the corolla or protrudes a short distance, about 6 inches long, triangular, light yellow-green; stigmas truncate, obtusely triangular, perianth tube 2 to 3 inches long, 1/4 inch in diameter, obtusely triangular, curved, yellow-green, grooved; perianth segments six, outer ones 3 to 3 1/2 inches long, 3/4 to 7/8 inches wide, apex acuminate-recurved, on internal face near apex a short appendage covered with short-white hairs, wax-white, inner segments 2 to 3 inches long, about 1 inch wide, elliptical-acuminate, apex recurved, tuft of short white hairs at apex on internal face, margins entire; stamens six, three long and three short, 1 3/4 to 2 1/4 inches long, broad at base tapered to apex, compressed, attached to base of the segments, curved upward near apex; anther 1/16 inch long, crescent-shaped light yellow, versatile, attached about middle, cream-colored, linear, 2-celled, anther of unopened flower, 7/8 to 1 inch long, 1/8 inch wide.

Crinum: "Greek name for a lily." Natives of tropic and warm-temperate regions in both hemispheres. The bulbs may be planted in ordinary garden soil, 4 to 8 inches deep, and from 16 to 24 inches apart. They should not be entirely covered with soil. They need plenty of room because the leaves are long and spreading and the bulbs multiply, producing large clumps, which may remain for several years without being changed. In some species the leaves are evergreen; in others they perish in the summer or autumn. The flowers

appear from April to November. When planted in direct sunlight, along fences and in out-of-the-way places in Tucson gardens, they add much with their clusters of large, pink or white lily-like flowers.

Hymenocallis calathina Nichols. (*Ismene calathina*).

Peruvian Daffodil. Bulb with a long hyaline, sheathing neck; leaves sessile, opposite, from the base of the flower stalk, 9 to 19 inches long, base  $3/4$  to  $1\ 1/2$  inches wide, middle  $1\ 3/8$  to  $2\ 1/2$  inches wide, linear-lanceolate-obtuse, medium bright green, striated, with yellow-green entire margins, blade incurved; leaves encircling the scape  $1\ 3/4$  to 4 inches long,  $3/8$  to  $1\ 1/4$  inches wide at base and  $1/4$  to  $1\ 1/2$  inches wide at middle, broadly lanceolate-acute, medium green to yellow-green striated, margins entire and translucent; scape single to a bulb, 20 to 24 inches long, 1 inch wide at base to  $5/8$  inch wide at apex,  $1/2$  inch thick with edges entire, compressed, medium green-silvery, glaucous; flowers tubular--campanulate,  $7\ 3/4$  inches long,  $4\ 1/2$  inches across, with heavy fragrance; perianth tube 4 inches long,  $1/4$  inch across at base,  $1/2$  inch wide at apex, triangular, grooved, yellow-green, glaucous; perianth segments six, united at base, recurved, three outer segments  $3\ 3/4$  inches long,  $1/4$  inch wide at base,  $1/2$  inch wide at middle, linear-acute, margins entire incurved, midrib prominent, white with base light yellow-green and apex light yellow-green recurved, three inner segments  $3\ 5/8$  inches long, base  $1/4$  inch wide,

to  $9/16$  inch wide at middle, linear-acute, margins entire involute, waxy-white with base and midrib light yellow-green; stamens six, filaments united to form a cup, ivory-white in color, cup  $2\ 3/4$  inches long, base  $3/8$  inch in diameter to apex 3 to  $3\ 1/4$  inches across, apex 6-lobed, each lobe free  $13/16$  inch from the apex, divided at apex. lobes obtuse, margins finely toothed, filaments free  $5/8$  inch from rim of filament cup, curved inwards, ivory-white with center of yellow-green; anthers six,  $1/4$  to  $5/16$  inch long, those of unopened flowers are  $5/8$  inch long with a  $3/32$  inch diameter, versatile, linear, yellow, pollen granular, yellow; ovary inferior,  $3/8$  to  $7/16$  inch long,  $7/16$  inch wide, triangular, yellow-green, glaucous, 3-carpellary, 3-loculed, central placenta, twelve ovules; style  $7\ 3/4$  inches long, triangular, lower half spirally twisted, ovary to light-yellow; stigma capitate, triangular, green.

Hymenocallis: "(Greek for beautiful membranes, alluding to the staminal cup.)" The bulbs may be planted in ordinary, well drained, rich garden loam, from February to April. Propagation is by offsets. Flowers fragrant and blooming in June to July. Hymenocallis calathian flowers the middle of June and continues for a long period. This pure white flower with a white fringed cup is an accent of beauty in any garden. Narcissus Tazetta--var. orientalis Hort. Chinese Sacred Lily

Bulb  $1\ 1/2$  to  $1\ 3/4$  inches long,  $1\ 1/2$  to  $1\ 3/4$  inches in diameter, somewhat compressed, bright green, glaucous, glabrous, solid or nearly so, ribbed and slightly channeled;

sheath terminating the scape, 1 1/2 to 2 inches long, narrow ovate-acute or obtuse, papery, thin; inflorescence of 2 to 10 flowers in an umbel; pedicels angular, 7/8 to 3 inches long, 1/16 inch in diameter, yellow-green, glabrous; ovary inferior, 1/4 inch long, 1/8 inch in diameter, 3-loculed, 3-carpellary with many ovules--2 rows in each locule; style 1/4 to 3/8 inch long, glabrous, white to yellow-green, terete; stigma 3-lobed, short and broad; perianth tube 1/2 to 3/4 inches long, 1/16 to 1/4 inch in diameter, gradually broadening above, obtusely 3-angled, yellow-green; sepals three, 3/4 inches long, 3/8 inches wide, elliptical, apex not apiculate, yellow; corona 3/16 to 1/4 inches long, 1/4 to 3/8 inches wide, elliptical, apex apiculate-spur yellow; petals three, 3/4 inches long, 3/8 inches wide, elliptical, apex not apiculate, yellow; corona 3/16 to 1/4 inches long, 1/4 to 3/8 inches across, up-shaped, rather firm, margin irregular, orange-yellow, stamens six, three long, three short, attached to base of the corona and to base of perianth tube, anther 3/16 inch long, split lengthwise, bright yellow; pollen yellow.

Narcissus Pseudo-Narcissus L. Daffodil or Trumpet Narcissus. Leaves basal, 11 to 15 inches long, 1 inch wide, exceeding the flowers, linear obtuse, erect, glaucous, green, coriaceous; scape 8 1/2 inches long, 1/4 inch in diameter, hollow, rounded, compressed, glaucous, green; bracts 2 1/8 inches long, 2 inches wide, lanceolate, scarious, tan, suffused with lavender, entire for 5/8 inch, completely surrounds stem, margins

of apex united; pedicel  $1 \frac{1}{8}$  inches long,  $\frac{3}{16}$  inch in diameter, somewhat compressed, yellow-green; inflorescence of a solitary flower which is  $2 \frac{3}{4}$  inch long,  $\frac{3}{8}$  inch in diameter, somewhat compressed, glaucous, medium green, 3-carpellary, 3-loculed, many-ovuled; style  $\frac{1}{2}$  inch long,  $\frac{1}{8}$  to  $\frac{1}{16}$  inch in diameter, 3-angled, yellow; stigma 3-lobed, expanded, yellow; perianth tube  $\frac{5}{8}$  inch long, base  $\frac{5}{16}$  inch wide expanded to  $\frac{3}{4}$  inch, somewhat compressed, yellow-green; perianth segments  $2 \frac{1}{2}$  inches long,  $1 \frac{1}{16}$  to  $1 \frac{1}{8}$  inches wide, ovate, acute, expanded, lemon-yellow; trumpet flaring,  $1 \frac{1}{2}$  inches long,  $\frac{3}{4}$  inch across at base to 2 inches wide at apex, margins of apex fluted, crenate, revolute, lemon-yellow; stamens six, filaments attached to the perianth tube for  $\frac{3}{16}$  inch,  $\frac{7}{8}$  inch free length,  $\frac{3}{32}$  inch in diameter tapered to apex, compressed, yellow to ivory; anthers  $\frac{1}{2}$  inch long,  $\frac{1}{16}$  inch in diameter, linear, base sagittate, 2-celled, yellow.

Narcissus, a classical Latin name, from the Greek, in allusion to narcotic qualities, are from original species grown in Central Europe and the Mediterranean region to China and Japan. The Narcissus bulbs are hardy and easily cultivated. They may be put in the ground from September to December and will bloom from February to April. They thrive in sandy loam or any average garden soil and the large bulbs should be planted at a depth of from 4 to 6 inches and 4 to 5 inches apart, smaller bulbs 3 inches deep and 3 to 4 inches

apart. Rich fertilizing is not necessary but they must be kept moist during the growing season. After the foliage has died down the bulbs may be dug up, divided, and replanted. Every third year is often enough to separate the bulbs. They like sun or partial shade.

The Chinese Sacred Lily, may be planted in the ground or in bowls with pebbles. The bowl should be filled with pebbles and the bulbs packed firmly and deeply with only enough water in the bowl to reach the lower part of the bulb. The bowl of planted bulbs should be placed in a dark cool place until the roots have formed, then set in a window where they will get light. If they are desired for Christmas or New Years they may be planted 4 to 5 weeks before, when they will be ready to open. The time required for maturity decreases; so that if planted in February, only 12 to 14 days are necessary. The Paper White Grandiflora, a variety, is excellent for bowl culture also.

Narcissus may be planted in clumps or borders. They are very adaptable as borders along a garden path, especially Jonquils and Daffodils. The flowers nearly always turn their faces to the south so when used as borders this should be considered. Many of the small varieties are effective in rock gardens. By careful selection it is possible to have a continuous blooming period over many weeks. In one yard in Tucson the King Alfred Daffodils were planted along the front of the house and scattered under the trees, presenting a very charming picture.

As cut flowers the daffodil lasts for one or two weeks, according to the temperature of the room and the care given them. The stems should be clipped and the water changed daily.

Iridaceae (Iris Family)

Iris pumila var. Honorabilis Hort.

Leaves 6 to 10 inches long,  $\frac{5}{8}$  to  $\frac{3}{4}$  inches wide, equitant, ensiform-acuminate, margins entire-ivory, ridged, glaucous, medium green, base suffused with red; spathe  $1\frac{1}{4}$  to 2 inches long, 1 to  $1\frac{1}{4}$  inches wide, ovate-acute, margins translucent, yellow-green, violet, suffused near margins; stem 6 to 8 inches long,  $\frac{3}{16}$  to  $\frac{3}{8}$  inch in diameter, one side compressed, glaucous, yellow-green; inflorescence two to three headed, spathe 1-flowered, flower  $2\frac{7}{8}$  inches long,  $2\frac{1}{2}$  inches across; pedicel  $\frac{1}{8}$  inch long,  $\frac{1}{8}$  inch in diameter, bright green; ovary  $\frac{1}{2}$  inch long,  $\frac{3}{16}$  inch in diameter, oblong, one side compressed, light green with darker green grooves, 3-carpellary, 3-loculed, many ovules; style three branched, united at base,  $1\frac{1}{8}$  inches long,  $\frac{7}{16}$  inch wide, spread over stamens, bright yellow, translucent, upper face convex, center thicker-keeled, broadly oblanceolate; stigma  $\frac{1}{2}$  inch long, two-lobed, lip under the crest, ivory, crest divided, yellow, deltoid, margins denticulated, recurved; perianth tube  $\frac{5}{8}$  inch long,  $\frac{1}{8}$  inch in diameter expanded above to  $\frac{5}{16}$  inch, yellow-green, dotted with red-violet; falls three,  $2\frac{1}{8}$  inches long,  $1\frac{1}{8}$  inches wide, spatulate-cuneate, apex obtuse to slightly retuse, blade deflexed, orange-brown radiating veins on a yellow ground, continue down margins of haft, lower part of blade-white with violet markings from

which light yellow beard extends down the concave haft and becomes orange-bearded; standards three,  $2 \frac{1}{16}$  inches long,  $1 \frac{1}{8}$  inches wide, arched over the center, obovate-unguiculate, apex retuse, bright yellow with lower part of blade and claw spotted red-violet; stamens three, filaments attached at the throat of the perianth tube near the base of the falls,  $\frac{9}{16}$  inch long,  $\frac{1}{16}$  inch in diameter, tapered to apex, compressed, white dotted with violet-red; anthers  $\frac{7}{16}$  inch long,  $\frac{1}{16}$  inch in diameter, linear, base sagittate, extrose, adnate, 2-celled, ivory.

Iris germanica L. Purple dwarf

Rhizome short, stout; leaves 1 to 6 inches long, 1 to  $\frac{1}{4}$  inches wide, glaucous-green, finely-ridged, margins entire white, ensiform-acute, equitant; scape 2 to 5 inches long,  $\frac{1}{4}$  inch in diameter, medium green, glabrous, somewhat compressed; spaths 2, covering the ovary,  $1 \frac{3}{4}$  to 2 inches long,  $1 \frac{1}{4}$  to  $1 \frac{1}{2}$  inches wide, ovate-acute, margins translucent-lilac, upper third scarious, yellow-green; inflorescence of two to three heads, spathe 1-flowered, terminal one blooms first; flowers  $3 \frac{1}{2}$  to 4 inches across; ovary  $\frac{5}{8}$  inch long,  $\frac{1}{4}$  inch in diameter, 3-angled, oblong, yellow-green, grooved, 3-carpellary, 3-loculed, many ovuled; style petal-like, three branches united at base,  $1 \frac{1}{4}$  inches long,  $\frac{3}{4}$  inch wide, oblong, spreading over the stamens, ivory translucent, middle part thicker, keeled on upper convex surface, light lilac, stigma lip at base of crest, crest

divided, deltoid, reflexed, lilac,  $\frac{3}{8}$  inch long; perianth tube  $\frac{3}{4}$  inch long,  $\frac{1}{4}$  inch in diameter expanded above to  $\frac{1}{2}$  inch, 3-angled, yellow-green with violet spots, falls three  $2\frac{1}{2}$  inches long,  $1\frac{5}{8}$  inch wide, obovate-retuse, blade deflexed, under side of segments, is violet with green haft, upper side, is violet-red with lower part and haft bearded; standards three,  $2\frac{1}{2}$  inches long,  $1\frac{3}{4}$  inches wide, obovate-spatulate retuse, arched over the center, margins revolute, blade delicate lilac shading lighter toward the basal claw, claw greenish on the outside, inner face concave, violet to brownish-red markings on a yellow ground; stamens three; filaments  $\frac{1}{2}$  inch long, tapered to apex, compressed, attached on throat of perianth tube at the base of the falls, white; anthers  $\frac{5}{8}$  inch long,  $\frac{1}{8}$  inch in diameter, linear, base sagittate, 2-celled, dehiscing lengthwise, adnate, extrose; pollen cream colored.

Iris germanica L. German Iris

Rhizome 3 inches long,  $1\frac{3}{4}$  inches in diameter, leaves equitant, together at base to form a fan, 14 to 24 inches long,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches wide, fusiform, medium green to yellow-green, nerves many, dark green, lighter green near base; spathe  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches long,  $1\frac{1}{8}$  inches wide, ovate, margins translucent-lavender, lower two-thirds yellow-green to violet, upper third scarious, brown, violet-red suffused; scape 12 to 21 inches long,  $\frac{3}{16}$  to  $\frac{3}{8}$  inch in dia-

meter, slightly compressed, bright green, glaucous; branches 1 1/2 to 3 inches long; inflorescence of four heads, spathe 1-flowered, flower 4 3/4 inches long, 5 1/2 inches across; pedicel 1/8 inch long, 3/16 inch in diameter, yellow-green; ovary inferior, 1 1/16 inches long, 5/16 inch in diameter, 3-angled, 6-grooved, yellow-green, 3-carpellary, 3-loculed, many ovuled; style with three branches, united at base, 1 1/2 inches long, about 1 inch wide, cover the stamens, translucent lavender, center thickened, keeled, red-violet, upper face convex; stigma lavender, lip under crest, crest deltoid, reflexed, 3/4 inch long, divided down center, margins denticulate, violet-red, nerves a deeper color; perianth tube 1 1/16 inches long, 3/16 inch in diameter expanded to 7/16 inch at apex, green, spotted violet, dark band down each side; falls three, 3 1/4 inches long, 2 1/16 inches broad, obovate-cuneate-retuse, blade deflexed, violet-red, nerves darker, lower part of blade and haft bearded, white tipped with yellow, haft concave on upper face, red-violet markings on white ground, margins revolute; standards three, 3 3/16 inches long, 2 3/16 inches wide, arched over center obovate-spatulate, outer face concave, red-violet, lighter than the falls, nerves darker, claw on inner face concave, violet-red markings on a yellow ground; stamens three, filaments attached to the throat of the perianth tube at the base of the falls, 11/16 inch long, 3/32

inch in diameter, tapered to apex, compressed, lavender; anthers 1/2 inch long, 1/15 inch in diameter, linear, base sagittate, adnate, extrose, 2-celled; pollen blue.

Iris germanica has according to all authorities gone astray in a Tucson garden. It is planted on the north side of the house and receives very little sun, but blooms the entire year. They have been checked and watched for many years.

Some of the garden varieties in the Iris germanica group are:

True Charm: leaves 9 to 12 inches long, scape 1 1/2 to 2 feet tall. Inflorescence three to four heads, spathe 1-flowered, flowers fragrant, 3 3/4 inch long to 2 3/4 inch across; spathes scarious except lower half or lower third which is yellow-green; falls white with marginal etchings of light violet; haft with upper face concave, bearded-white hairs tipped with yellow, markings on white ground, lower surface yellow-green; standards arched toward center, margins revolute-fluted, obovate base narrow, apex emarginate, white with marginal etchings of light violet and midrib lavender, claw concave on inner face.

Pocahontus is similar to True Charm except that the light violet etchings on the falls do not appear on the apex of the blade, the beard on the lower part of the blade is white, on the haft the white hairs are tipped with orange and

brown, the markings on the haft are violet-red; the claws of the standards are marked with red-violet and in the concave part of the claw there are long, white hairs tipped with violet.

Alameda is similar to True Charm except that the flowers are more distinctly ruffled, the etchings are lavender-blue and the marginal band of etchings is very broad, especially on the standards; the beard on the lower part of the blade is white, on the haft, white tipped with yellow to amber.

Queen Caterina has leaves 7 to 12 inches long, 1 to 1 1/2 inches wide, ensiform; stem 15 to 20 inches tall, spathe entirely scarious, nearly white, violet-red suffused, exceeding the perianth tube, inflorescence three-headed, spathe one-flowered, flower small, fragrant, 2 3/8 inches long, 2 3/4 inches across; falls with beard on lower part of blade and haft, white haired tipped with yellow; veins on haft lavender on white ground; blade lavender; standards delicate lavender, lighter than the blades, stigma crest lavender.

Monsignor: is 12 to 15 inches tall; leaves about equal to the stem; inflorescence three-headed, spaths one to two-flowered, yellow-green with upper third or half scarious, covering the perianth tube; flower 4 to 4 1/2 inches across; haft of the falls bearded yellow hairs tipped with brown to white, lower part of blade lavender hairs tipped with purple; haft markings of purple on white ground, veins radiate

out from the beard, veins on the blade are a deep purple terminating in a purple-red, blade lavender near margins with margins purple; standards lavender with violet-red markings on white ground on claw; outside of light green with green veins going up the midrib of the blade; margins fluted; stigma crest deltoid, lavender with denticulate, purple margins.

Iris squalens Linn. Ramona

Rhizome; stout; leaves 11 to 21 inches long,  $7/8$  to  $1/78$  inches wide, equitant, ensiform-acuminate, margins white-translucent, ridged, green to yellow-green, nerves darker green, spathe  $1\ 1/4$  to 2 inches long, 1 to  $1\ 3/8$  inches wide, elliptical-obtuse, margins lavender suffused, lower half yellow-green, upper half scarious, translucent; scape 21 inches long,  $2/16$  to  $7/16$  inch in diameter, somewhat compressed, glaucous, green; branches 1 to 4 inches long,  $3/16$  inch in diameter; inflorescence three to four heads, spathe one to two-flowered, flower fragrant,  $4\ 3/4$  inches across; pedicel  $1/4$  inch long,  $3/16$  inch in diameter, yellow-green, glabrous, compressed on one side; ovary inferior,  $3/4$  to  $7/8$  inch long,  $1/4$  to  $3/8$  inch in diameter, 3-angled, 6-ridged, yellow-green, darker green in grooves, elliptical, 3-carpellary, 3-loculed, many ovules; styles three, united at base, covering the stamens,  $1\ 1/4$  to  $1\ 3/4$  inches long, about  $3/4$  inch wide, oblong, upper face convex, golden-translucent with center thicker,

lavender, and golden keeled; stigma with lavender lip under crest, crest  $1/2$  to  $3/4$  inch long, deltoid, margins denticulate, divided down center, bronze streaked with lavender, recurved, perianth tube  $3/4$  to 1 inch long,  $3/16$  inch in diameter, expanded to  $3/8$  to 1 inch, 3-angled, yellow-green; falls three, 3 to  $3\ 3/4$  inches long,  $1\ 3/4$  to 2 inches wide, obovate-obtuse, margins of blade unevenly undulate, blade deflexed, lavender with bronze margins, lower part of blade and haft bearded orange, haft concave on upper surface with brown markings on a yellow ground, underside greenish; standards three, forming a dome over center,  $2\ 3/4$  to  $3\ 7/8$  inches long,  $1\ 5/8$  to  $2\ 1/4$  inches wide, apex retuse, margins bronzed somewhat fluted, blade lavender, inner side of claw concave with brown markings on a bronze ground; stamens three; filaments  $5/8$  to  $3/4$  inch long, tapered to apex, attached to throat of the perianth tube at the base of the falls, compressed, yellow shading to lavender; anthers  $5/8$  to  $3/4$  inch long,  $3/32$  inch in diameter, linear-obtuse, base sagittate, adnate, extrose, 2-celled; pollen cream colored. Quaker lady is similar to Ramona except the stem is longer, the falls lighter lavender and standards light bronze-lavender suffused; not as fragrant as Ramona.

Iris variegata Linn. Zuanenburg.

Leaves 9 to 12 inches long,  $3/8$  to  $1/2$  inch wide, linear-acute, margins entire and white, yellow-green, finely ribbed, scape 8 to 11 inches long,  $1/4$  inch in diameter, yellow-green

somewhat compressed, glaucous; spathes 3 to 6  $\frac{1}{2}$  inches long, 1 to 1  $\frac{1}{4}$  inches wide, lanceolate-acute, equitant, margins translucent, green to yellow-green; spathe-valves two, surrounding the ovary 1  $\frac{3}{8}$  to 1  $\frac{5}{8}$  inches long, ovate-acute, margins translucent, yellow-green; inflorescence of three to four heads, spathe one-flowered, the flowers 4  $\frac{1}{2}$  inches across; pedicels 1  $\frac{1}{4}$  to 3 inches long,  $\frac{1}{8}$  inch in diameter, rounded-triangular, glaucous, yellow-green; receptacle  $\frac{1}{8}$  inch long,  $\frac{3}{16}$  inch in diameter, glabrous, yellow-green; ovary inferior,  $\frac{3}{4}$  inch long,  $\frac{5}{16}$  inch in diameter, elliptical, 3-angled, grooved, yellow-green, 3-carpellary, 3-loculed, many ovules; style three branched, petal-like, united at base, 1  $\frac{5}{8}$  inches long, 1 inch wide, spreading and covering the stamens, golden translucent, midrib keeled, violet, stigma lip under crest, crest bronze-gold, reflexed, crest  $\frac{3}{8}$  inch long, divided, margins unevenly toothed; perianth tube 1  $\frac{1}{8}$  inches long,  $\frac{5}{32}$  inch in diameter at the base, expanded to  $\frac{3}{8}$  inch at the apex, 3-angled, yellow-green; falls three, 2  $\frac{5}{8}$  inches long, 1  $\frac{5}{8}$  inches wide, obovate, blade deflexed, golden-bronze splashed with violet-red; haft concave on internal face, reddish-violet, yellow beard tinged with violet on lower part of blade and haft; standards three, 2  $\frac{3}{8}$  to 2  $\frac{1}{2}$  inches long, 1  $\frac{5}{8}$  inches wide, somewhat crinkled, obovate-spatulate, erect, arched, pale yellow-translucent, tinged with lavender, claw concave on internal

face, red-violet markings on yellow ground; stamens three, filaments attached to the throat of the perianth tube, at base of falls,  $\frac{3}{4}$  inch long,  $\frac{1}{16}$  inch in diameter and tapered to apex, compressed, lavender; anthers  $\frac{5}{8}$  inch long,  $\frac{1}{16}$  inch in diameter, linear, base sagittate, extrose, adnate, 2-celled; pollen yellow.

Iris neglecta Horn.

Rhizome stout; leaves 8 to 24 inches long,  $1\frac{1}{4}$  to  $1\frac{3}{4}$  inches wide, oblanceolate-acuminate, rigid, upright, equitant, margins entire and white translucent, glaucous, bright green, scape 2 feet long,  $\frac{3}{8}$  inch in diameter, larger at nodes, glaucous, green, somewhat compressed, spathes  $1\frac{3}{4}$  to  $2\frac{1}{2}$  inches long,  $1\frac{1}{8}$  to  $1\frac{1}{4}$  inches wide, scarious, green at base to tan to violet, ovate-lanceolate, apex acute to obtuse, base surrounds node, midvein prominent and sharp; pedicels  $1\frac{1}{2}$  to  $3\frac{1}{2}$  inches long,  $\frac{1}{8}$  inch wide, somewhat compressed, glaucous, green; inflorescence of three heads, spathes 1-flowered, flower 4 to  $4\frac{1}{4}$  inches long,  $3\frac{1}{4}$  to  $3\frac{1}{2}$  inches across; ovary  $\frac{3}{4}$  inch long,  $\frac{1}{4}$  inch in diameter, 3-angled, each side grooved, bright green, 3-loculed, 3-carpellary, many ovuled; style branches three, united at the base and attached on the throat of the perianth tube,  $1\frac{3}{8}$  inches long,  $\frac{3}{4}$  inch wide, oblong, midrib prominent-keeled, deep violet; stigma lobe under crest, crest two-parted, reflexed, translucent-lavender, crest  $\frac{1}{2}$

inch long; perianth tube about 1 inch long, base  $\frac{3}{16}$  inch in diameter expanding above to  $\frac{3}{8}$  inch, 3-angled, light green, spotted with purple, band of purple down the three sides; falls three, 3 inches long,  $1\frac{3}{8}$  inches wide, obovate-obtuse, blade purple, haft purple-lined on white ground, beard yellow, external face green with purple markings, standards three, about 3 inches long,  $1\frac{1}{2}$  inches wide, obovate-retuse, domed, blade purple lighter than flass, claw yellow with purple-red lines; stamens three; filaments  $\frac{5}{8}$  inch long,  $\frac{1}{16}$  inch wide, taper to apex, compressed, attached to the throat of the perianth tube, light lavender; anthers  $\frac{5}{8}$  inch long,  $\frac{1}{16}$  in diameter, linear with base sagittate, 2-celled, extrose, adnate; pollen light yellow.

Iris florentina L. Florentine Iris

Leaves 1 foot long,  $\frac{3}{4}$  inch wide, linear-acute, ensiform, equitant, margins entire white, green or sometimes bluish-green; long,  $\frac{1}{2}$  inch in diameter, somewhat compressed, glaucous, bright green shaded to bluish-green; spathe 1 to 2 inches long, 1 inch wide, ovate to oblong-ovate-obtuse, entirely scarious with just the base yellow-green; inflorescence of three to four heads, spathe one-flowered, flowers about 4 inches long and 3 inches across; pedicel about  $\frac{1}{2}$  inch long, about  $\frac{1}{8}$  inch in diameter, yellow-green to bright green; receptacle beneath ovary,  $\frac{1}{16}$  to  $\frac{1}{8}$  inch long, yel-

low-green; ovary  $\frac{5}{8}$  inch long,  $\frac{1}{4}$  inch in diameter, yellow-green, 3-angled, 3-loculed, 3-carpellary, many ovules; style branches three, united at base  $1\frac{3}{8}$  inches long,  $\frac{3}{4}$  inch wide, elliptical, delicate, translucent lavender-white; upper face convex, center thicker and keeled; stigma lip under lavender-white crest,  $\frac{7}{16}$  inch long, deltoid, margins denticulate; perianth tube  $\frac{13}{16}$  inch long,  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in diameter, yellow-green; falls three,  $2\frac{3}{4}$  inches long,  $1\frac{5}{16}$  wide, narrow obovate, apex rounded, beard on lower part of blade white tipped with yellow, on haft beard is yellow; haft veined brownish-red on nearly white ground; blade deflexed, white, tinged with lavender; standards three,  $2\frac{3}{4}$  inches long,  $1\frac{5}{8}$  inches wide, arched over center, translucent white, tinged with lavender, margins undulate, somewhat fluted on lower part, claw red and brown markings on light yellow-green ground, upper part concave, long hairs yellow tipped; stamens three; filaments  $\frac{5}{8}$  inches long, base tapered to apex, compressed, lavender tinged; anthers  $\frac{9}{16}$  inch long, linear, sagittate, 2-celled, ivory, extrose, adnate.

Iris pallida Lam. Mesopotamia

Leaves 1 to  $1\frac{1}{2}$  feet long, 1 to  $1\frac{1}{2}$  inches wide, ensiform, apex acute to acuminate, equitant, medium green, margins entire; scape  $1\frac{1}{2}$  to 2 feet long,  $\frac{3}{8}$  to  $\frac{1}{2}$  inch wide, glaucous, medium green, terete, erect; outer spathe

1 1/2 inches long, 7/8 inches wide, scarious, ovate-acute; inner spathe 1 inch long, 3/8 to 1/2 inch wide, oblong-retuse, greenish at base, scarious with 2 spathes surrounding the ovary, 1 1/2 inches long, 1 1/8 inches wide, ovate, lower part green, upper scarious, purple-suffused; inflorescence of two flowers in head, fragrant, 3 1/2 inches long, 4 1/2 inches across; pedicel 1/8 to 5/8 inch long, somewhat compressed, bright yellow-green; ovary 9/16 inch long, 1/4 inch in diameter, elliptical, 3-angled, grooved, bright green, 3-loculed, many-ovuled; style branches three united at base, 1 3/8 to 1 1/2 inches long, 3/4 to 13/16 inches wide, petalike, translucent, thicker toward center, keeled on upper convex surface, oblong, light lavender, outwardly spreading and covering stamens; stigma lip under crest, divided, deep lavender, reflexed margins denticulated, length of crest 1/2 inch; perianth tube 7/8 inch long, expanded above to 7/16 inch, 3-angled, yellow-green spotted purple; falls three, 2 7/8 inches long, 1 3/8 inches wide, narrow obovate, spreading with blade reflexed, blade purple, haft concave on upper face, bearded, white-tipped with yellow to orange, markings of reddish-brown to bronze on a white ground, external face greenish; standards three, 2 3/4 inches long, 1 1/2 to 1 5/8 inches wide, upright, arched over center, obovate-spatulate, apex retuse, claw reddish-brown markings on yellow ground, concave on upper side, blade lavender, somewhat crinkled; stamens three, opposite falls,

filaments attached to throat of perianth tube at base of falls,  $3/4$  to  $11/16$  inch long, tapered to apex, white, compressed; anthers  $5/8$  to  $11/16$  inches long, linear, base saggitate, adnate, extrose, 2-celled; pollen ivory-colored.

Iris pallida var. Hidalgo Hort.

Leaves 1 to 2 feet long,  $1\ 1/4$  to 2 inches wide, equitant, ensiform-acute, many-nerved, margins entire white-translucent, leaves green; stem 27 to 39 inches long,  $5/8$  to  $1/4$  inch in diameter, slightly compressed, glaucous, bright green; branches one or two on a stem in axis of reduced leaves, 3 to 9 inches long; spathe  $1\ 3/4$  inches long, ovate, outer scarious, inner lower half, yellow-green, upper half scarious with violet-tinged margins; inflorescence of two to three heads, spathe one to three flowered, flowers fragrant, 5 inches long,  $6\ 1/2$  inches across; pedicel  $3/16$  to  $5/16$  inch long,  $1/4$  inch in diameter, yellow-green, slightly compressed; ovary  $1/2$  inch long,  $5/16$  inch in diameter, yellow-green, 3-angled, 6-ridged, 3-carpellary, 3-loculed, many-ovuled; branches three, united at base,  $1\ 5/8$  inches long,  $3/4$  inch wide, oblong, translucent orchid with center thicker and darker colored, upper face convex-keeled, covering the stamens; stigma dark orchid, lip under crest, crest  $5/8$  inch long, deep orchid, deltoid, reflexed; perianth tube  $3/4$  inch long, base  $3/16$  inch in diameter, expanding above, yellow-green, spotted-violet; falls three,  $3\ 7/8$  inches long,  $2\ 5/8$  inches wide, ovate-

retuse, blade orchid, deflexed, lower part of blade and haft are bearded white, tipped with yellow to orange; upper surface of haft concave, with bronze markings on white ground, margins revolute; standards three,  $3 \frac{3}{4}$  inches long,  $2 \frac{5}{8}$  inches in diameter, obovate-emarginate, base narrow arched over center, outer surface concave, delicate orchid, claw on inner face concave, markings of violet on cream ground; stamens three; filaments attached to the throat of the perianth tube at the base of the falls,  $\frac{5}{8}$  inches long,  $\frac{1}{8}$  inch in diameter, tapered to apex, white-orchid tinged, compressed; anthers  $\frac{7}{16}$  inch long, linear, base sagittate, adnate, extrose; pollen ivory.

Iris Pseudacorus L.

Leaves 2 to 4 feet long, 1 to  $\frac{3}{4}$  inch wide, equitant, ensiform acuminate, finely ridged, bright green, margins entire and white; stem equal or somewhat exceeding the leaves, 3 to 4 feet long,  $\frac{1}{4}$  to  $\frac{1}{2}$  in diameter, somewhat compressed on one side, bright green, leafy below; branches two to three on a stem, 6 to 8 inches long,  $\frac{3}{16}$  inch in diameter; spaths 2 to 3 inches long,  $\frac{7}{8}$  to 2 inches wide, exceeding the pedicels, outer valves green, lanceolate acute, margins translucent, inner valves light green, translucent; inflorescence of six to nine flowers on a stem, spathes two to three flowered; pedicels  $1 \frac{1}{8}$  to 2 inches long,  $\frac{1}{8}$  to  $\frac{3}{32}$  inch in diameter, compressed on one side, yellow-green; ovary  $1 \frac{1}{4}$  inches long,  $\frac{1}{4}$  inch in diameter, 3-angled, deeply grooved,

glabrous, yellow-green, 3-carpellary, 3-loculed, many ovuled; styles three, united at the base to form a tube, the tube  $\frac{9}{16}$  inch long and  $\frac{1}{16}$  inch wide, expanded above, light yellow-green, branches  $1\frac{3}{8}$  inches long,  $\frac{1}{4}$  to  $\frac{1}{2}$  inch wide, narrow cuneate, translucent-yellow with upper face convex and center thicker, covering the stamens; stigma lip beneath the crest, crest  $\frac{5}{8}$  inch long, rounding, divided, margins unevenly denticulated, reflexed, yellow; perianth tube  $\frac{1}{2}$  inch long, at base  $\frac{1}{8}$  inch in diameter,  $\frac{1}{4}$  inch broad at apex, yellow-green, glabrous, margins of falls free for  $\frac{3}{16}$  inch from the apex of the tube; falls  $3\frac{1}{8}$  inches long,  $1\frac{3}{8}$  inches wide, spatulate, blade yellow, deflexed, apex reticulate, orbicular, haft ridged down center,  $1\frac{1}{4}$  inches long, yellow-green, with bright spot at the throat and radiating brown and dark green veins; standards  $1\frac{1}{16}$  inches long,  $\frac{1}{4}$  inch wide, lanceolate-truncate with base widened to  $\frac{1}{4}$  inch, erect, yellow; stamens three, filaments  $\frac{1}{2}$  inch long,  $\frac{3}{32}$  inch in diameter, taper to apex, compressed, attached on throat of perianth tube at base of falls, yellow; anthers  $\frac{11}{16}$  inch long,  $\frac{1}{16}$  inch in diameter, linear, base sagittate, 2-celled, extrose, adnate, yellow, red-violet suffused, with a margin of violet on each side; pollen yellow.

Iris orientalis Mill. (orchroleuca) Oriental Iris.

Rhizomes oblique, short, stout; leaves 19 to 39 inches long, 1 to  $1\frac{1}{16}$  inches wide, ensiform, equitant, acuminate,

green, finely ridged, margins entire white; stem about equal to the leaves, stout 2 1/2 to 3 1/2 feet long, 1/8 to 3/8 inch in diameter, yellow-green, compressed to 4-angled, bearing leaves and two to three heads; spaths 3 to 5 inches long, 3/4 to 1 1/4 inches wide, lanceolate-acuminate, margins entire-translucent, green; inflorescence of three to four heads, spathe 1-flowered, flower 5 inches across; pedicels 2 1/2 to 3 inches long, 3/16 inch in diameter, twisted, light green; ovary 1 inch long, 5/16 inch in diameter, oblong, light yellow-green, deep channeled which extends to the perianth segments, 3-carpellary, 3-loculed, many ovuled; neck of ovary 1 3/16 inch long, 1/8 to 3/16 inch in diameter, similar to the ovary; style branches three, united at the base to form a tube 5/16 inch long, spreading to cover stamens, 2 inches long, 5/8 inch wide oblong, ivory-white translucent, upper face convex, central portion thickened and keeled; stigma 2-lobed, lip under crest, with each apex mucronate, crested, the crest 1/2 inch long, divided down center, deltoid, reflexed; perianth tube 1/2 inch long, 5/16 inch in diameter, yellow-green, grooved; falls three, 3 inches long, haft 9/16 inch across, blade 1 5/16 inches across, as long as the haft, deflexed, orbicular to obovate with apex emarginated, white with spot of yellow at base of blade; haft elliptical, concave on top, lower surface yellow-green, upper face yellow; standards three, about 3 inches long, 1 inch wide, oblanceolate-emarginate, erect, white with base

and midveins light yellow-green; stamens three; filaments attached to the wall of the perianth tube at the base of falls,  $9/16$  inch long,  $1/8$  inch in diameter, lanceolate, compressed, light yellow-green; anthers  $7/8$  inch long,  $1/16$  inch in diameter, base sagittate, 2-celled, light yellow, adnate, extrose; pollen orange-yellow.

Iris Monnieri DC.

Leaves equal or sometimes longer than the stem, 2 to 3 feet long,  $5/8$  to 1 inch wide, equitant, ensiform acuminate, margins entire white, finely ridged, green, lower part sheathing the stem, erect; spathe 3 to 5 inches long  $1\ 1/4$  inches wide, lanceolate-acuminate, margins entire translucent, green; stem 2 to 3 feet long, about  $3/8$  inch in diameter, somewhat compressed, stout, medium green; inflorescence of three heads, spathe 1-flowered, flower  $5\ 1/2$  to 6 inches long,  $4\ 1/2$  inches across; pedicel 3 to 4 inches long,  $1/8$  inch in diameter, somewhat 3-angled, nearly white to light green; ovary  $1\ 1/8$  to  $1\ 1/4$  inches long,  $5/16$  inch in diameter, oblong with 6-prominent ridges, yellow-green, 3-carpellary, 3-loculed, many ovuled, neck or continuation of the ovary  $1\ 1/16$  inch long,  $1/4$  inch in diameter, similar to ovary, style branches three united into a tube  $3/8$  inch long,  $1\ 7/8$  inches long,  $3/4$  inch wide spreading over stamens, translucent yellow, center of upper face thicker, keeled, convex; stigma two-lobed, lip under crest, yellow, crest  $1/2$

inch long, deltoid, reflexed, divided; perianth tube  $\frac{3}{8}$  inch long,  $\frac{3}{16}$  inch in diameter at base to  $\frac{3}{8}$  inch at apex, green to yellow-green; falls three,  $3\frac{1}{2}$  inches long, blade  $1\frac{7}{8}$  inches long, and 2 inches wide, haft  $\frac{11}{16}$  inch wide, blade deflexed, orbicular-retuse, lemon-yellow; upper face of haft concave, yellow-green, with center band of yellow, elliptical; standards three,  $3\frac{1}{4}$  inches long,  $1\frac{1}{4}$  inches wide, spatulate-emarginate, unguiculate, erect, yellow but not as bright as the falls; stamens three, filaments attached at the throat of the perianth tube and to the base of the falls,  $\frac{3}{4}$  inch long,  $\frac{3}{16}$  inch in diameter to  $\frac{1}{16}$  inch at apex, oblong, reflexed, compressed, yellow; anthers 1 inch long,  $\frac{3}{32}$  inch in diameter, linear, base sagittate, yellow- 2-celled, extrose, adnate.

Iris Xiphium Linn. Spanish Iris

Bulb  $1\frac{1}{8}$  inches in diameter; stems 20 to 28 inches long,  $\frac{1}{4}$  inch in diameter, erect, terete, unbranched, solid, yellow-green, striated, glabrous, internodes near base from  $2\frac{1}{2}$  to 3 inches long, becoming longer above, 3-4 inches; basal leaves  $12\frac{1}{2}$  to 30 inches long,  $\frac{1}{4}$  to  $\frac{11}{32}$  inches wide, linear-ensiform, apex long-acuminate or bluntish, upper face silvery-green, striated, concave; margins entire, translucent, slightly darker green near them, lower face convex and keeled, veins prominent, parallel, leaves gradually become shorter on the upper part of the stem, upper-

most leaves mostly reduced to a sheath, 3 to 3 1/2 inches long, lower ones composed of a sheath and a blade, but sheath portion not distinct from the blade, 4 to 6 inches long, sheath united at base for a space of 2 inches; pedicel 3 1/2 inches long, subterete or somewhat compressed, light yellow-green, glabrous; ovary inferior, 7/8 to 1 inch long, 1/4 inch in diameter, 3-angled, grooved, yellow-green, slightly constricted at apex, compound, 3-loculed with central placenta, many-ovuled; falls — three outer segments, 2 to 2 3/16 inches long, lower face convex, central portion yellow-green striated, violet with darker striated lines, margins entire, blade expanded, 3/4 to 7/8 inches long, 7/8 to 1 inch wide, flabelliform, blue, margins entire, central portion of base orange-yellow fading to a light yellow near its edges, upper face concave with coloring brighter than lower face, half-oblong, pale violet-red more or less suffused with green; standards three, inner segments, alternate with falls, 2 to 2 1/4 inches long, 1/2 to 3/4 inches wide, broadly obovate-oblongate, apex obtuse and 2-lobed, margins slightly undulate, long-tapered toward base, purple striated, toward the base violet-red; style branches three, united at base, petal-like, opposite outer segments, 1 1/2 to 2 inches long, 1/2 to 5/8 inches wide, oblong, slightly recurved, upper face convex, also keeled, margins keeled, incurved, thin, translucent, light lavender, central portion thickened; stigma at apex of style

branch, crest 2-lobed, 1/2 to 3/4 inches long, divided to base, lavender-blue, margins denticulate, stigma membrane on under side of crest.

Iris: Fleur-de-Lis; (Iris: Greek the rainbow.) The Iris will grow in any well-drained location, and most of them like sun. September is a good time to plant Iris. They should be transplanted about every third year, otherwise they will become root-bound. The rhizomes should not be planted very deep in the ground. There are many forms-- bearded, beardless, and crested. By planting different types, there will be a succession of blossoms for many months. The first to flower in February to March is the Dwarf variety which is adapt for rock gardens or edging beds. The intermediate and tall bearded iris are the next to bloom, extending from March to June. These can be planted in bold clumps or drifts if one has the available space. Because of the infinite tints and shades in the Iris it would be possible to have a rainbow garden which would rival all other plant families. I would like to see them planted with the colors blending so that it would be a true rainbow in color. Iris germanica prefers lime-containing soil with no standing moisture.

The Spuria type forms large clumps and blooms in March. They will grow in any soil and are very hardy, tall and decorative. Iris monnieri and Iris orientalis belong in

this class. Iris pseudacorus grows in water and becomes very robust. Siberian Iris form stout clumps and blooms after the Iris germanica. They do not care for lime-containing soil.

An oriental atmosphere may be obtained by planting the Japanese Iris, which blooms in June to July. It requires garden soil, sunlight and water but not enough to produce a boggy condition. Lime is likely to kill them, and the best fertilizer is well-rotted stable manure.

Iris are excellent for cut flowers but do not last many days, except the Spanish Iris or bulbous Iris. They keep from ten to fourteen days and their wide range of color has made them popular for house decorations. They should be planted in September-November and bloom in April and May. The Dutch Iris is a hybrid of the Spanish and English Iris and also has lasting qualities. They require rich, moderately moist, well-drained soil to bring forth their dainty and fairy-like grace.

Iris missouriensis Nutt.

Rootstock stout, horizontal, many surrounding base; leaves basal, 6 to 19 inches long,  $5/32$  to  $7/16$  inches wide, linear to ensiform, apex acuminate, pale bluish-green, margins entire and lighter colored, satiny smooth, finely ribbed, purple below; sheathes not splitting into fibres,  $1\ 7/8$  to 2 inches long; broadly lanceolate, yellow-green, margins translucent; stem exceeding the leaves 1 to 2 feet long;  $1/8$  to  $3/16$  in diameter, terete, simple, with one leaf 4 to 7

inches long from near the base or about half way up the stem; inflorescence 1 to 2 clusters of flowers terminating the stem, flowers 2 to 5 in cluster, 3 inches long, 2 1/2 to 3 inches across; spathes thin, papery, lanceolate; pedicels 3/16 to 1 inch long; ovary inferior, 3/8 to 5/8 inches long, 1/8 inch in diameter, 3-loculed, many ovules; style branches three, petal-like, spreading over stamens, branches 1 1/8 inches long; stigma crested, broad, lip at base of crest; perianth tube short 1/8 inch long; perianth segments six, falls three, 2 3/4 inches long, blade obovate-cuneate, 1 inch wide, haft 1 1/2 inches long, pale blue with yellow down the midrib; standards three, shorter than falls, oblanceolate-unguiculate, apex emarginate, erect, pale blue; capsule 1 1/2 to 1 3/4 inches long, 7/16 to 1/2 inch in diameter, oblong, 6-angled.--White Mountains, Greer, Arizona; Flagstaff, high mountains 7000 feet; Rincon Mountains, Arizona.

Tigridia Pavonia Ker. Tiger-Flower.

Leaves near the base of the stem, 9 inches long, 9/16 inch wide at base, apex acuminate, margins translucent-entire and free two-thirds the length, base completely encircling the stem, 2 1/8 inches from the base it is folded like a fan, equitant, bright green; spaths around pedicels, usually three, 3 1/2 to 3 3/4 inches long, 1/2 inch wide at base, 1 inch wide at the middle, lanceolate-acuminate, tapered to apex, margins entire and translucent, folded at

midrib, bright green; stem erect, 13 inches long,  $\frac{1}{8}$  inch in diameter, slightly compressed, nodes  $\frac{1}{4}$  inch in diameter, internodes 3 to  $4\frac{1}{4}$  inches long with several leaves, glabrous, bright green; pedicels  $2\frac{3}{8}$  to 3 inches long,  $\frac{1}{8}$  inch in diameter, obtusely triangular, light yellow-green; perianth segments six, united at base to form a cup, outer segments 3 to  $3\frac{1}{4}$  inches long,  $\frac{1}{8}$  inch wide at base,  $2\frac{1}{8}$  inches broad at the middle, apex obtuse, some with a short mucron, near the base the margins are folded in and then spread out again about one third the distance from the base, midrib prominent and yellow on the external face, external face salmon-red, lower half internal face yellow with red spots, upper half red, inner segments three,  $1\frac{1}{8}$  inches long,  $\frac{1}{8}$  inch wide at base, at sagittate points  $\frac{11}{16}$  inch wide, at middle  $\frac{1}{4}$  inch wide, sagittate-acuminate, edges of lower half involute, yellow, lower half yellow suffused and spotted with violet-red, upper part yellow with red spots; stamens three, filaments united to form a slender tube that includes the style, tube is 3 inches long, at base  $\frac{3}{16}$  inch wide and at apex  $\frac{1}{8}$  inch across, triangular, yellowish at base to violet-red; anthers  $\frac{5}{8}$  inch long; pollen greenish-yellow; ovary inferior,  $\frac{1}{2}$  inch long,  $\frac{1}{8}$  inch in diameter, obtusely triangular, yellow-green with violet-grooves, 3-carpellary, 3-loculed, central placenta, many ovules with two rows in each locule; style  $2\frac{1}{4}$  inches filiform, yellow-green to violet-red; stigma three, and each

2-branched, violet-red.

Tigridia: Tiger-Flower or Mexican Shell Flower is native of Mexico to Chile. The Tigridia has been traced back to the time of the Aztec sun worshipers who treasured it because the flower follows the sun from dawn to dusk. The petals open with the rising of the sun and close at sunset. Good garden soil, well prepared is best for these bulbs. They prefer a warm sunny spot and plenty of water while in active growth, but do not like a wet soil. In the spring, the bulbs should go into the earth to a depth of 2 to 3 inches from the ground surface to the top of the bulbs and about 4-6 inches apart. It is best not to disturb them until they are over-crowded. They may be grown from seed without having to wait so long for blooms as with some bulbous plants, because they flower the second or third season after sowing. Although they bloom for only a day, there are many buds on each plant, which assures a continuation of brilliant color for several weeks to over a month during the months of August to October. They supply accented notes of color in the garden because of the range from white, heavily marked with ruby red; chrome yellow, spotted with crimson; orange, patterned in chocolate brown; flames to deepest scarlet shot with red-violet. They seem to be best fitted to a garden if planted in a mass and not mixed with other flowers because of their being heavily spotted in contrasting shades.

Sisyrinchium arizonicum Rothrock.

Root fibrous; leaves equitant, 5-15 inches long, 1/4 to 1/2 inch wide, linear-acute, margins slightly roughened-violet-red, minutely pruinose-glandular, dark green, violet suffused at base, 4-prominent central veins-white, 1 or more veins toward margins; stem 1-2 feet long, somewhat compressed, winged with margins violet-red, smooth; inflorescence of 1-2 umbellate clusters terminating the stem; outer spathes 1 1/4 - 1 5/8 inches long, broadly lanceolate, green, margins violet-red; pedicles 2-6, terminating stem, 1 1/4 - 1 7/8 inches long, violet suffused; flower 7/16-3/8 inch long, 1-1 1/2 inches across, campanulate; ovary 3/16 inch long, 3/32 inch in diameter, globose, 3-loculed, many-ovuled; capsale globose, 1/2-5/8 inch long, 1/4-3/8 inch in diameter, 3-angled; style cleft half-way down into linear divisions; filaments 1/4 inch long, dilated, united for one-third their length; anthers 1/2 inch long, linear; perianth segments 6, 3/16-1/4 inch long, 1/8 inch wide; broadly lanceolate to obovate, yellow.- Willow Spring, Arizona- altitude of 7,195 feet; Bonita Creek, White Mountains; Chiricahua Mountains; Santa Catalina Mountains; damp places. Can be used as hardy borders at high altitudes.

Ixia speciosa Andr.

Corm globose, 3/8 inch long, 1/2 to 5/8 inch in diameter; plant 9 1/2 inches tall; leaves basal, four to seven, 3 to 7 1/2 inches long, 1/4 inch wide, linear-acuminate,

lower part equitant, margins entire, erect, light green with five nerves in darker green; scape 8 1/2 inches long, 1/32 to 1/16 inch in diameter, terete, medium green; spathe 1/4 inch long, yellow-green, translucent, to reddish-orange at apex, outer spathe 3-toothed, inner spathe 2-toothed; inflorescence of four flowers in a short spike, terminal, flowers star-shaped, 1 1/2 inches across; ovary inferior, 1/8 inch long, 3/32 inch in diameter, sessile, oblong, yellow to yellow-green, 3-celled, many ovuled; style exceeding tube, 7/16 inch long, filiform, white, with three branches, 5/32 inch long, curled outward and downward; stigma terminates the style, margins with glandular hairs, viscous; perianth tube, 1/4 inch long, 1/16 inch in diameter, longer than spathe, straight, cylindrical, dilated at the apex; perianth segments six, about 3/4 inch long, 1/4 inch wide, oblong-obtuse, delicate pink with spot of rose at the base of the lobe; stamens three, filaments inserted at the throat of the perianth tube, 3/16 inch long, filiform, pink suffused; anthers 1/4 inch long, linear, base sagittate, innate, yellow.

Ixia: "Greek bird-lime; said to refer to the juice."

Fleshy-stemmed plants from South Africa. They require good drainage and enriched, sandy loam. The corms may be planted from September to November or early in spring, about 2 inches deep and 3 inches apart or colonies may be formed from seeds. To prevent crowding by the rapid increase of offsets, they

should be divided every alternate year. They prefer sunlight and it must be intense to open the flowers to their greatest extent. Blooming March to June, the flowers will remain intact for three weeks or more. They may be used in a variety of ways because of the wide range of color- white, yellow, orange, lilac, pink, crimson, red, purple. A dainty grace is possessed by them which brings charm to the borders and beds in the garden.

Gladiolus nanceianus Hort. Willbrink

Corm tunicated; stem erect, 3 feet long, 5/16 inches in diameter, subterete, glaucous-green to yellow-green; leaves 6 to 9 on stem, 1 to 1 1/2 feet long, 7/8 to 1 1/8 inches wide, ensiform-acuminate, equitant, ridged, margins entire, bright green; inflorescence of 15 alternate flowers on spike, flowers sessile, 4 to 4 1/4 inches long, 4 inches across; spathe 1 7/8 to 2 5/8 inches long, 1 1/8 to 1 3/8 inches wide, ovate, apex 2-acuminate points, margins translucent entire, yellow-green, outer ones violet suffused; ovary 7/16 inch long, 1/4 inch in diameter, 6-grooved, yellow-green, 3-loculed, 3-carpellary, central placenta, many ovuled; style 2 1/2 inches long, 1/16 inch in diameter, flattened on one side to compressed at apex, white with base pink suffused; stigma 3-branches, spreading and recurved, branches 3/8 inches long, folded down center, margins white-glandular hairy, lavender-rose; stamens three, filaments attached to the

throat of the perianth tube where it starts to expand,  $1 \frac{5}{8}$  inches long,  $\frac{3}{32}$  inch in diameter; anthers  $\frac{3}{4}$  inches long,  $\frac{3}{32}$  inches in diameter, broadly linear, base sagittate, 2-celled, white with lavender margins; perianth tube  $1 \frac{3}{8}$  inches long,  $\frac{5}{32}$  inches in diameter, expands to  $\frac{3}{4}$  inch, straight half way and then abruptly expanded, yellow-green with expanded part pink, internal surface maroon; perianth segments six,  $2 \frac{1}{2}$  to  $2 \frac{3}{4}$  inches long,  $1 \frac{1}{2}$  to  $1 \frac{7}{8}$  inches wide, obovate to broadly obovate, apex obtuse with mucronate point sometimes retuse-mucronate, pink splashed with a deeper shade, margins entire, upper segment longest and upright; lower segment smallest,  $2 \frac{1}{8}$  inches long, 1 inch in diameter, narrow obovate-mucronate, pink with band of yellow and the lower half of segment-stripped and pebbled with maroon, midrib prominent on internal face.

Odden - height 3 feet tall thirteen flowers in spike, flower coral shading lighter toward the center, throat-maroon, anthers lavender, stigma light coral.

Halley - height 30 inches tall, fifteen flowers in spike, flower deep salmon, lower segment dotted with violet-red, anthers lavender with violet margins, stigma rosy-lavender.

Prince of Wales - 30 inches tall, fifteen flowers in spike, flower delicate coral-pink shading to shell-pink at center, anthers with lavender margins, stigma pink suffused.

Gladiolus byzantinus, growing in a Tucson garden, is

treasured because of its graceful beauty and interesting history. This rose-lavender flower was brought here from the gardens of the Royal Palace in Mexico City where it was growing when Mexico was a monarchy.

Gladiolus: "(Latin small sword, used here originally because of the sword-like leaves.)" These cormous plants are abundant in the Mediterranean region and in South Africa. They are easily cultivated and produce such glorious flowers that they ought to be plentiful in southern Arizona. They will thrive in any good garden earth if it is properly cultivated. The gladiolus demands sunshine, so open sunny places should be given them. The corms are graded according to size, small "bulbs" are 3/4-1 inch blooming late, No. 1's and No. 2's are from 1 1/4-2 inches in diameter, and jumbo "bulbs" exceed 2 inches in diameter and are likely to be flat and old. The thick, high-centered corm is better than a thinner, flattened one, because it is a more vigorous, younger, and will last longer for repeated blooming. At planting time old rotted manure or commercial fertilizer can be used if necessary. The soil should be pulverized well and trenches dug about 6 inches deep and about as wide. The corms should be planted from 4 to 6 inches deep and from 3 to 5 inches apart according to their size. If wanted for color effects in the garden they may be planted in groups or with many rows close together. The soil should be kept

free from weeds and well watered. Rather than sprinkle the surface it should be thoroughly irrigated. The "bulbs" should be planted in January about the first of the month, and those of *Gladiolus* which will flower in from 52 to 80 days should be selected. If it takes longer than this to mature, the flowers may burn with the heat.

If the flowers are used for house decoration, they should be cut when the first flower opens. They will continue blooming until the terminal flower has opened. The flower stalk should be cut with a knife so that from 3-5 leaves remain on the stem to help the corm mature. The corms may be left in the ground or taken up every year after the withering of the leaves in October. The bulblets which produce the high-crowned corms, should be separated from the corm, and planted the following year. The corms should be dried and stored.

Almost any color of the palette may be had; from white, cream, yellow, orange, salmon, pink, rose pink, light red, dark red, lavender and violet, purple and mauve, to smoky or odd shades. Some varieties from Michigan, which have done exceptionally well here are- Halley, Odden, Willbrink, and Prince of Wales.

*Watsonia rosea* Ker.

Corm globose; leaves rigid, 1 to 1 1/2 inches long, 1 to 1 3/4 inches wide, ensiform-acuminate, margins entire, bright green; spathe 3/4 inch long, 5/16 inch wide, broadly lanceolate-acute, basal third green, upper two thirds yellow

with margins of red to violet-red; branches three to four on one stem, 5 to 7 inches long; inflorescence of eleven to twenty-two flowers in a raceme, distance apart of flowers on the stem  $1\frac{1}{2}$  to  $1\frac{1}{4}$  inches at apex, flowers alternate,  $2\frac{1}{2}$  to 7 inches long,  $1\frac{1}{2}$  inches across; ovary inferior,  $\frac{3}{16}$  inch long,  $\frac{1}{8}$  inch in diameter, 3-angled, bright green, 3-carpellary, 3-loculed, many ovuled; style  $1\frac{5}{8}$  inches long, filiform, reddish, style three branches,  $\frac{3}{16}$  inch long; stigma three and each branched,  $\frac{1}{16}$  inch long; perianth tube  $\frac{3}{4}$  to 1 inch long, base  $\frac{1}{16}$  inch wide tapered to apex  $\frac{5}{16}$  inch across, rose-lavender; perianth segments six, 1 to  $1\frac{3}{16}$  inch long,  $\frac{1}{2}$  inch wide, oblong to elliptical, apex acute-mucronate, margins entire, rose-violet; stamens three, extending half way up the segment, filaments  $\frac{1}{2}$  inch long, filiform, inserted on throat of perianth tube; anthers  $\frac{1}{2}$  inch long,  $\frac{3}{32}$  inch in diameter, base sagittate, violet, adnate, extrose.

Watsonia: (Sir William Watson, 1715-1787, English botanist.) This plant comes from South Africa. It is closely related to the Gladiolus and requires about the same culture. It prefers full sun and the corms may be set out in September to October or later, at a depth of  $2\frac{1}{2}$  to 3 inches and 3 to 4 inches apart. They bloom from April to June. They are attractive in the garden when placed according to color harmonies, but they seem to me to be even more pleasing in the house as cut flowers. The long spikes are beautiful when

placed in large jars on the floor, and the buds continue to open for two weeks or longer.

Freesia refracta var. alba Baker.

Corms tunicated, bulb-like; leaves 6 to 12 inches long, 3/8 inch wide, linear-acute, midrib prominent on both surfaces, margins entire, texture thin, 1 1/2 to 3 inches from the base it becomes narrow and continues to base, medium green; stems 5 inches long, 3/32 inch in diameter, terete, glabrous, medium green; inflorescence of five to many flowers in a loose raceme-like spike, racemes bending at right angles to the stem, flower 2 inches long, 1 3/8 inches across, funnel-shaped, fragrant; bracts two, surrounding the base of the flower, 3/8 inch long, 1/4 inch wide, ovate-acute, apex of upper bracts double mucronate, margins translucent, bright green; perianth tube slender, 1/16 to 3/32 inch in diameter for 1/2 inch, then expands to 5/16 inch, light yellow, expanded part white, perianth segments six, expanding, 5/8 to 1 1/4 inches, 3/8 inch wide, margins entire, apex obtuse, segments somewhat irregular, central upper lobe broader, external surface white lightly suffused with violet, lower segment yellow-suffused, internal face white with lower lobe having a yellow spot and adjoining lobes tinged with yellow; stamens three; filaments attached to the perianth tube, free from expanded part of tube, 11/16 free length, narrow, white; anthers 5/16 inch long, linear, 2-celled,

attached near base, versatile, ivory-white; pollen ivory-white; ovary  $\frac{3}{16}$  inch long,  $\frac{1}{8}$  inch in diameter, elliptical, triangular, yellow-green, 3-carpellary, 3-loculed, central placenta, many ovuled; style  $1\frac{3}{8}$  inches long, filiform, white; stigmas three, each branches,  $\frac{1}{4}$  inch long, branch  $\frac{1}{8}$  inch long.

Freesias: these flowers are from South Africa. They may be planted from July until January in light, rich, well-fertilized loam. The corms should be set about 2 inches deep and 1-2 inches apart. If planted in beds with many rows, a much better effect will be achieved and they should be left to multiply. If propagation is from seed, they should give blooming corms in two or three years. When planted in partial shade they produce finer flowers than in the direct sunlight. They bloom here during February to April. The fragrant blossoms are lasting when cut. The colors are from white to orange-red, with many two-toned effects.

Cannaceae (Canna Family)

Canna generalis Bailey. Common French Canna

Large varieties are the result of hybridation; rhizome branched, 1 to 1 and 3/4 inches in diameter, joints 1 1/4 inches long, fleshy fibrous; starch bearing; stem 4 to 6 feet long, subterete, slightly compressed, yellow-green, glabrous, internodes 11 inches long, 1/2 to 7/8 inches in diameter, nodes swollen; 5/8 to 1 inch in diameter; leaves with sheath 7 3/4 inches long, encircling the internode, yellow-green, margins thin, translucent violet-red, blade 11 to 14 inches long, 5 1/4 to 6 1/4 inches wide, pinnately-parallel veined, apex acute, green with yellow-green toward margins, margins entire with line of white translucent and brown line, coriaceous, upper face with midrib concave, lower face-midrib convex, yellow-green, flower stalk 7 1/2 to 9 inches long, 1/4 inch in diameter, triangular, glaucous, green suffused with violet-red; inflorescence cymose, flowers 2-ranked, narrow paniculate; pedicel 1/4 inch long, yellow-green; flower bracts 2, at base of ovary, 3/4 to 1 inch long, 1/2 inch wide, ovate-elliptical-obtuse, base truncate, margins entire, thin, glaucous, violet-red; ovary 1/2 inch long, 3/8 inch in diameter, slightly triangular, green suffused with violet-red, mass of papillae cover the ovary, 3-carpellary, 3-loculed, about 9 ovules in each car-

pel, style 2 1/2 inches long, 5/16 inch in diameter, attached to staminodium with 1/2 anther for 1/2 inch at the base, spatulate, one-sided, apex obtuse, base narrow, 1/8 inch thick margins entire, glandular at apex, orange-red; sepals 3, 1 inch long, 3/8 inch wide, broadly lanceolate-acute to obtuse, base truncate, margins entire, violet-red, glaucous, encircling the petals; petals 3, 2 3/4 inches long, 3/8 to 1/2 inch wide, oblanceolate-acute to obtuse, base united for 5/8 inch to form a tube, margins entire-translucent, glaucous, violet-red, suffused yellow-green, encircling staminodia internal surface margins translucent violet-red, center parallel lines of violet-red over translucent yellow-green; staminodia five, attached at the apex of the corolla tube, 4 to 5 inches long, 2 inches wide, of uneven lengths, staminodium with 1/2 anther, oblong-obovate-obtuse, base narrow truncate, margins irregular undulate, bright red-orange, attached 1 3/8 inches from base, margin of apex slightly crenate with dentate margin, central part orange-red with spots of red.

Canna indica, Linn. Indian Shot

Plants 6 feet tall; stems 7/8 to 1 1/4 inches in diameter, somewhat compressed, jointed, glaucous, glabrous, yellow-green suffused with violet-red, internodes 4 to 6 inches long; leaves alternate, petiole sheathing from 6 to 9 inches long, leaf ovate-oblong, apex obtuse or acuminate with long early deciduous membranous mucro, yellow-green suffused with

violet-brown, midrib large, channled above, prominent below; blades 22 to 24 inches long, 8 to 10 inches wide, pinnate parallel veined, glaucous, glabrous, slightly wavy, margins with translucent violet-red edge; flowers born in a terminal showy raceme; pedicel 1/2 inch long, triangular, glaucous, glabrous, violet-red; ovary enclosed by 1 or more broadly rounded bracts, 3/16 inch long, 5/32 inches in diameter, obovate, glandular, tubular, roughened, violet-red with some yellow-green, 3-loculed, central placenta, many ovules; style 2 inches long, oblique linear spatulate, violet-red, glossy; sepals three, 7/16 to 1/2 inch long, parallel veined, ovate-oblong-obtuse, violet-red, after flowering sepals become translucent; petals three, 1 5/8 inches long, linear-oblong-acute, involute, glabrous, thin, translucent violet-red, all similar; staminodia 2 to 2 1/2 inches long, spatulate, occasionally lobed above, 3 in number, sometimes a fourth one-half stamen and one-half anther.

Canna: (ancient name of a reed or cane.) These plants seem to do especially well here because they will grow in almost any type of soil and withstand the heat. The rhizomes should be planted shallow and given plenty of water during the entire season. They bloom from May to October. They are of quick growth and tropical appearance, presenting a mass of gorgeous colors throughout the summer. The most pleasing effect that I have seen around Tucson was gained by planting them on each side of a drive-way. Being all of

the same color it is truly beautiful.

Araceae (Arum Family)

Zantedeschia aethiopica Spreng. Calla Lily

Rhizome thick; blades 9 to 10 1/2 inches long, 5 to 6 inches wide, cordate with sagittate base, apex acuminate, petiole 12 to 15 inches long, 3/8 inch in diameter, bright green, lower half sheathing; peduncles 21 inches long, base 3/4 inch in diameter to 7/16 inch at apex, bright green, one side compressed; spathe 8 1/2 inches from base to tip, 5 1/2 inches across, ivory-white, outer surface of base green shading to yellow or ivory-white, basal part of spathe convolute, upper part expanded and open with acuminate recurved tip, spadix 3 1/4 inches long, its base 3/8 inch to 1/4 inch in diameter, lower part pistillate, upper part staminate, stamens two, spadix pebbled yellow with many ovaries, many ovules in each, pollen ivory-white, waxy.

Zantedeschia aethiopica var. Minor Engler. Calla Lily

Rhizome thick; leaves basal, blade 6 1/2 to 8 1/2 inches long, 3 3/4 to 5 inches wide, cordate with sagittate base, apex cuspidate, bright green, petiole 7 to 10 inches long, 1/4 inches in diameter, bright green, one side compressed; spathe white, 3 inches long, 2 1/4 inches across, base convolute, spreading above, the apex with an acuminate point, spadix slender, cylindrical, with yellow stamens above and below each imperfectly 3-celled. This dwarf is splendid for potted culture because of the bright green of the foliage and of the leaf form.

Calla Lilies are from South Africa. They are a semi-bog plant when growing wild, so that they need plenty of water. The soil should be enriched with an occasional application of manure. The fleshy roots may be planted from November-February. Propagation is by division of roots and the plants may be left undisturbed for many years. They need full sunlight and will bloom around Easter time or spring and summer. They are suitable for out-door bedding or for pot culture. If planted in pots they can be put in rich fibrous soil in 6-inch containers. They have a texture which will last for a long time when used as cut flowers.

Bulb culture.

If a bulb bed is to be made it is beneficial to dig to a depth of 6 inches and remove this soil, then put in the bottom of the bed about 2 inches of well-rotted manure and spade it into the soil. This should be leveled off and covered with an inch of sand or some of the top soil. This prevents the bulbs from coming in contact with the manure and allows the water to drain away from the bulbs. They can then be placed in position and the top soil replaced. If this is done the bulbs will be planted at an even depth and they will flower uniformly.

When selecting bulbs they should be secured from a reliable firm. Cheaply priced bulbs are sometimes a waste of time and money if they are not up to standard. One should be sure that his bulbs are mature, the proper size, and not carriers of plant diseases.

It has been most convincing and satisfying to study the different varieties of the Liliales Order in private gardens of Tucson and vicinity. With an altitude of 2400 feet, the atmosphere is excessively light and dry. Bulb-planting in this section should be started in the late fall, October to November, while the ground is still warm so that the bulbs will be well established to stand the long summer which comes all too soon after spring planting. For the spring-flowering bulbs, the garden soil really furnishes better storage conditions than do most basements. Available climatic data

will show that freezing temperature is very rare; it is one of the driest places in the United States; this dryness is, I believe, especially valuable to bulb gardening.

"They thrust their venturing heads  
up through the sod  
And thrive and blow; stand still  
and softly nod  
Then fall again to sleep beneath  
the sun;  
Fulfillment their reward; their  
work is done."

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