# PLANT LIFE

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# PLANT LIFE

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1948

AROID LILY EDITION

Edited by

Hamilton P. Traub

Harold N. Moldenke

THE AMERICAN PLANT LIFE SOCIETY
Box 2398, Stanford, California

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# PREFACE

PLANT LIFE for 1948 is devoted to the AROID LILY, genus *Zantedeschia.* The AROID LILY COVER DESIGN, based on *Zantedeschia Elliottiana,* represents the last and unfinished artistic work of the late J. MARION SHULL, who died unexpectedly of cerebral hemorrhage on September 1, 1948, at the age of 76 years. Although the design was unfinished, it was far enough along so that it could be used for its intended purpose. The original plan was to have a two-color cover—green and golden yellow—but since the design was not completely inked in, and it would have been necessary to add greatly to the work to complete it, it was thought best to reproduce the cover just as MR. SHULL left it in black and white as a memorial to him. The autograph was taken from one of his earlier designs, and the lettering was added by the editor, otherwise it is just as MR. SHULL left it. The sudden death of MR. SHULL came as a shock to all who knew him, and who will miss him very much. MR. SHULL's autobiography and portrait were published in HERBERTIA 10(1943): 29—33, pl. 243. 1944, to which the reader is referred for information about his long and brilliantly useful career. The reader is also referred to MR. SHULL's last article—on Kodachromes—which was completed only a short time before his death, and which appears in HERBERTIA 1948.

The FIRST AROID LILY EDITION of PLANT LIFE is appropriately dedicated to the late N. E. BROWN, the monographer of *Zantedeschia* in FLORA CAPENSIS and FLORA OF TROPICAL AFRICA.

The available representatives of the genus *Zantedeschia,* the AROID LILY or CALLA LILY, have been popular pot plants in northern Europe and American gardens and homes, and they are grown out of doors in warmer climates, particularly in Florida, California and Australia. The AROID LILY is also a valuable cut flower. Unfortunately there was no convenient up-to-date *Zantedeschia* reference source and for this reason the ARACEAE COMMITTEE of the SOCIETY was requested to furnish the needed articles to make good the deficiency. These articles are published in this FIRST AROID LILY EDITION of PLANT LIFE.

The genus *Zantedeschia* is a relatively small one, including eight or nine discovered species. N. E. Brown reduced *Z. macrocarpa* Engl., to the synonomy of *Z. angustiloba,* and this disposition is recognized in the systematic treatise of the genus included in the present issue. However, it is hoped that Dr. Dyer or one of his associates, who has access to living material in the native habitats, will give us an appraisal of the relative status of *A. angustiloba* and *Z. macrocarpa,* and also *Z. hastata,* all of which are not well known in America.

In the systematic treatise an attempt is also made to include a descriptive catalog of the cultivated forms, including hybrids. There is now an active group of AROID LILY hybridizers in America and Australia, and the future development of this group as a garden and pot plant is very promising.

In addition to the systematic treatise of the genus *Zantedeschia,* this issue contains interesting articles on the *Zantedeschia* industry by

Messrs. Danks (Australia), Butterfield (California), and Hayward (Florida). Mr. Mirzwick (California), a specialist in the *Araceae,* contributes an interesting article on *Zantedeschia* and other *Araceae,* and Mr. Longmire (California), a specialist in *Zantedeschia,* favors us with a note on the introduction of a *Zantedeschia* species.

For the future, the ARACEAE COMMITTEE plans to furnish ARACEAE material for additional issues, including *Zantedeschia, Anthurium, Caladium, Arum,* etc.

*Hamilton P. Traub*
*Harold N. Moldenke*

*September 15, 1948*

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When taking photographs of amaryllids, an effort should be made to include the whole plant—*stem,* if any, *leaves, scape* and *flowers.* Separate views of the *bulb* and *roots* are also valuable in some cases. These remarks do not apply to cut-flowers.

## CORRIGENDA FOR PLANT LIFE, VOL. 2 (1946) 1948

Page 5, 2nd entry under Table of Contents, change "on" to "for."

Page 87, 18th line from bottom, for "Françis" read "François."

Page 100, 12th line from bottom, in both instances, for "Agaveae" read "Agavaceae."

## CORRIGENDA FOR PLANT LIFE, VOL. 3 (1947) 1948

Page 2, under directions about citations to this issue of PLANT LIFE, 2nd line, after "1—3" insert "(1947)."

Page 41, 4th paragraph, 1st line, for "Br." read "Mr."

Dedicated to N. E. Brown,
the monographer of *Zantedeschia* in
Flora Capensis and Flora of Tropical Africa.


*Zantedeschia aethiopica* (Linn.) Sprengel

THE IMMACULATE AROID LILY. One of the early illustrations of the type species, genus **Zantedeschia** Sprengel, reproduced from Bot. Mag. Lond., Plate 832. 1805. See Figure 1, for morphological details.
Plate 1

# THE GENUS **ZANTEDESCHIA**

HAMILTON P. TRAUB

The genus *Zantedeschia,* commonly known as AROID LILY or CALLA LILY, belongs to the Arum Family *(Araceae).* It is a relatively small genus with only eight or nine species, all native to Africa.

In the first edition of Species Plantarum, 1753, Linnaeus included two species under the generic name, *Calla* Linn. One of these, *Calla palustris* Linn., is an aquatic species native to the Northern Hemisphere, and the other, *Calla aethiopica* Linn., represents a non-aquatic species native to South Africa. We now know that these two species are not closely related, and did not properly belong to a single biologic genus. Kunth therefore proposed the name *Richardia* Kunth (1818), non Linn., to accommodate the South African species. Unfortunately, this name was already occupied by the Linnean genus *Richardia* Linn. *(Rubiac.),* and another name, *Zantedeschia* Sprengel (1826) was later adopted to accommodate the type, *Calla aethiopica* Linn. This is obligatory since Linnean generic names cannot be switched around so as to mean something different than originally intended.

After Linnaeus proposed the type species, *Calla aethiopica* Linn., in 1753, more than a hundred years elapsed before Hooker f., proposed the second species, *Richardia albomaculata* Hook. f. (1859). In addition, more than ten other species have been proposed. Some of these have passed into synonomy by common consent; some, including *Richardia hastata* Hook. f. (1860), (syn.- *Calla? oculata* Lindl., 1659, nom. prov.), *Richardia melanoleuca* Hook. f. (1869), *Zantedeschia Rehmannii* Engl. (1883), *Calla Elliottiana* Knight ex W. Watson (1892), and *Richardia Sprengeri* Comes (1902), have apparently been generally accepted, but the status of two others, *Richardia angustiloba* Schott (1865), and *Zantedeschia macrocarpa* Engl. (1883) has not been definitely settled.

N. E. Brown, in FLORA CAPENSIS (7, pt. I, 6. p. 37. 1897) and in FLORA TROPICAL AFRICA (8, pt. I, p. 169. 1901) reduced *Z. macrocarpa* Engl. to the synonomy of *Z. angustiloba* (Schott) Engl., but Engler (Pflanzner, 4(23 Dc., 65—67. 1915) recognized both species. In the present article, the viewpoint of N. E. Brown is adopted, but it is realized that the subject needs further investigation. *Zantedeschia angustiloba* (Schott) Engl., according to N. E. Brown, is shown in Plate 3, and the typical *Z. macrocarpa* Engl., in Plate 4.

The question apparently is not that of minor intra-specific differences such as size of fruits, but rather if any observed differences are of sufficient importance to warrant specific rank for both on a biologic basis. If the ranges of the two overlap, and the two do not cross in nature, and they thus maintain themselves distinct, then we are certain that they are both entitled to specific rank. If they are separated geographically, then the problem is a more difficult one to solve. The conflict can best be definitely resolved by the consideration of living plants in connection with the herbarium specimens involved, and it is

hoped that Dr. Dyer, or a member of his staff, will give the necessary help toward straightening out this matter.

Unfortunately, the karyology of *Zantedeschia* species has not been investigated, but material has been furnished to Dr. Flory, and the information will be available later.

In America, *Zantedeschia,* the AROID LILY or CALLA LILY, is grown mainly as a greenhouse forcing subject, or as a pot plant, in the North, but it is cultivated out of doors in the South and in California. The importance of the industry is considered by other writers in the present issue of PLANT LIFE.

In the present monograph an attempt has been made to achieve a unified treatise so as to include not only the naturally occurring species, but also hybrids and horticultural selections. In this connection it should be noted that from the standpoint of nomenclature, the International Rules apply to all three categories. It is realized that the Rules concerning cultivated plants have as yet been inadequately drawn up, but that is no reason for delay in applying such Rules as have been agreed upon.

## Genus ZANTEDESCHIA Sprengel,

Syst. 3: 765. 1926; Baillon, in Bull. Soc. Linn., Paris, 1: 354. 1888; Engler, Bot. Jahrb. 4: 64. 1883; Engler, in Engl. & Prantl, Nat. Pflanzenfam, ed. 1, 2(3): 136. 1887; Engler, Das Pflanzenr., hft. 64. 1915.

SYN.—*Aroides* Heist., ex Fabricius, Enum. Pl. Hort. Helmst., ed. 2, 2:42. 1763; *(Arodes)* Kuntze, Rev. Gen. 2: 739-740. 1891; Rendle, Cat. Afr. Pl. Welw., 2: 90—91. 1899; *Colocasia* Link, Diss. Bot. Suerin. 77. 1795, et Handb., 1: 267. 1829, non Neck., nec Schott: *Richardia* Kunth, Mem. Mus. Paris, 4: 437, pl. 20. 1818, non Linn.; N. E. Brown, Flora Capensis, 7(Part I): 36—39. 1897; Flora Trop. Afr., 8(Part I): 167—169. 1901: *Otosma* Rafin., Fl. Tellur., 4: 8. 1836, et New Fl. Amer., 2: 90. 1836.

DIAGNOSIS.—Perennial herbs with thick fleshy rhizomes or corms; leaves contemporary with the flowers, all radical with long petioles, and truncate, hastate, saggitate, cordate or lanceolate blades; peduncles solitary, as long as or longer than the leaves; spathe large, showy, white, yellow or rosy, sometimes blotched with purple-brown at base within, persisting and changing to green as the fruit develops; convolute in the lower half, funnel-shaped; limb oblique, open, suberect or recurving, truncate or terminating in a subulate point; spadix monoecious, free, sessile or stipitate, much shorter than the spathe; staminate and pistillate parts contiguous, appendix none; staminodia sometimes mixed with ovaries, other barren organs absent; perigone absent, ovaries 1—6-celled, numerous, crowded, subglobose, stigma discoid, ovules 2—4 in each cell, on axile placentas, anatropous; anthers sessile, crowded, oblong, compressed, truncate at the apex, 2-celled, cells opening by terminal pores; fruit a berry. Type species: *Zantedeschia aethiopica* (Linn.) Sprengel. Eight species, all native to Africa.

## Key to the species of the genus **Zantedeschia**

1a. Leaf blades hastate, saggitate, cordate, or oblong-acute with truncate basal lobes:
  2a. Leaf blades hastate, saggitate or cordate:
    3a. Spathe milk white, with or without purple blotch at base inside:
      4a. Leaf blades not white-spotted; bristles on petiole absent; spathe without purple blotch at base inside (Cape Province and Natal) ..... 1. *aethiopica*
      4b. Leaf blades white-spotted; bristles on petiole present or absent; spathe with purple blotch at base inside (Transvaal) ..... 2. *albomaculata*
    3b. Spathe yellow or greenish-yellow, with or without purple blotch at base inside:
      5a. Leaf blades not white spotted:
        6a. Spathe Gamboge-yellow, or intense sulfur colored, with purple blotch at base inside (Transvaal and Angola) ..... 3. *angustiloba*
        6b. Spathe light yellow, tinted greenish, with or without purple blotch at base inside (Basutoland, Transvaal and Natal) ..... 4. *hastata*
      5b. Leaf blades white-spotted, except sometimes without spots in juvenile stage:
        7a. Leaf blades cordate, white-spotted in all stages; spathe bright golden yellow, without purple blotch at base inside (Trop. Transvaal) ..... 5. *Elliottiana*
        7b. Leaf blades hastate-saggitate, or cordate-saggitate, sometimes without spots in juvenile stage; spathe greenish- or lemon-yellow, with purple blotch at base inside, except in var. *concolor* (Natal and Nyasaland) ..... 6. *melanoleuca*
  2b. Leaf blades oblong-acute with truncate basal lobes:
    Leaf blades white-spotted, rarely variegated with white; spathe bright yellow to sulfur yellow, or white or rarely spotted (Transvaal) ..... 7. *Sprengeri*
1b. Leaf blades lanceolate:
  Spathe light rosy-purple, darker but not blotched at base inside, or white or greenish-white to base inside, with rosy tinted margins (Natal) ..... 8. ***Rehmannii***

1c. *Zantedeschia* hybrids (see text for names and descriptions.)

1d. *Zantedeschia* forms of unknown origin (See text for names and descriptions.)

1e. Excluded species (See text for names.)

## Description of species

1. Zantedeschia aethiopica (Linn.) Sprengel, Syst., 3: 765. 1826. [Plate 1, and Figure 1]

SYN.—*Calla aethiopica* Linn., Sp. Pl., ed. 1, 968. 1753; Bot. Mag. Lond., pl. 832. 1805; *Colocasia aethiopica* Link, Diss. Bot. Suerin. 77. 1795, et Handb. 1: 267. 1795; *Calla ambigua* Salisb., Prodr. 262. 1796; *Richardia africana* Kunth, Mem. Mus. Paris, 4: 433, pl. 20. 1818; N. E. Brown, Flora Capensis, 7: 38—39. 1897; *Richardia aethiopica* (Linn.) Sprengel, Syst., 3: 765. 1826, in synon.; *Otosma aethiopica* Rafin., New Fl. Amer. 2: 90. 1836; et Fl. Tellur. 4: 8. 1036; *Arodes aethiopicum* Kuntze, Rev. Gen. 2: 740. 1891; *Calla generalis* E. H. Krause, Fl. Deutschl. ed. 2, 1: 180. 1906.

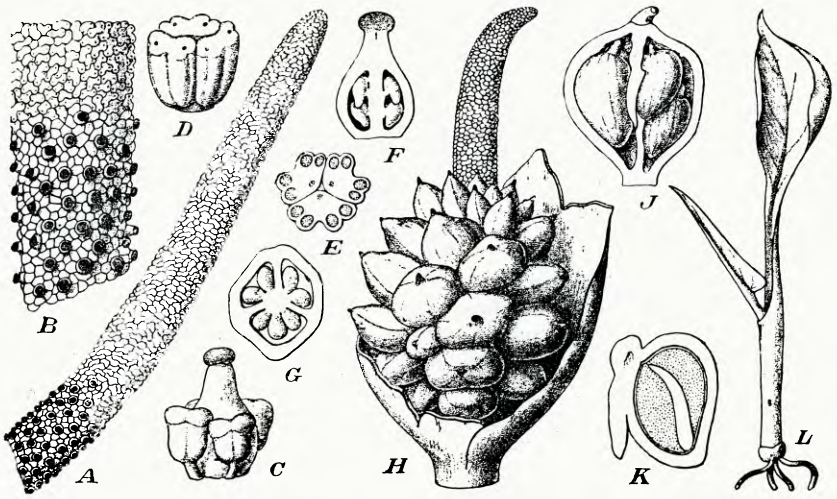


Figure 1. THE IMMACULATE AROID LILY. *Zantedeschia aethiopica* (Linn.) Sprengel. A. spadix .8 nat. size; B. portion of spadix showing staminate and pistillate flowers, 1.6 nat. size; C. pistillate flower with staminodes, 4.8 nat. size; D. staminate flower, 5.6 nat. size; E. same, cross-section, 5.6 nat. size; F. pistil, longi-section, 4.8 nat. size; G. same, cross-section, 6.4 nat. size; H. fruiting spadix, .8 nat. size; J. fruit, 1.6 nat. size; K. seed, 3.2 nat. size; L. seedling plant, .8 nat. size. (Reproduced from Engler, Das Pflanzenr. 4(23Dc): 63. 1915.)

DESCRIPTION.—IMMACULATE AROID LILY. Petiole smooth, without bristles; blade 1.5—4.5 dm. long, 1—2.5 dm. broad, cordate or hastate, obtuse or acute, tipped with a subulate point, the length of the part above the basal lobes much less than twice its breadth, green, unspotted; spathe 1—2.5 dm. long; limb oblique, recurving from the tube, milk white, without any blotch at the base within; spadix sessile, about half as long as the spathe, or less, cylindric; ovaries narrowed into a distinct style 1—2 mm long, pale, greenish-white; staminodia and anthers bright yellow.

RANGE.—South Africa; Cape Province, and Natal.

NOTES.—According to W. Watson (Gard. Chron 12: 123. 1892), this species was "introduced into Europe from South Africa in 1687, when according to Miller, it was sent to Commelyn. Miller cultivated it at Chelsea in 1731." Plate 1, reproduced from Bot. Mag. Lond. pl. 832. 1805, is one of the early illustrations of *Zantedeschia aethiopica* (Linn.) Sprengel.

1a. ZANTEDTSCHIA AETHIOPICA (Linn.) Sprengel var. UMGANIENSIS Leichtlin ex Engler, Pflanzenreich 4 (23 Dc.): 65. 1915.

DESCRIPTION.—Leaf blade ovate-cordate, narrowed from the middle upward, with subulate cusp 2 cm. long, the whole 2.5 dm. long, 1.2 dm. broad, lower lobes semi-ovate, one-third as long as the main portion of the leaf-blade; limb of the spathe broad.

RANGE.—South African highlands; Natal, Howick Falls.

NOTES.—Collected by W. Nelson in 1899.

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HORTICULTURAL SELECTIONS. Although most of the horticultural selections of the Immaculate Aroid Lily have been given Latin varietal names, this procedure is not in accordance with the International Rules since these are usually clones that are propagated vegetatively, and have no definite area of distribution in nature. In the present monograph therefore these will be given fancy names to distinguish them from the genuine botanical varieties that exist in nature.

The following list has been compiled from the literature, and is not complete, but should serve as a beginning. It has been possible to obtain in the trade only two of those listed, but it is hoped that this listing will stimulate enthusiasts to search for the remainder so that they may also be offered in the trade in due time.

(a) ZANTEDESCHIA AETHIOPICA c. IMMACULATE GIANT, *nom. nov.;* Syn.— var. GIGANTEA Hort.

DESCR.—Plant very large. The form, PEARL VON STUTTGART may belong here.

(b) ZANTEDESCHIA AETHIOPICA c. SNOW WHITE, *nom. nov.;* Syn.— var. *candidissima* Hort.

DESCR.—Spathe large, pure white.

(c) ZANTEDESCHIA AETHIOPICA c. SWEET PERFUME, *nom. nov.;* Syn.— var. *grandiflora* Harris, Garden & Forest, 5: 587. 1892.

DESCR.—Flowers with particularly "sweet and strong" fragrance.

(d) ZANTEDESCHIA AETHIOPICA c. FRAGRANCE (Burbank, 1899). Syn.— *Calla fragrans* Perry, The Garden, LV: 337. 1899; *Calla* "Fragrance," Burbank ex W. E. Gumbleton, The Garden, LV: 342. 1899.

DESCR.—Plants as large as the type, spathe white, but with "delicious fragrance somewhat resembling that of the *Gardenia* but more delicate."—W. E. Gumbleton.

NOTES.—According to W. E. Gumbleton (1899), this clone "originated in Mr. Burbank's garden in 1894 amongst over 100,000 seedlings of *Calla* LITTLE GEM, but showed no signs of its parentage in the size of its own flowers (spathes) or foliage."

(e) ZANTEDESCHIA AETHIOPICA c. GODFREY. Syn.— var. *Godfreyana* Hort.

DESCR.—Plant medium sized; spathe white.

(g) ZANTEDESCHIA AETHIOPICA c. MIDWAY Hort. ex Len Mirzwick.

DESCR.—Next in size between GODFREY and LITTLE GEM; spathe pure white, spadix yellow; fragrant; blooms from December to June, and is reported as more frost resistant than the other two clones mentioned.

(h) ZANTEDESCHIA AETHIOPICA c. CHILDS PERFECTION, *nom. nov.;* syn.— var. *Childsiana* Hort.

DESCR.—Plant dwarfer and more compact than the type, and more floriferous; spathe white.

(i) ZANTEDESCHIA AETHIOPICA c. LITTLE GEM (T. Sherman, 1890). Syn.—*Richardia aethiopica* var. LITTLE GEM, T. Sherman, Gard. Chron. 1890, p. 755, fig. 153; *Richardia nana compacta* Hort.; *Z.* var. *minor* Engler, in Das Pflanzenr. 63. 1915; *Zantedeschia* c.BABY CALLA Hort.

DESCR.—Differs from the type in being smaller in all its parts, reaching a total height of only 2.3 to 3 dm. with perfectly formed miniature spathes.

NOTES.—First exhibited by Mr. H. Elliott, Springfield Nursery, St. Heliers, Jersey. Sherman (1890) observes, "One great recommendation of this LITTLE GEM for that is its name, is the small space it requires to grow it in, and the small size of the pot, a 32 being the largest size needed."

This clone is grown commercially in California and Florida.

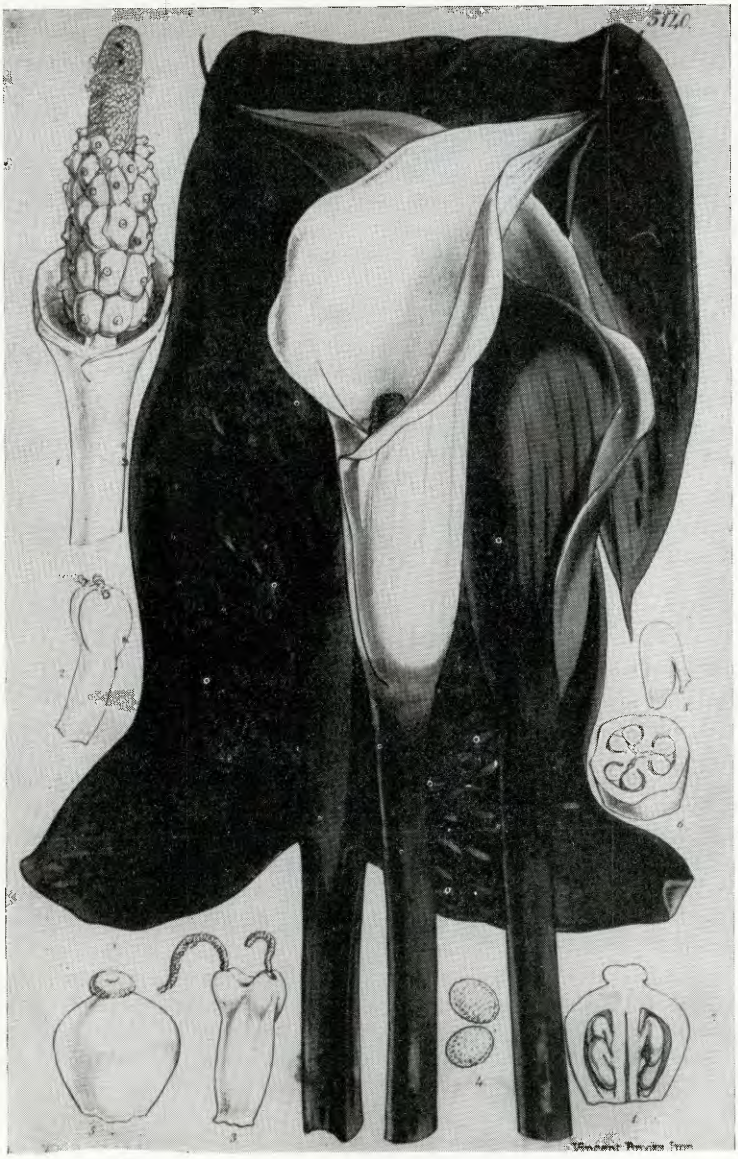
(j) ZANTEDESCHIA AETHIOPICA c. DEVON BEAUTY, *nom. nov.;* Syn.—*Richardia devoniensis* Hort.

DESCR.—Plant dwarf; freer bloomer than LITTLE GEM, and more fragrant.

2. ZANTEDESCHIA ALBOMACULATA (Hook. f.) Baillon, in Bull. Soc. Linn., Paris, 1: 354. 1880; et ex Engl., Bot. Jahrb. 4: 64. 1883. [Plate 2 and Plate 4, E—G]

SYN.—*Richardia albomaculata* Hook. f., Bot. Mag. Lond., pl. 5140. 1859; Lemaire, L'Illus. Hort. 7: pl. 255. 1860; Gartenfl. pl. 462. 1865; Fl. des Serres, 13: 97, pl. 1343; 21: 165, pl. 2258; N. E. Brown, Fl. Capensis, 7: 37—38. 1897.

DESCRIPTION.—Petiole smooth, without bristles; blade 1.5—4.5 dm long, 7.6—23 cm. broad across the basal lobes, hastate or occasionally




*Zantedeschia albomaculata* (Hook. f.) Baillon

The type illustration, from Bot. Mag. Plate 5140. 1859. See also Plate 4, for Engler's illustrations of the fruiting spadix, the fruit and seed of this species.

Plate 2

sagittate, with a wide open sinus, the part above the basal lobes very elongate-deltoid or elongate-oblong, acute or acuminate, more than twice as long as broad, green, with numerous elongated, semi-transparent, white spots; spathe 6.4—11.4 cm long; limb oblique, suberect, acuminate, milk-white, with a dark purple-brown blotch at the base inside; spadix shortly stipitate, scarcely half as long as the spathe, cylindric; ovaries with a sessile or subsessile stigma, pale greenish; staminodia none, or a few around the uppermost ovaries; anthers yellow; berry 1—5-celled (according to Hooker f.).

RANGE.—Natal, and Transvaal (forma *latifolia* Engl.).

NOTES.—According to Hooker f. (1859) this species was introduced from Natal by Messrs. Backhouse of York, in 1859.

2a. ZANTEDESCHIA ALBOMACULATA forma LATIFOLIA Engler, in Bot. Jahrb., 4: 64. 1883.

DESCRIPTION.—Leaf blades broad-hastate, lower lobes spreading, gradually narrowing toward the upper end.

RANGE.—Transvaal.

NOTES.—This is hardly worthy of listing separately since there is only a difference in the leaf blade.

3. ZANTEDESCHIA ANGUSTILOBA (Schott) Engl., Bot. Jahrb., 4: 64. 1883. [Plate 3 and Plate 4, H—N]

SYN.—*Richardia angustiloba* Schott, in Jour. Bot. 3: 35. 1865; N. E. Brown, Flora Capensis, 7 (Part I): 37. 1897; Flora Trop. Afr., 8 (Part I): 169. 1901; *Zantedeschia macrocarpa* Engl., Bot. Jahrb. 4: 64. 1883; Pflanzenr. 4 (23 Dc.): 67, fig. 30, H—M, incl. 1915; *Richardia macrocarpa* W. Watson, Gard. Chron. 124. 1892; *Richardia Pentlandii* Whyte ex W. Watson, Gard. Chron. 123. 1892, et 590. 1894; et ex Hook. f. Bot. Mag. t. 7397. 1895; Whyte, The Garden, 1895; Rev. Hort. 67: 37-38. 1895; *Aroides angustilobum* Rendle, in Cat. Afr. Pl. Welw. 2: 90-91. 1899; *Arodes angustilobum* O. Kuntze, Rev. Gen. Pl. 2: 740. 1891; *Zantedeschia chloroleuca* Engl. et Gilg, in Warburg, Kuene-Sambesi Exped. 180. 1903.

DESCRIPTION.—Leaves glaborous; petiole smooth, without bristles; blade 1.9—4.3 dm. long, 1—2.8 dm. broad across the basal lobes, hastate, green without spots; the part above the basal lobes elongate-deltoid or elongate-oblong, often very narrow, acute or acuminate, 2—5 times as long as broad; basal lobes very variable, short or long, sometimes very spreading, sinus very open; peduncle about as long as the leaves, smooth; spathe 1—1.1 dm. long, clear deep gamboge-yellow, with a purple-brown blotch at the base inside, according to Welwitsch "intense sulphur-colored, blood-red at the base inside," paler outside; tube funnel-shaped; limb oblique, subhorizontal, acute; spadix shortly stipitate, scarcely half as long as the spathe, cylindric, obtuse; ovary subglobose, pale greenish-white; style short; stigma small, discoid; staminodes none; anthers yellow; berries large, subglobose or obovoid.

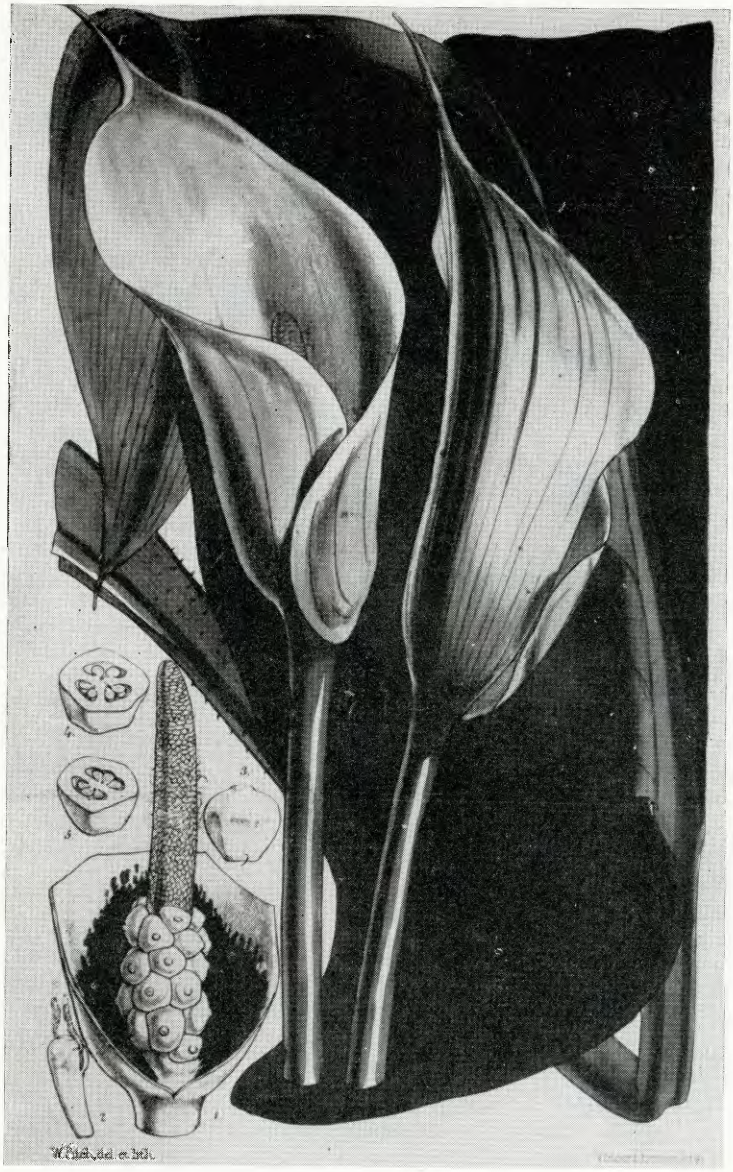
*Zantedeschia angustiloba* (Schott) Engl.

The first illustration of this species (syn.—*Richardia Pentlandii* Whyte ex W. Watson), reproduced from Bot. Mag. Lond., Plate 7397. 1895. See also Plate 4, for *Z. macrocarpa* Engl., reduced to synonomy of *Z. angustiloba* by N. E. Brown.

Plate 3


A—D, *Zantedeschia Rehmannii* Engl., A, flowering plant, .3 nat. size; B, spadix, .8 nat. size; C, single-celled pistil, longi-section, 1.2 nat. size; D, 2-celled pistil, longi-section, 1.2 nat. size. E—G, *Z. albomaculata* (Hook. f.) Engl., E, fruiting spadix, .8 nat. size; F, fruit with staminodes, 1.5 nat. size; G, seed, .5 nat. size.— H—N, *Z. macrocarpa* Engl., H, flowering plant, .16 nat. size; J, lower part of spathe, and spadix, .8 nat. size; K, stamen, .6 nat. size; L, pistil, .6 nat. size; M, fruit, upper view, .8 nat. size; N, same, longi-section, .8 nat. size. (Reproduced from Engler, Das Pflanzenr. 4(23Dc): 66. 1915.)

Plate 4



*Zantedeschia hastata* (Hook. f.) Engl.

The type illustration, reproduced from Bot. Mag. Lond., Plate 5176. 1860.

Plate 5

RANGE.—Transvaal and Angola.

NOTES.—According to E. Hill (The Garden, 55: 317, 319. 1899), in the Tring Park variety (of *Richardia Pentlandii* = *Zantedeschia angustiloba)* "the color of the spathe is gold almost to an orange shade, yet very pure and uniform throughout the entire set of plants shown. There are also the same characteristic blotch within and the translucent blotches on the leaves. The latter, however, are of unusual size."

4. ZANTEDESCHIA HASTATA (Hook. f.) Engl., Bot. Jahrb. 4: 64. 1883. [Plate 5]

SYN.—*Calla? oculata* Lindley, in Gard. Chron. 1859, p. 788, nom. prov.; *Richardia hastata* Hook. f., Bot. Mag. Lond., pl. 5176. 1860; N. E. Brown, Flora Capensis, 7 (Part I): 38. 1897; Flora Trop. Afr. 8 (Part I): 168—169. 1901; *Arodes hastatum* O. Kuntze, Rev. Gen. Pl. 2: 270. 1891; *Aroides hastatum* Rendle, in Cat. Afr. Pl. Welw. 2: 90—91. 1899. *Richardia Lutwychei* N. E. Brown, Gard. Chron. 13: 568. 1893; (errore *R. Lutwichei)* Hort. ex Rev. Hort. lxxiii: 249. 1895; *Zantedeschia Lutwychei* Durand & Schinz, Consp. Fl. Afr. 5: 477. 1895; *Zantedeschia oculata* Engl. Pflanzenr. Arac., etc., 68. 1915; *Zantedeschia oculata* (Lindl.) Burtt Davy, Kew Bull. Misc. Inf. 234. 1924.

DESCRIPTION—Leaves with petioles 3—4.5 dm. long, having soft bristle-like hairs on the lower part, which wither and often disappear in the dried state; blade green, without spots, 2.2—3.4 dm. long, 1—1.9 dm. broad across the basal lobes, triangular-sagittate or hastate, acute, the part above the basal lobes usually less than twice as long as broad; basal lobes very broadly ovate or rounded, very obtuse, overlapping one another at the sinus, or spreading; peduncle about 3 dm. long, smooth; spathe 7.6—10 cm. long, light yellow, tinted with green outside, marked with a large purple-brown blotch at the base inside; tube funnel-shaped, limb obliquely truncate at the mouth, abruptly subulate-pointed; spadix about half as long as the spathe, cylindric, obtuse; ovary augular-globose, light green; style very short, conical; stigma small; staminodes none; anthers yellow.

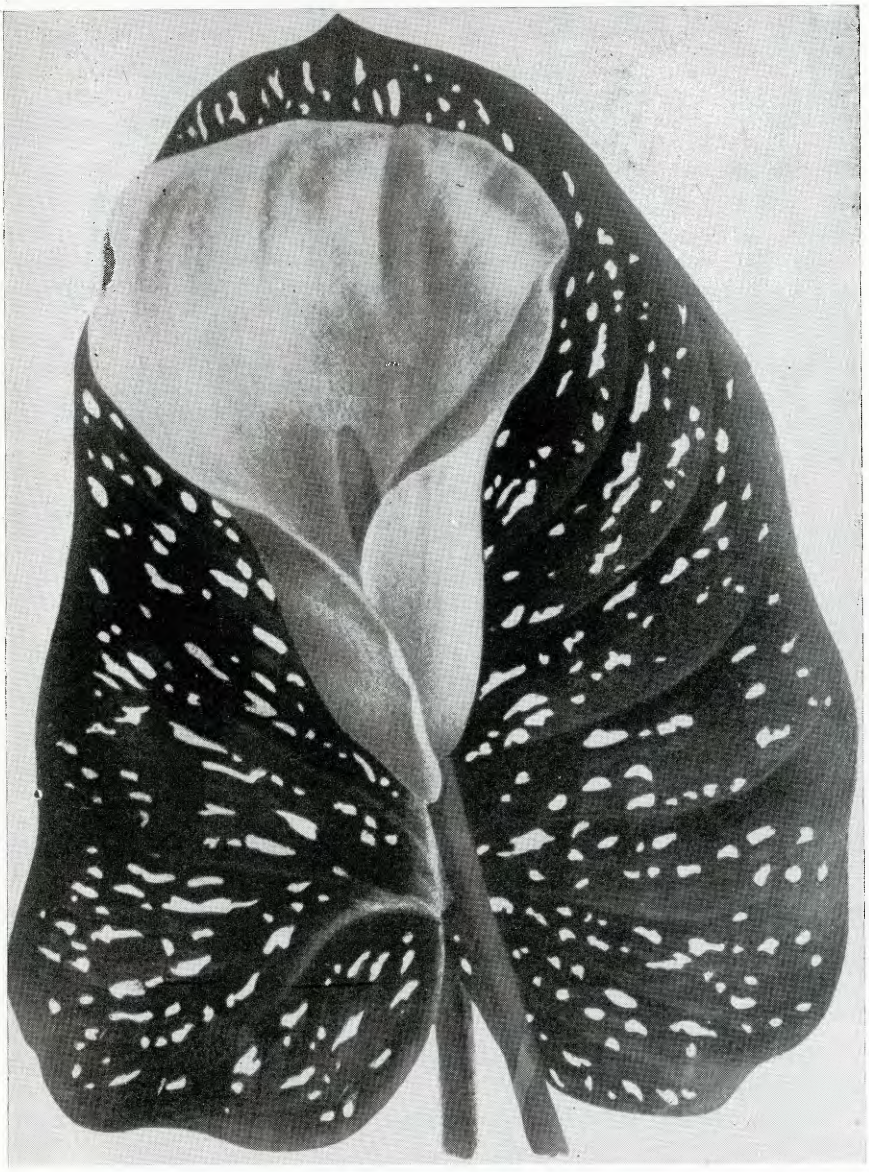
RANGE.—South Africa, Basutoland, Transvaal and Natal.

NOTES.—N. E. Brown (Flora Trop. Afr. 8: 169. 1902) states, "The difference of the overlapping basal lobes of the leaf, and the presence of bristles on the petiole, by which I originally distinguished *R. Lutwychei* from *R. hastata,* I find to be inconstant; with regard to the bristles on the petiole of *R. hastata* they are either sometimes absent, or disappear in the process of drying."

Lindley (1859) first described this species under the provisional name *"Calla? oculata"* from specimens received by Messrs. Veitch & Co., from Natal in 1857.

5. ZANTEDESCHIA ELLIOTTIANA (Knight ex Watson) Engler, in Engl. Pflanzenr., Arac.—Anuiod., etc., 18. 1915; Burtt Davy, Kew Bull., Misc. Inf., 234. 1924. [Plate 6]

SYN.—*Calla Elliottiana* Knight ex W. Watson, Gard. Chron. 12: 123. 1892; Garden & Forest, 5: 330. 1892; *Richardia Elliottiana* (Knight



*Zantedeschia Elliottiana* (Knight ex W. Watson) Engl.

THE GOLDEN AROID LILY. The first illustration of this species, reproduced from Rev. Hort. Belg. 23: Plate facing page 13. 1897.

Plate 6

ex W. Watson) Mottet, Rev. Hort. 67: 38. 1895; E. de Duren, Rev. Hort. Belg. 23: 13 cum tab. 1897; Hook. f., Bot. Mag. Lond., pl. 7577. 1898; N. E. Brown, Flora Trop. Afr. 8: 167—168. 1901; *Richardia Rossii* Chalwin, Gard. Chron. 21: 259. 1897, et 21: 58, 243. 1897.

DESCRIPTION.—GOLDEN AROID LILY. Leaves glabrous; petiole 3 dm. or more long, smooth, without bristles; blade bright green, marked with numerous transparent white elongated spots, 2.3—2.8 dm. long, 1.5—2.5 dm. broad, ovate or orbicular-ovate, obtuse, with a subulate point at apex, cordate at base; basal lobes very broadly rounded; sinus about 5 cm. deep; peduncle longer than the leaves, smooth, green; spathe 1.3—1.5 dm. long, bright golden-yellow, without a purple blotch at the base within; tube funnel-shaped; limb oblique, subhorizontally spreading, obtuse, with a subulate point; spadix about half as long as the spathe, cylindric, obtuse; ovaries subglobose, angular from mutual pressure, pale-greenish; stigma sessile, discoid; staminodes none; anthers orange-yellow; berries large, about 1.9 cm. in diam., obovoid or subglobose, green.

RANGE.—Tropical Transvaal.

NOTES.—According to W. Watson (1892), this species was named in honor of Capt. Elliott, of Farnboro Park, Hampshire.

According to Burtt Davy (1924), *Zantedeschia Elliottiana* "differs from *Z. angustiloba,* the other golden-spotted species, in its much larger size, broad spotted leaves more deeply cordate at the base, the smooth surface of the limb of the spathe within, and the absence of purple coloring at its base; also in the large ovaries and sessile stigma."

The proposed species, *Richardia Rossii* Chalwin—incompletely described in Gard. Chron. 21: 58. 1897,—"plants with broad leaves set on rather short petioles, regularly spotted over the entire surface of the blade. Spathes as high or higher than the leaves"—apparently is not even a distinctive variety of *R. Elliottiana* but may be a free-flowering form of it with spathes of "brightest shade of yellow" as indicated by Donald Ross. The W. L. Lewis Co., (Gard. Chron. 21: 259. 1897) indicated that it would "put this matter straight within a few months, when the plants will be blooming [in England]," but examination of the indices of vols. 22, 23 and 24 did not reveal any further reports. It is assumed that the W. L. Lewis Co., itself was convinced that *R. Rossii* is synonymous with *Z. Elliottiana.*

6. ZANTEDESCHIA MELANOLEUCA (Hook. f.) Engl., Bot. Jahrb. 4:64. 1883. [Plate 7]

SYN.—*Richardia melanoleuca* Hook. f., Bot. Mag. Lond., pl. 5765. 1869; N. E. Brown, Flora Capensis, 7: 38. 1897.

DESCRIPTION.—NATAL AROID LILY. Petiole with soft bristles on the lower part; blade 1.3—2 dm. long, 6.4—15 cm. broad across the basal lobes, deltoid or ovate-deltoid, acute, with a subulate point, hastate or sagittate at the base, with an open sinus, the part above the basal lobes usually much less than twice as long as broad, green, with numerous semi-transparent white spots; spathe 5—7.6 cm. long, obliquely subtrun-


*Zantedeschia melanoleuca* (Hook. f.) Engl.

The type illustration, reproduced from Bot. Mag. Lond., Plate 5765. 1869.

Plate 7

cate at the mouth, light yellow or greenish-yellow, with a dark purple-brown blotch at the base inside; spadix shortly stipitate, cylindric; ovaries with scarcely any style, pale greenish; stigma subsessile; staminodia none; anthers yellow. (Note also two varieties below—*tropicalis* and *concolor.)*

RANGE.—Natal.

NOTES—According to Hooker. f. (1869) this species was "imported by Mr. Bull, of Chelsea, from Africa, and was flowered in his establishment in the autumn of 1868."

6a. **Zantedeschia melanoleuca** (Hook. f.) Engl., **var. tropicalis** (N. E. Brown) Traub **comb. nov.**

SYN.—*Richardia melanoleuca* Hook. f., var. *tropicalis* N. E. Brown, Flora Trop. Afr. 8: 168. 1901.

DESCRIPTION.—Leaves glabrous; petiole 2.3—8.6 dm. long, smooth, without the soft bristles at the base that are characteristic of the type; blade 2—3.6 dm. long, 1.2—3.5 dm. broad across the basal lobes, hastate or somewhat sagittate in the smaller leaves, acute, green, marked with transparent white linear spots; basal lobes spreading, obtuse; peduncle longer than the leaves, smooth; spathe 7.6—14 cm. long, lemon-yellow, with a crimson blotch at the base inside; tube funnel-shaped; limb oblique, tapering into a subulate point; spadix shortly stipitate, not half as long as the spathe, cylindric, obtuse; ovary subglobose, green; style .7—1 mm. long; stigma small; staminodes none, or confined to a very few of the uppermost female flowers.

RANGE.—Nyassaland.

NOTES.—According to N. E. Brown (1901) "In the young state the leaves of this variety are elongate-ovate, acute, cordate-sagittate at the base, and green without any spots, the spots developing with the age of the plant." He also states that "This differs from the typical South African form by its larger size, and by the absence of the soft bristles at the base of the petioles so characteristic of the Natal plant. The stigma is not always subsessile in the typical *melanoleuca* Hook. f., as I had previously described, some specimens having a distinct style about .6 mm. long."

6b. ZANTEDESCHIA MELANOLEUCA (Hook. f.) Engl., var. CONCOLOR Burtt Davy, Kew Bull. Misc. Inf., 233. 1924.

DESCRIPTION.—Differs from the type in having fewer, smaller and more irregular white spots on the leaf-blades, and in the absence of the purple blotch at the base inside the spathe.

RANGE.—South Africa.

NOTES.—According to Burtt Davy (1924) this is apparently not a hybrid, since van Tubergen reports that it reproduces true from seeds, and is deciduous, losing its leaves in autumn.

7. ZANTEDESCHIA SPRENGERI (Comes) Burtt Davy, Kew Bull. Misc. Inf. 234. 1924.

SYN.—*Richardia Sprengeri* Comes, in Atti Inst. Incorazz., Napoli, ser. 5, vol. 3, no. 7, pl. col., 1902; fide Terracciano, in Bot. Centralbl. 89: 660. 1902; N. E. Brown, Gard. Chron., 31: 349. 1901; 32: 350. 1902.

DESCRIPTION.—TRANSVAAL AROID LILY. Petiole 1.5—1.8 dm. long, smooth, without bristles at the base; blade 2—2.3 dm. long, 7.5—8.5 cm. broad, oblong, acute at the apex, truncate (not hastate nor cordate) at the base, green, marked with semi-transparent white spots, and sometimes varigated as well with white; peduncle 3—3.5 dm. tall, smooth, glabrous; spathe broadly funnel-shaped, bright clear yellow, varying to sulphur-yellow or white, or sometimes spotted; when flattened out measuring 1—1.1 dm. long, exclusive of the 1.2—1.8 cm. long subulate cusp, and 12.5—13 cm. in breadth, somewhat transversely rhomboid-ovate or rhomboid-orbicular in outline; spadix shortly stipitate, not half as long as the spathe; ovaries without neuter organs mingled with them, somewhat 4-angled, with sinuous sides as viewed from above, flattened at top; stigma sessile.

RANGE.—Transvaal.

NOTES.—Named for Carl Sprenger of Naples, who imported it in 1898. Burtt Davy (1924) observes, "It is one of the yellow-flowered group, 'rivaling *R. Pentlandii* and *R. Elliottiana*' in color, and has equally large if not larger spathes, differing from these and all other species in the form of the leaves and the broader, funnel-shaped, or somewhat trumpet-mouthed spathes, which when flattened out, are broader than those of any other species."

The Italian periodical "ATTI INST. INCORAZZ., NAPOLI," is not available in America, and it was therefore not possible to include a reproduction of the plate showing *Z. Sprengeri* that appeared in that publication in 1902. It is hoped that our Italian friends will furnish a set of this rare periodical for one of the research libraries in America so that it will be available for microfilm copying.

8. ZANTEDESCHIA REHMANNII Engler, Bot. Jahrb. 4: 63. 1883; *Z. Stehmannii*, (sphalm.) Sprenger, Wien., Ill. Gart. Zeit. 415. 1901. [Plate 4, A—D, and Figure 2]

SYN.—*Richardia Rehmannii* (Engler) W. Harrow ex N. E. Brown, in Gard. Chron. 14: 659. 1893; N. E. Brown, Flora Capensis, 7: 36—37. 1897; *R. Lehmannii* (sphalm.), N. E. Brown ex E. H. Krelage, Gard. Chron. 14: 564, fig. 94. 1893; *R. Rehmannii* (Anon.), Gard. Chron. 14: 658. 1893; (Anon.), Gard. Chron. 14: 770. 1893; E. H. Krelage, Gartenfl. 43: 12—14, abt. 7, p. 15. 1894; Mottet, Rev. Hort. 67: 38. 1895; *Richardia Rehmanniana* (sphalm.), Hook. f., Bot. Mag. Lond., sub pl. 7397. 1896; *Richardia Stehmannii* (sphalm.), Sprenger, Wien., Ill. Gart. Zeit. 415. 1901; *Richardia nilotica* W. Watson, Garden & Forest, 5: 618. 1892; Flora Trop. Afr. 8: 169. 1902.

DESCRIPTION.—RED AROID LILY. Petiole smooth, without bristles; blade of the leaf 1.9—3.8 dm. long, 2.5—5 cm. broad, lanceolate, acuminate, subulate at the apex, cuneate at the base, of an uniform green, or marked with short, linear, semi-transparent white spots; spathe

7.6—11.3 cm. long; limb oblique, more or less recurved, light rosy-purple, darker but not blotched at base within, or white or greenish-white to the base within, with rosy-tinted margins; spadix not half as long as the spathe, stipitate, cylindric; ovaries with very short, stout styles; anthers yellow; fruits obovoid or depresso-obtuse, 1-2-loculate, 6 mm. long, 5-8 mm. thick, locules 1-seeded; seeds about 5 mm. long.

RANGE.—Natal, dry or stony hills.

NOTES.—This species was named for Rehmann, German missionary and plant collector in the Transvaal from 1875 to 1888. The type description was based on specimens that included the leaves and mature inflorescence with fruits. Engler indicated that the leaves were lanceolate and the fruits 1- or 2-celled with one seed per cell. On the basis of the latter character particularly he suggested the provisional subgenus *Oligosperma* to accommodate the species. His suggestion was not apparently acceptable.

Bailey (Stand. Cyclo. Hort. 3: 3536. 1939) lists "forma *speciosa*" which is described as dwarfer and more robust than the type.

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HORTICULTURAL SELECTIONS. The following is an incomplete listing of cultivated selections of *Z. Rehmannii*.

(a) ZANTEDESCHIA REHMANNII c. CALIFORNIA PINK, *nom. nov.*

SYN.—"Dark rose pink variety," Houdyshel, Bulbs for Pots (Catalog), Fall, 1947. La Verne, Calif., 1947, p. 27.

DESCR.—Spathe dark rose pink.

(b) ZANTEDESCHIA REHMANNII c. CARMINE QUEEN, *nom. nov.*

SYN.—*Richardia Rehmannii* var. *carminea*, van Tubergen, Autumn 1946—Spring 1947 Cat., 1946, p. 24.

DESCR.—Spathe carmine red.

(c) ZANTEDESCHIA REHMANNII c. PINK LADY, *nom. nov.*

SYN.—*Zantedeschia Rehmannii* var. *elegans* Hort., in Houdyshel, Bulbs for Pots (Catalog). Fall, 1946, La Verne, Calif., p. 31.

DESCR.—Light pink spathes "of a lovely shade that many like better than the darker colored type. It is a taller and better grower, is easier to force in pots, but when forced many report that the flowers are white. Even in the gardens some flowers are white with shell pink tintings. But the white ones are still lovely, more so than the white *aethiopica.*"

(d) ZANTEDESCHIA REHMANNII c. STRAWBERRY RED Mirzwick.

DESCR.—Plant larger than in the type, up to 6 dm. tall; leaves more numerous per single corm which produces from 4 to 6 flowers; spathe dark strawberry red in color.

NOTES.—This clone was apparently introduced by Len Mirzwick.

(e) ZANTEDESCHIA REHMANNII c. AUSTRALIAN BEAUTY, *nom. nov.*, Montague, Cat. 2nd Sp. ed., p. 53.

DESCR.—Larger and deeper colored than the type.

(f) ZANTEDESCHIA REHMANNII c. VIOLET QUEEN, *nom. nov.*, Montague, Cat. 2nd Sp. ed., p. 53.

DESCR.—Violet red shade.

Figure 2. THE RED AROID LILY. *Zantedeschia Rehmannii* Engl. The first illustration of this species; reproduced from Gardeners' Chronicle, 14: Fig. 94. 1893. See also Plate 4, for Engler's later illustration, and morphological details.

## **Zantedeschia** Hybrids and Forms of Unknown Origin

This section is devoted to the available information on (a) artificial hybrids between various *Zantedeschia* species, and (b) various forms of unknown origin. No claim is made for an exhaustive treatment, but the information available to the writer is briefly summarized.

The nomenclature used is in conformity with the International Rules. For each combination of species, representing reciprocal crosses, a single binomial, the first one validly published, is recognized (Art. 31), and any selected cultivated forms are given fancy epithets (names) under this binomial (Art. 34).

Examples:

(1) Hybrids (unselected): *Z. melanoleuca* x *Z. Rehmannii* = *xZantedeschia cantabrigiensis* Lynch ex Engler
Hybrids (selected): *xZantedeschia cantabrigiensis* c. MRS. ROOSEVELT *xZantedeschia* c. SOLFATARE

(2) Forms of unknown origin: *Zantedeschia Nelsonii* Smith & Bailey *Zantedeschia* c. NEW CREAM Hort. ex Mirzwick

It should be noted that there are no reported hybrids between *Z. aethiopica*, with a ramifying rootstock and not requiring a complete resting period, and the rest of the species of the genus, with compact corms and requiring a complete resting period. The writer has attempted such crosses. Although seeds developed they did not germinate and eventually rotted. The attempts however are being continued. There may be a distinct gap from the standpoint of gene exchange. It will be of interest to hear from other breeders. Crosses within the compact form group apparently can be readily made as shown by the reported results, which have been verified by the writer.

## (A.) **Z. albomoculata** x **hastata**

### (a) **xZantedeschia aurata** (Deleuil ex W. Watson) Traub, **comb. nov.**

SYN.—*Richardia aurata* Deleuil ex W. Watson, Garden & Forest, 5: 617—618. 1892; Rev. Hort. p. 27. 1893; Mottet, Rev. Hort. 67: 38. 1895 (err. *R. curata*); Weathers, Bulb Book, 406—407. 1911.

DESCR.—*xZ. albomaculata* x *hastata;* plant 6 dm. tall, with white-spotted, hastate leaf blades, and well developed spathes of a beautiful chrome-yellow color.

NOTES.—According to W. Watson (1892), this hybrid was produced by J. B. M. Deleuil, Marseilles, France.

## (B.) **Z. albomaculata** x **Elliottiana**

(a) xZANTEDESCHIA LATHAMIANA Hort., ex Smith & Bailey, Stand. Cyclo. Hort. 1939; et R. Irwin Lynch, Gard. Chron. 35: 226. 1904.

DESCR.—*xZ. albomaculata* x *Elliottiana;* no description available.

NOTES.—Reported without a name by R. Irwin Lynch (1904) as flowering for the first time in 1903 for Mr. W. B. Latham, then of the Birmingham Botanic Garden; the name *Zantedeschia Lathamiana* apparently was given by Smith & Bailey, but without a description.

## (C.) Z. [Z.albomaculata x hastata]× Z. Elliottiana

### (a) xZantedeschia Taylori (Lynch) Traub, comb. nov.

Syn.—*Richardia Taylori* Lynch, in Gard. Chron. 35: 226. 1904; Bailey, Stand. Cyclo. Hort. 1939.

Descr.—*xZ. aurata* x *Z. Elliottiana;* no description available.

Notes.—According to Lynch (1904), this hybrid was first raised by Messrs. Clibran & Sons.

## (D.) Z. melanoleuca × Rehmannii

(a) xZantedeschia cantabrigiensis Lynch ex Engler, Lynch, in Gard. Chron. 35: 226. 1904; et Engler, Pflanzenr. 4(23 Dc.): 69. 1915.

Syn.—*Richardia cantabrigiensis* R. Irwin Lynch, in Gard. Chron. 35: 226. 1904.

Descr.—*CAMBRIDGE AROID LILY.* Reciprocal crosses: *Z. melanoleuca* x *Rehmannii;* Leaves intermediate between *Z. melanoleuca* (type) and *Z. Rehmannii* (type), and with little or nothing of the hispidity of *Z. melanoleuca;* spathe half open, ivory white flushed with pink; slightly pink on the inside, but deeper on the outside, with a splendid dark blotch at the base inside.

Notes.—These reciprocal crosses which were made by R. Irwin Lynch (1904), of the Cambridge Botanic Garden, England, "appear to be identical, and besides having an elegant shape, conferred by *R. melanoleuca,* appear to possess an important point of interest in the fact that the slight tendency (in England) of the spathe in *Rehmannii* to be pink is greatly intensified. This species has been called the pink *Richardia,* but an African sun is apparently necessary to bring out the color; while in these hybrids, under conditions which induce no trace of colour in *R. Rehmannii,* the pink colour is very clearly in evidence, slight perhaps on the inside of the spathe, but more deeply on the outside. It may be said that they are ivory-white flushed with pink. . . . As in *R. melanoleuca,* these hybrids have a splendid dark "eye," and in this particular they are governed by that parent, whichever way the cross is made, *R. Rehmannii* having no trace of it. The leaves in outline and general character are nearly intermediate; and stalks are colored much as in *R. melanoleuca,* but have little or nothing of the hispidity characteristic of that species. Small Richardias, especially those, I think, with half open spathe like *R. melanoleuca* and these hybrids, are especially good for cutting. One of these hybrids and the parent made, with slight additions, an exceedingly elegant arrangement in a silver vase in the Queen's Room at the Fitzwilliam Museum on the occasion of the recent Royal visit to Cambridge, when the new schools and other buildings were opened by the King. . . . An object in crossing Richardias should be to obtain a free-flowering habit in combination with the brilliant qualities in color of such fine plants as *R. Pentlandii.*"

(b) xZANTEDESCHIA CANTABRIGIENSIS c. MRS. ROOSEVELT. Gard. Chron. ex Engler, Pflanzenr. 4: (23 Dc.): 69. 1915.

DESCR.—Cross: *Z. melanoleuca* x *Rehmannii* forma *violacea;* leaf blade somewhat spotted in the middle; spathe tinged with violet above the violet base.

### (E.) **Z. Elliottiana** x **Rehmannii**

#### (a) **xZantedeschia Ragionieri** Traub, **nom. nov.**

SYN.—*xR. Elliottiana* x *R. Rehmannii,* Bois, in Rev. Hort. 9: 349. 1909; *xZ. Elliottiana* x *Z. Rehmannii,* Engler, Pflanzenr. 4(23 Dc.): 69. 1915.

DESCR.—RAGIONIERI AROID LILY. Cross: *Z. Elliottiana* x *Rehmannii;* no description of the progeny available except for the selected horticultural form described below.

NOTES.—These hybrids were made by the late Dr. A. Ragionieri at Firenze, Italy.

#### (b) **xZantedeschia Ragionieri** c. **Madame Fosca Ragionieri,** Traub, **comb. nov.**

SYN.—*Richardia* MADAME FOSCA RAGIONIERI, Bois, in Rev. Hort. 9: 349. 1909; Engler, Pflanzenr. 4(23 Dc.): 69. 1915.

DESCR.—Leaf blade blackish-green, marked by elongate white spots, subtriangular, 4.5 dm. long, 2 dm. broad, thick-ribbed; immature spathe pinkish-violaceous, when mature, 12 cm. long, 6 cm. broad, the lower third of trumpet greenish, white above the blade, veins tinged with pinkish-violet, pale tawny within, slightly tinged with pinkish-violet on the margin. Differs from typical Zantedeschias in that the spathe is emarginate below the upper third and so is three-lobed.

NOTES.—This is a named selection of *xZantedeschia Regionieri.*

### (F.) **Zantedeschia** Hybrids of Unknown Parentage

(a) xZANTEDESCHIA c. SOLFATARE (van Tubergen) Traub, *comb. nov.*

SYN.—*Richardia* c. SOLFATARE C. G. van Tubergen, Autumn 1946—Spring 1947 Cat., 1946, p. 24; Montague, Cat. 2nd Sp. ed., p. 53.

DESCR.—Hybrid, origin not indicated; spathe large, sulfur yellow.

(b) xZANTEDESCHIA c. CYNTHIA (van Tubergen) Traub, *nom. nov.*

SYN.—*Richardia pallida* C. G. van Tubergen, Autumn 1946—Spring 1947, Cat. 1946, p. 24.

DESCR.—Hybrid, origin not indicated; spathe large, pale yellow with violet central blotch.

### (G.) **Zantedeschia** Forms of Unknown Origin

(a) RICHARDIA INTERMEDIA Hort., Smith & Bailey, Stand. Cyclo. Hort. 3; 1939.

Syn.—Very free flowering; leaf stalks bright green, marbled with white and rose; spathe very dark yellow, with small black blotch at the base.

(b) Richardia Adlamii Hort., Leichtlin ex Bailey, Cyclo. Hort. 3: 3536. 1939.

Descr.—Strong-growing, with leaves saggitate, bright green, and somewhat exceeding the scape; spathe short and rather open, creamy white with a black or purple throat. Trop. Afr.?

Notes.—According to Bailey (1939) this was distributed by Max Leichtlin (Germany) in 1898, and that there are hybrids of this and *Z. Elliottiana.*

(c) Richardia suffusa E. Hill, The Garden 55: 317. 1899.

Descr.—A distinct dwarf-habited plant with a creamy-white spathe, the base in the inside of a rich violet-purple shade. It is apparently a plant of good constitution. From Lord Rothschild, Twing Park; gardener, Mr. E. Hill.

(d) Zantedeschia Nelsonii Smith ex Bailey, in Stand. Cyclo. Hort., 6:3536. 1939.

Syn.—*Richardia Nelsonii* J. G. Smith, Cyclo. Amer. Hort. p. 1534; Montague, Cat. 2nd Sp. ed., p. 53.

Descr.—Allied to *Z. albomaculata;* very vigorous and floriferous, reaching 9—12 dm., in height; scape overtopping the foliage; leaves saggitate, bright green, sprinkled with pellucid dots or spots, as in *Z. Elliottiana;* spathe scarcely spreading, the limb short, very pale yellow, with a purple blotch at the bottom.

Range.—Unknown.

Notes.—In southern California, according to Bailey (1939), this species blooms only in summer, after *Z. Elliottiana* is past. Mirzwick, in the present issue of Plant Life, indicates the flowering season as from May to July.

This may be a variety of *Z. albomaculata,* but the subject needs further study before a definite disposition can be made.

(e) Zantedeschia c. New Cream Hort. ex Mirzwick.

Descr.—Plant robust in growth; blooms from June to July; spathe rich cream color, with slight dark blotch in throat.

Notes.—Mirzwick considers this a sport of *Z. albomaculata.*

(f) Zantedeschia c.Lemon Cream Hort. ex Mirzwick.

Descr.—Plant robust, leaves arrow-shaped, sprinkled with pellucid dots throughout; spathe large, widely flaring, and tip recurved, soft lemon yellow in color, and with slight dark blotch inside at base; flowering season from June to August.

Notes.—Mirzwick does not indicate the origin of this plant.

(g) ZANTEDESCHIA c. PURPLE HEART Hort. ex Farmer Seed & Nursery Co., Cat. Faribault, Minn., p. 42. 1948.

DESCR. —Leaves deep green, with white translucent spots; spathe pale creamy-yellow, with intense purple blotch in the throat.

NOTES.—Origin not indicated.

(h) ZANTEDESCHIA c. ALDA MI, Montague, Cat. 2nd Sp. ed., p. 53.

DESCR.—Cream with large violet blotch in throat.

(i) ZANTEDESCHIA c. CHROMATELLA, Montague, Cat. 2nd. Sp. ed., p. 53.

DESCR.—Yellow, with large violet blotch in throat.

(j) ZANTEDESCHIA c. GOLDEN GLORY, Montague, Cat. 2nd Sp. ed., p. 53.

DESCR.—Deep golden yellow, with black velvety blotch in throat.

## EXCLUDED SPECIES

*Calla occulta* Lour., Fl. Cochinch., 2: 532. = *Homalomena aromatica.*
*Zantedeschia aromatica* Sprengel, Syst., 3: 765. = *Homalomena aromatica*
*Zantedeschia asperata* C. Koch, in Ind. Sem. Hort. Berol. 1853, App. 5. = *Philodendron asperatum.*
*Zantedeschia occulta* Sprengel, Syst., 3: 765. = *Homalomena aromatica.*

[GENUS ZANTEDESCHIA— INDEX TO GENERA AND SPECIES— turn to page 47.]

# ZANTEDESCHIAS FROM FRENCH EQUATORIAL AFRICA

A. A. LONGMIRE, *California*

Recently the writer has received from Africa the rare PRIDE OF THE CONGO, *Zantedeschia hastata* (Hook. f.) Engl. (syn.— *Z. oculata* (Lindl.) Engl.), which he has attempted to obtain for many years. The corms came to him from Bongolo Mouila Gabon, French Equatorial Africa from a location inhabited by a pygmy tribe of negroes, and were sent by a missionary who had spent 20 years along the Congo River with these people.

The package received contained three species, perhaps all belonging to the genus *Zantedeschia*, and was three months in transit. On arrival the corms had started into growth. They were placed in large pots, using a sand-gravel mixture as a potting medium. To insure against loss, the plants will be grown under glass.

The missionary writes that the pygmies eat the roasted corms, and that the elephants are also fond of the corms, "tusking" them out of the ground for food.

# THE AROID LILY (**ZANTEDESCHIA**) IN AUSTRALIA

FRED M. DANKS, *Australia*

Just what we in the isolated spaces of this Island Continent can offer in improved Zantedeschias or AROID LILIES is a question that only can be answered by the interchange of information, but in the comparison of conditions alone something can be learned, and there is the question of reversal of seasons to take into account. It may be possible to gain an advantage from this in breeding by having forcing stock from the opposite hemisphere to bring into flower when pollen is needed.

So far as varieties are concerned, the species are relatively fixed, but among the hybrids it may be that the range we have has something different to offer, and an exchange of seeds might help.

Some breeding has been done already mostly in the way of increasing stocks, and the better types have been isolated, but in addition some regulated crosses are being handled and in due time something good will show. New Zealand claims "Whiteley Hybrids," but the origin seems obscure, and Chandler of Tecoma raised a number of varieties some years ago. Gilbert Errey of Lilydale too had some of the larger pinks. A. S. Goen of Bluff Hussary Loorabbas has a good range.

More progress can be expected for the growing conditions are as favorable as in the best of the Californian areas. The problem is to grow thousands of corms in a small area. There is here a good market for blooms and corms.

Here seeds can be sown as soon as the frosts are over—in early September—and the seedlings form handy size "buttons" the first year in good soil, and give full flowering corms the next year.

The reversal of seasons is quite another matter and might be worthy of a trial. Corms are available to any who are interested. The normal season of flowering is in January and February here, and it would seem that the corms ripen here should respond the same in the Northern Hemisphere in winter if given suitable growing conditions. Someone in England has tried out the idea and has paid a high figure with air transport—seemingly not necessary—into the bargain. Even as a source of supply, the stocks here are relatively low in cost in comparison with European grown corms. Such out of season blooming should be welcomed by florists. If carefully packed, the corms should travel well, but import permits will be necessary. Corms are ready in June and July, and seeds just a month or two earlier.

# THE **ZANTEDESCHIA** (CALLA) INDUSTRY IN CALIFORNIA

H. M. BUTTERFIELD, *Agriculturist.*
*Agricultural Extension Service,*
*University of California, Berkeley*

*Zantedeschia* (CALLA LILY or AROID LILY) is grown extensively in California, both in home gardens and commercially. A survey made of the bulb industry in California several years ago showed that Santa Cruz County had 2,195,650 yellow callas *(Zantedeschia Elliottiana),* 1,411,-425 white callas *(Zantedeschia aethiopica),* 35,000 "albomaculata" callas *(Zantedeschia albomaculata),* and 16,000 black callas (possibly *Arum palaestinum).*

The yellow calla has been the leading commercial variety grown in California and is prized more than any other variety, being planted mostly as a pot plant by those who buy the field grown bulbs. Flowering potted plants are sold by many florists. The roots or corms are treated much like a true bulb and must have good drainage to escape root troubles.

*Zantedeschia albomaculata* has either creamy yellow or milk-white flowers with a blotch of crimson at the base. The leaves are spotted with white like those of the yellow calla. Judging from the number of field-grown corms, this species is also popular.

White callas are available in different forms or varieties. Minor or LITTLE GEM is one of the dwarf varieties grown. GODFREY is another dwarf variety. Such dwarf kinds may grow to good size under favorable field conditions but when confined to a small pot they produce the smallest flowers. If planted in good soil in the garden, these dwarf kinds are often disappointing because they are not sufficiently dwarf and the flowers are too large. A very large white calla, known as var. *grandiflora* has been grown occasionally. Sometimes a double or hose-in-hose form is reported but is never common.

The common white calla was brought to California with the first American nurserymen and was listed by Col. Warren of Sacramento in 1853. From that time on the calla has been a common door-yard plant in many home gardens near the coast where freezing weather is absent in winter. The reason why callas have been grown so extensively in California may be attributed to mild weather in both winter and summer and to the dry summers which permit good drainage in most soils. Continued wet weather or excessive irrigation has caused serious damage to commercial plantings.

The pink or rose calla, *Zantedeschia Rehmannii,* should be mentioned, although it is relatively unimportant under field conditions. It is limited almost entirely to greenhouse culture and is often used as a potted plant.

The black calla *(Arum palaestinum)* grows well outside in the coastal area of California under the same soil and climatic conditions where

white callas grow. The flowering season is early. This species has been imported into California many times in earlier years. One such importation came in from England about 1880 but similar importations are reported. The dark colored flowers appear in late winter or early spring and do not last very long. They have a musty wine odor but are not offensive like *Helicodiceros muscivorus* flowers or flowers of *Dracunculus vulgaris (Arum dracunculus)*. Still another related plant is *Arum italicum,* often seen in California gardens where the white veined green leaves and greenish flowers appear more or less unnoticed but the plants are enjoyed primarily for the yellow seed clusters that develop later in the year after the leaves have died down. *Amorphophallus Titanum* from Sumatra has been called the largest flower in the world and belongs to the Arum Family. A corm of 113½ pounds and spathe of 4 feet across was reported from the New York Botanical Garden in 1937. *Hyrosome Rivieri (Amorphophallus Rivieri)* has been planted only occasionally in California gardens and has no promise as a commercial crop. Still other related genera may be classed as oddities without much horticultural value.

Commercial growers of callas have to contend with root rot due to the fungus, *Phytophthora richardiae,* confined to the white callas. Starting with healthy plants is important in avoiding this trouble. Soft rot, due to *Erwinia arpideae,* has not yet been serious in California. Chalk rot often injures the roots. Leaf Spot, caused by the fungus *Phyllosticta richardae,* has occasionally been serious in the coastal area of California. Good drainage and starting with healthy planting stock on new ground will usually avoid most of these troubles.

The future of the calla industry in California will depend mostly on demand and prices. No adequate recent figures are available to show the total acreage of callas in leading counties nor the total value per acre. We might look at the acreage of callas in San Mateo County in 1945 when 57 acres were reported and were valued at $117,119. This is at the rate of more than $2,000 gross value per acre, which might seem to indicate great promise for commercial growers. The sale of the "bulbs" will doubtless continue to be the primary outlet. No doubt some callas are being shipped to eastern florists but the amount is not large. California growers can produce any amount of calla corms or cut flowers that buyers will take at a good price. The cost of irrigation and hired labor will continue to be high and most growers will study carefully to see which crop leaves the best margin of profit. Callas may not be as profitable to the grower as some other crops that do well on the same land. As long as demand is limited the grower will continue to give most of his attention to other flower crops and vegetables which do offer a good income per acre.

# THE **ZANTEDESCHIA** (Calla) INDUSTRY IN FLORIDA

WYNDHAM HAYWARD, *Florida*

The memory of even the oldest old timers runneth not to the contrary when some forms of the white calla *(Z. aethiopica)* were not grown in Central Florida gardens. At present CALLA LILIES are one of the commonest water-side plants, and are also cultivated for winter bloom in pots, urns, tubs, beds, bog gardens and other similar places in all parts of the Sunshine State.

Only in those sections providing an abundance of rich, moist mucky soil, which can be raised into beds for a certain amount of drainage, has the commercial culture of the white CALLA LILY arrived at a major importance. This situation prevails over the Central part of the state, in the lake and low hammock country, with Orlando as a central point.

Even veteran horticulturists of the State Experiment Station do not recall when callas were introduced into Florida. The late Henry Nehrling, in his work "My Garden in Florida," Vol. 1, writes that a "Mr. Bunek" at Eustis, years before, grew the white calla *(Z.aethiopica)* "permanently in a mucky, shallow pond with much success." Once established the plants can stand water a few inches deep over them for weeks at a time.

In ordinary Florida garden and commercial culture, the variety of *Z. aethiopica* commonly planted is the semi-dwarf type known as the GODFREY. This is intermediate between the large-flowered type, and the variety known as LITTLE GEM of BABY CALLA, which seldom gets more than a foot tall. The GODFREY grows to two and a half or three feet tall, and sometimes more in shady places. The larger variety or common *Z.aethiopica* will grow nearly twice as tall as the GODFREY, under the most favorable conditions. In the usual muck bed commercial plantings in Florida the GODFREY calla grows between two and three feet tall. The handsome white spathes top the graceful arrow-shaped leaves by a few inches at their optimum growth.

The GOLDEN CALLA, *Z.Elliottiana,* has been grown in Florida for thirty years at least, but not commercially for the propagation of the bulbs. Tubers are imported from California to grow in garden beds or as pot plants by home horticulturists or florists. The pink calla, *Z.Rehmanni* and its varieties have been tried in Florida for 10 or 12 years and every season a few pots of this are seen as novelties at the flower shows in spring, but as in the case of the GOLDEN CALLA, the bulbs are difficult to "hold over" in the summer, with any success. They are subject to various rots, decays, and also the root-knot nematode is damaging to them in sandy loam soils, where this pest is present

The white callas are also subject to damage by the root-knot nematode in Florida in sandy soils, but this pest is not usually a serious problem with the heavy types of mucky soils where the callas are usually grown. The root-knot nematode does not thrive in such heavy, moist soils.

There is a large occurrence of rot among the white calla rhizomes when dug and stored every summer, as is the custom in large plantings. In some cases the loss may be 30 to 50 per cent or more among the bulbs dug and stored in ventilated sheds, due to the hot, humid weather which prevails in Florida in the summer, while the bulbs are supposed to dry out. Possibly the use of a heated dryer such as is used by California growers would help this situation. However, usually the plantings are not large enough to bring about the adoption of such measures of efficiency.

Often GODFREY calla plantings are made along a lake shore, or in a piece of hammock muck land sloping down to a creek or "branch." Often the edges of bay-heads or cypress "bottoms" are utilized. Lake-side locations are more desirable as they offer more protection against frost. Any cold wave bringing temperatures below freezing, even down to 30 or 28 degrees F. for a few hours, will cause a serious loss to any calla planting. A sharp frost may cut down all blooms and buds in a calla planting and severely injure the foliage on plants. In the past 15 years there have been several "freezes" which killed the main Florida calla plantings to the ground. However, the plants have great vitality and "come back" in a few weeks, almost as good as ever.

It is best to cut off and remove foliage damaged by cold after a severe freeze in a calla planting, as the frozen foliage soon decays and the decay may go down the main stem and destroy the main tuber of the plant. This means that the whole corm may become decayed by digging time in early summer, or only a few of the larger offsets may survive.

Operation and maintenance of a successful calla planting requires plenty of hard toil and conscientious attention to detail. Preparation of the "muck patch" from its primeval woods is a heroic task like clearing land for celery plantings in the Florida hammocks. After the soil is broken up and made into beds and all roots removed, the calla rhizomes or corms are planted in rows, 6 inches to a foot apart in the row and the rows 2½ to 3 feet apart on the bed. Some growers run the rows the long way of the beds and some crosswise. It makes no difference except as the ease of cultivation and picking the crop figure in the matter.

The calla beds of rich, damp, mucky soil are made up freshly every summer, and the corms that have survived the drying-off period in the bulb shed trays are re-set. This usually takes place in late August or September. By Christmas, with reasonable rains and a monthly fertilizing with any good vegetable mixture rather heavy in potash (say a 4-5-6) the first flowers will appear. The early blooms are usually inferior and many are defective, but when the plants have gained full foliage, by mid-January, fine blooms appear.

The flowers are picked usually in early morning and late afternoon. In the warm part of the day they are soft and easy to damage in the picking process. When picked they are brought to the packing shed, which may be the grower's back porch, and placed in tall containers of cool water for several hours. Then they are packed in the shipping boxes of corrugated cardboard, one layer over another, and each layer with its

flowers a few inches below the one beneath. When the box has received all the flowers it will hold, the stems are fastened firmly with cleats between the sides, the box is covered, tied and labeled for shipping. From 50 to 150 calla blooms, depending on size, can be packed in a single box, of the usual size, 4 to 5 feet long, 18 to 22 inches wide and 8 to 10 inches deep. These shipping boxes are of the common corrugated cardboard.

Calla lilies packed in this way are shipped by railway express to Jacksonville, Birmingham, Atlanta, and to points in Virginia, the Carolinas and occasionally to places as far away as Chattanooga, Tenn., and Washington, D. C. However, these blooms are not regarded as "carrying well" on longer shipments, as to New York and Chicago. The advent of cheaper air freight rates may change this picture. The express charges on a box of large callas would be a disadvantage to successful shipping to New York and similarly situated large cities in the North, even if this could be done feasibly. For shipping within 500 miles or slightly more the calla is well adapted.

In the Orlando area there are numerous calla farms, mostly side issues for citrus growers, real estate men, horticulturists, florists, etc., of ½ to several acres in extent. Some ship as many as 30,000 calla blooms a season. The individual calla corm of large size may produce as many as five to seven blooms in a season. A small GODFREY calla bulb will bloom at ½ to 1 inch in diameter of the rhizome, but to produce the larger and more desirable flowers, a corm 1 to 2 inches in diameter is required. The large flowers of the *Z.aethiopica* type commonly grown in California are not popular in the Florida trade.

Because of the large losses in rotted rhizomes, the Florida growers seldom have more than enough bulbs at the end of the season to give them their usual expanded planting. In many cases they will have less corms at the end of the season than they had when they started. Sometimes the loss of corms in summer storage is heavy, at other times not serious, but usually there is no surplus of the larger rhizomes, so it is often difficult to obtain corms by purchase, unless cormlets are bought by the bushel.

The Florida Agricultural Experiment Station has studied the problem of the decay of calla rhizomes and has made recommendations for various fungicidal baths and dips for the corms. But the fact remains as much a matter of cultural technique and physiology of the plant as anything, in the opinion of veteran growers. Many of these feel that a calla rhizome, properly fed with adequate potash during the season, and not excessively forced with a high-nitrogen fertilizer, dug when mature, carefully cleaned, and dried in the shade, will stand off decays as well as a dipped bulb which has been given improper culture and careless treatment in digging and drying.

The drying of the corms in storage seems to be a process quite different in the case of the GODFREY calla than in the California type of the large-flowered *Z.aethiopica*. California produces a crop of dried, cured *Z.aethiopica* corms numbering many thousands annually, which are largely sold in the Midwest, North and East for greenhouse calla culture.

Florida produces virtually no calla rhizomes for sale in the florist and bulb trade, either GODFREY or *aethiopica*. The *aethiopica* or large calla type grows well in Florida, but tends to die out in the hot Florida summers and gives more trouble in storage from decays than the GODFREY.

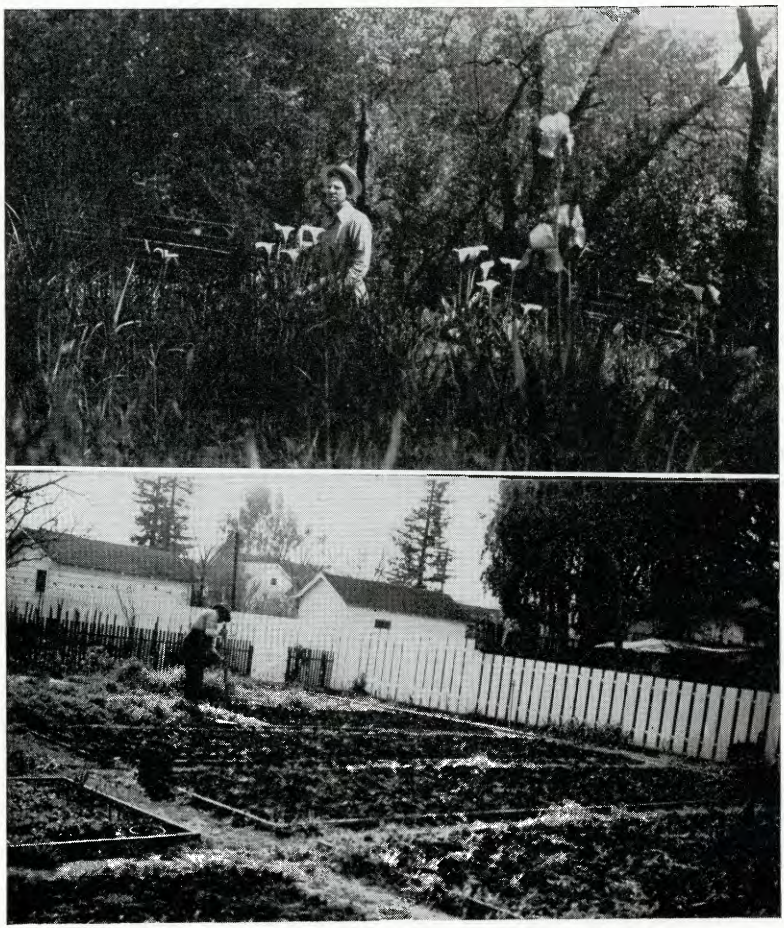
A new planting of the GODFREY calla is usually started from cormlets, which may be purchased in quarts or bushels from growers having a surplus. No Florida grower ever had a surplus of large GODFREY corms to this writer's knowledge, due, as stated, to the heavy loss of the larger size corms in summer storage, no matter what treatment is given them. The cormlets and small offset corms usually keep much better in storage.

Some growers wash off the muck around the calla rhizome at digging time in June or July. Others leave the corms in a clump of muck just as dug. They have both good and bad luck in keeping the bulbs during the summer either way. Before replanting in both cases, dried corms, dirt and smaller offsets are removed from the larger ones.

Fertilizing is usually accomplished by simple side-dressing, scratched gently into the top muck. Little weeding is necessary after the first six weeks, as by Christmas time in a well-grown calla patch, the foliage will cover virtually all of the ground. Sometimes a heavy rain on the calla bed shortly after planting, as during a September hurricane, will create a soggy condition which will rot a good part of the unsprouted rhizomes just as they are, freshly planted in the muck. This is one of the hazards of the industry along with frosts.

Some growers protect their planting from frost and cold by burlap sack screening overhead and on the sides. Some use heaters, but a severe freeze will usually create considerable havoc in any calla planting regardless. The advantage of heating facilities lies in the earlier return of plants to full blooming after a cold spell, which may mean considerable profit to the grower if his neighbors' calla plantings were severely damaged.

As an ornamental, the calla will survive for years in a Florida lake-side planting. When not subjected to the high pressure of heavy fertilization, cultivation, digging and storing, it takes its own leisurely time about blooming, but presents a handsome appearance in bloom and out in any reasonably frost-free pool or lake-side planting, even a few inches under water. The GODFREY calla seems to prefer an acid soil.



Upper, part of a collection of various *Araceae* naturalized in the overflow of a huge spring on 300 acre ranch high in hills where Len Mirzwick made his home for 30 years. Note Mr. Mirzwick; tall iris and string pull to camera.

Lower, Len Mizwick's new location for past 4 years on city lot, showing *Zantedeschia* beds.

Plate 8

# ZANTEDESCHIA AND OTHER ARACEAE

LEN MIRZWICK, *California*

Over a period of years in Sonoma County, California, I have grown a number of *Zantedeschia* species, and other Araceae (Plate 8). The Zantedeschias are all native to South Africa and Tropical Africa, but various other *Araceae*, while found mainly in African and South American jungles, range northward to the temperate zone, many being found in Japan, China and India. Some are intensely fragrant while others give off offensive odors to attract insects. A few of these are a sight not-to-be-forgotten when in flower. Many species are used in medicine, mostly for coughs and colds. Some are chewed by natives of tropical islands as an exitant before warring on neighboring islanders, and many are of a poisonous nature. Others are used as foods in various parts of the world.

Among those grown by the writer over the past 15 years are the following:

## ZANTEDESCHIA SPECIES

The *Zantedeschia* species are my chief interest at present, and a number of these are cultivated. The following is a brief statement about each of the species and forms grown.

ZANTEDESCHIA AETHIOPICA. The white CALLA LILY, or IMMACULATE AROID LILY is well represented in my collection, including the type and several forms. (1) The tallest is PEARL VON STUTTGART which is apparently a sport of the type. It attains a height of 7 ft., or more, and has enormous snow white saucer size, widely flaring spathes with prominent recurving tips. The spadix is up to 8 inches long, and the leaves are shiny-green and free from spots. (2) The waxy-white type of *Z. aethiopica* is much desired at Easter time, and is planted in tubs and pots. The leaves are shiny, and the flowers appear from December through June. (3) The GODFREY clone is more slender and dwarfer than the type, and is fine for cutting. The spathes are marble white, with yellow spadix. (4) The yellow-leaved *Zantedeschia* has spathes like GODFREY but the leaves are nearly as yellow as the spadix; it grows to 14 inches high, and is rather difficult to propagate; the blooms appear from June to August. The rhizomes are much like those of GODFREY. (5) The clone Midway is the next in size between GODFREY and LITTLE GEM. The spathe is pure white, the spadix yellow; it blooms from December to June and is quite fragrant and more resistant to frost than the other two above. (6) The clone LITTLE GEM (syn.— BABY *CALLA*), the smallest and whitest of all, is like the type but only 8 to 10 inches tall; the spathe is about 2½ inches long, marble white with yellow spadix; it blooms from December to July, and is used quite extensively for corsages. It can be forced to bloom for Christmas and Easter as potted specimens.

ZANTEDESCHIA ALBOMACULATA. In this the leaves are marbled and very decorative; it blooms from June to August, and must have lots of water; the spathe is ivory white.

Apparently the clone, NEW CREAM, belongs here for it was found in a shipment of *Z. albomaculata* and is probably a sport of it. In growth it is robust, blooming from June to July; the spathe is rich cream color, with a slight dark blotch in the throat. It is lovely and spectacular.

The clone, *Z. Nelsonii* is similar to *Z. albomaculata.* It is robust, growing to 3 ft. tall; the leaves are rather thick, bright green, and spotted somewhat as in *Z. albomaculata* (type); the flowers appear from May to July, lasting longer than those of any other yellow *Zantedeschia;* the spathe is cornucopia shaped, not flaring, pale yellow in color, with a purple blotch in the throat. This plant fails to die down until frost forces it to go dormant. It is a beautiful plant and should be more widely known.

ZANTEDESCHIA HASTATA (SYN.— Z. OCULATA). This is also known as *Richardia* "Pride of the Congo" (Rev. Hort. p. 27. 1893). It was sent to me many years ago by a friend, but it failed to survive. Attempts to obtain it again have all failed.

ZANTEDESCHIA ANGUSTILOBA (SYN.— Z. PENTLANDII). This species from South Africa is one of the Aristocrats of this genus. It has a very large and broad saucer-like spathe (See Plate 9.), the color of hammered gold; with a black-purplish blotch at the base inside; the leaves are green, quite thick; the blooms appear in June and July; the spathes remaining in good condition for a relatively long time.

ZANTEDESCHIA MELANOLEUCA. (See Plate 9.) This species is native to South Africa, and has straw-colored spathes, with velvety black blotch at the base inside. The flowers stand well above the leaves, on a rather thick stem; the leaves are blotched with silvery markings throughout; it is a lovely pot plant, as well as a show in the garden; the blooms appear through July and August.

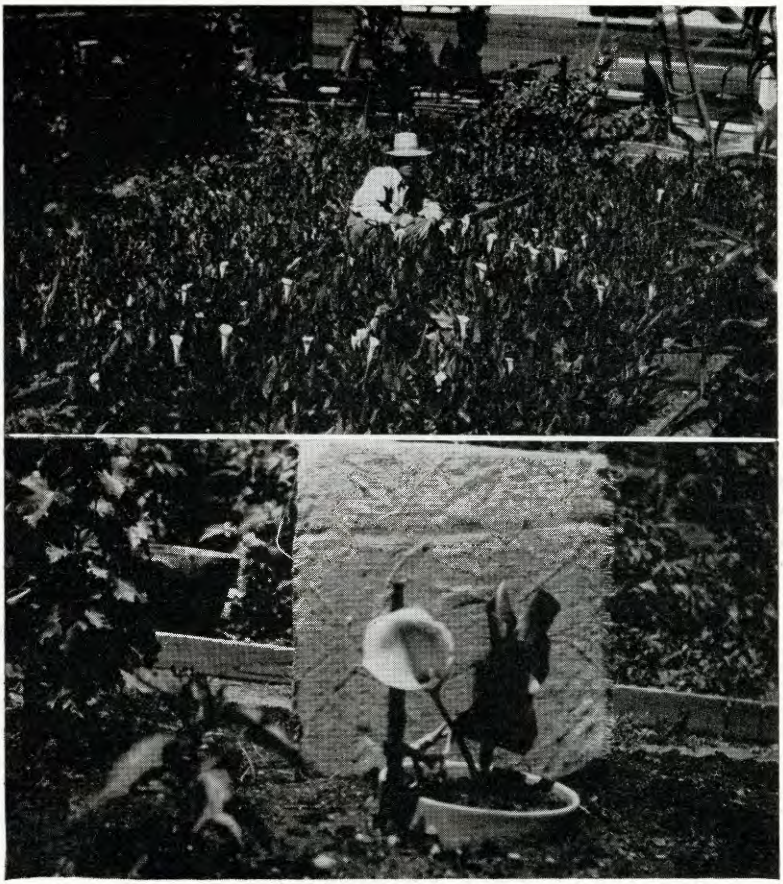
A clone, similar to the type, *Z. melanoleuca,* but in which the flower stalk and petioles are purple like the throat in the spathe, apparently belongs here. It appeared among thousands of seedlings of *Z. melanoleuca.*

ZANTEDESCHIA c. LEMON CREAM. This is a robust grower with thick, arrow-shaped leaves, splotched throughout with silvery markings; it blooms from June to August; the spathe is quite large, widely flaring, and tip recurving; it is of a soft lemon shade, with yellow spadix, and slight blotch inside the spathe. A lovely plant.

ZANTEDESCHIA ELLIOTTIANA. This is the GOLDEN AROID LILY, or GOLDEN CALLA. It has a deep lustrous yellow spathe, and blooms in June and July, the flowers lasting well, and turning green in a few weeks. It has no black blotch in the throat.

Here belongs the clone which is like the type, *Z. Elliottiana,* but has leaves like those of *Z. albomaculata.* It blooms during May and June. It is very odd and unusual, and is probably a sport rather than a hybrid.

ZANTEDESCHIA REHMANNII. This is the PINK or ROSE CALLA. The spathes range in color from the palest blush pink to a rich rose; very rarely they are white. It is dwarf and compact, and likes lots of water, and some shade. The blooms appear during May to July.



Upper, portion of Len Mirzwick's *Zantedeschia* beds during summer growing season, planted to *Z. melanoleuca* for seeds and corms.

Lower, *Z. angustiloba* (syn.- *Z. Pentlandii),* in pot culture, is slow to propagate, but pollen for hybridizing has been produced for himself and for shipment to other breeders.

Plate 9

The clone, *Zantedeschia Rehmannii* c. STRAWBERRY RED, is quite different from the type in that the spathe is a beautiful dark strawberry red in color. The plant is larger, growing to 2 ft. tall, and it holds better. The leaves are lance-like and grow very thickly from the corm that produces from 4 to 6 lovely blooms from May to July.

## OTHER **ARACEAE**

I have grown 17 species, representing 5 genera of the *Araceae* other than the *Zantedeschia* species and forms indicated above. These will be briefly discussed under the five genera.

ARUM. (1) *Arum italicum*— leaves long and broad, light veined; flowers short, stocky, yellow and white, rather straight; spathe slightly swollen below; the flowers appearing in late April and lasting about five days; the tubers can be lifted in July or can be left in the beds. (2) *Arum Palaestinum*— Big flower spathe, dull black-green on outside, midnight velvety maroon inside; tip of spathe sometimes recurved. Native to Palestine and sometimes referred to as Solomon's Lily. (3) *Arum Dioscoridis*— *Spathe* tube pale within; limb about 6 inches long, splotched with purple spots; spathes may be marked differently; the bulb in this collection had a 14-inch spadix, spathe 14 inches long, 6 inches wide, and stood erect many days before opening; odor slight at first but none after a few days. A beautiful flower reminding one of the tropical jungle. (4) *Arum crinitum*— [= *Helicodiceros muscivorus*], the TWIST-ARUM; the spathe is very hairy, and has a bad odor that attracts insects, and even buzzards. It is from Corsica. (5) *Arum biarum Bovei*— A small arum collected in Palestine; a low growing plant, said to have BLACK CALLA like flowers before the leaves appear. I had this for many years but it never flowered. Native to Syria and Palestine. (6) *Arum maculatum*— Known in England as WAKE ROBIN; it is short in growth, slightly more than a foot high; leaves luscious green, black spotted; flowers in May for just one day, then withers; the spathe is contracted above the base, with tendency to incurve or inroll, giving the spathe an odd appearance; spathe white with purple spots. There are five other forms, but this is believed to be the type. It is native to northeastern Europe, and was used by the ancients as an exitant. (7) *Arum arisaema* [= *Arisaema triphyllum Torr.*] The well-known JACK-IN-THE-PULPIT; also known as INDIAN TURNIP; very odd hooded, the spathe inrolling over the spadix, which ripens into a cluster of red berries; spathe light green; very easily grown and will spread rapidly. Native to North America. I have collected it in the birch swamps of New Jersey. (8) *Arum cornutum*— SNAKE LILY; similar to *Sauromatum guttatum* in habit, flowering from dry corms in early spring; the spathe is red, spotted black, very curious; the foliage is palm-like. (9) *Arum* (ST. CLAIR PURPLE). This plant is tentatively so named because it is as yet unidentified. The only purple *Arum* that I know; it blooms in February in the garden; is about 14 inches tall; the spathe is a beautiful purple, completely stretched out, then gradually inrolling, showing a green mar-

gin. It is the hardiest arum that I know of, frost and ice may come but it just keeps on growing.

ARISAEMA DRACONITUM. Known as GREEN DRAGON. This unusual plant has a single large leaf divided into 7 to 9 segments; it blooms in May, the flowers lasting only a short time; the spadix extends far above the spathe which is wrapped around it; bright orange clusters of fruit (or berries) resembling kernels of maize form on the spadix; these sprout readily around the plant in the wild state. This plant will naturalize and take over the garden if not held in tow. It is known as the DRAGON PLANT of America in contrast with *Dracunculus vulgaris,* known as the DRAGON PLANT of Europe.

DRACUNCULUS. (1) *Dracunculus vulgaris*— Also known as the DRAGON PLANT of Europe; the dragon fingered leaves are odd and interesting; the tube of the spathe is purple-streaked; the spathe is purple throughout but much more so along the border, especially the wavy edges; it blooms in May, lasting 4 or 5 days, and smells to very high heaven. (2) *Dracunculus canariensis*— It blooms from dry corms which are very tender and may rot easily; the blooms appear in April; it is very smelly but interesting; the leaf-lobes and the spathe are narrow.

SAUROMATUM. (1) *Sauromatum nubicum*— Much like *S. guttatum* and requires the same care, but the flower-spathes are enormous and deep maroon, yellow marked; it is easily attacked by rot. (2) *Sauromatum guttatum*— Known as MONARCH OF THE EAST; the flower stem is beautifully marbled; the dry corms placed in the east window will have rose-tinted, purple-streaked ivory flowers; flowers last but a short time; the corm should then be placed in the garden where the beautiful leaves will be produced; the corms bear a single leaf one year, and flower the next; the flowers appear in June and July, lasting but a few hours. (3) *Sauromatum venosum*—Known as LIZARD LILY; the leaves are 10 to 12 inches long; the flower is purple on black and it is yellow within; this is supposed to be the same as *S. guttatum,* but my bulbs are different; my *S. guttatum* has beautiful "Sugar Pine diamonds" up the stems, *S. venosum* has not; *S. venosum* is an interesting plant from the Himalaya Mountains.

AMORPHOPHALLUS. (1) *Amorphophallus Rivieri*— Known as AFRICAN or SNAKE LILY, and also as DEVIL'S TONGUE. The scape precedes the leaves in early spring; the flower is dark with red speckles; the very large, often 3 ft. long, spadix is dark red, and has a very offensive odor; the blooms appear in May and June, lasting about 6 days. (2) *Amorphophallus Mozambiquana*— The velvety maroon flowers appear in late winter from a dry corm; it is very unusual, and difficult to start and keep growing.

## ADDENDA

The following names pertaining to the genus *Zantedeschia* came to light after the article above was set in type.

*Calla Pentlandii* Hort. ex Kew Bull. (1893), append. 2: 30. = *Zantedeschia angustiloba* (Schott) Engl.

*Arodes albomaculatum* Kuntze, Rev. Gen. 740 = *Zantedeschia albomaculata* (Hook. f.) Baillon.

*Arodes melanoleuca* Kuntze, Rev. Gen. 740. = *Zantedeschia melanoleuca* (Hook. f.) Engl.

## Hybridizing the Aroid Lily

As we go to press word is received from Clark L. Thayer, Dean, School of Horticulture, University of Massachusetts, Amherst, Mass., that a graduate student at that University, Miss Betty Lou Travis, is working on the hybridizing of the AROID LILY or CALLA, *Zantedeschia.*

# THE GENUS **ZANTEDESCHIA**— INDEX TO GENERA, SPECIES AND CLONES

(Continued from page 32)

Generic names are in capitals (ZANTEDESCHIA); valid species names are in capitals and small capitals (ELLIOTTIANA), or in small capitals (AETHIOPICA); cultivated clones are in capitals and lower case (Little Gem); and all others are in italics *(Richardia Rossii)*. Figures after the names refer to page numbers in the text.

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