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STUDIES IN THE IRIDACEAE, VII

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INTRODUCTION

In view of the fact that the genera *Mastigostyla* and *Cardenanthus* have been treated piecemeal by me in three different publications, it seems desirable to give them unified treatments, with complete keys, and adding two more species to *Mastigostyla*. A treatment of *Anomalostylus*, fuller than that given in the original publication, is included. Finally, there are some notes on the genus *Trimezia*, with the description of two new species, some miscellaneous notes, and descriptions of three novelties in the genus *Sisyrinchium*.

Aside from specimens in the Gray Herbarium (GH), material has been seen from the U. S. National Herbarium (US), the New York Botanical Garden (NY), the Missouri Botanical Garden (MBG), the Chicago Natural History Museum (F), the University of California (UCAL), and the Academy of Natural Sciences of Philadelphia (PHIL). To the administrative officers of these herbaria, I am indebted for the opportunity of seeing this material.

1. MASTIGOSTYLA I. M. JOHNST.

Reasons for believing *Mastigostyla* distinct from *Cypella* were given in detail in Contrib. Gray Herb. no. 155: 22-23 (1945). Additional material, both of *Mastigostyla* and *Cypella*, seen since that time has strengthened the view there

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expressed. This may be recapitulated briefly as follows: *Mastigostyla* has a short but definite perianth-tube, with the base of the flower infundibuliform; the long stamen-filaments are either completely united or nearly so, while the anthers are free from the style; the style-arms are bifid to a point well below the stigmas; the inner tepals are greatly reduced, far more so, proportionately, than in any species of *Cypella*.

Mastigostyla I. M. Johnst. in Contrib. Gray Herb. (n. s.) no. 81: 85 (1928); Diels in Engler & Prantl, Nat. Pflanzenfam. (ed. 2) 15a: 498 (1930), as synonym of *Cypella*; Macbride in Field Mus. Pub. Bot. 13: 716 (1936), as synonym of *Cypella*; Foster in Contrib. Gray Herb. no. 155: 22-23 (1945) and no. 161: 15 (1946).

Bulbous, caulescent or acaulescent herbs. Basal leaves few, linear; cauline leaves 1-2. Stem simple or branched. Spathes firm-textured, usually subequal, or the outer shorter, 1-4-flowered, the slender pedicels usually not exerted at anthesis. Flowers infundibuliform at the base, with a short perianth-tube (usually 2 mm. long); the two series of tepals markedly dissimilar in size and shape, the outer larger than the inner. Stamen-filaments united in a column, the anthers sessile, or nearly so, on the column, opposite the style-arms. Style as long as the column, more or less wing-margined above; style-arms bifid below the transverse stigmas, the crests (2 per style-arm) more or less petaloid or flagelliform, decurrent on the abaxial faces of the style-arms. Capsule oblong-ellipsoid; seeds small, angulate.

Type-species: *M. cyrtophylla* I. M. Johnst.

KEY

- a. Length of style, style-arms and -crests less than 15 mm.
 - b. Spathes immediately subtended by 1-2 cauline leaves.
 - c. Spathes subtended by 2 cauline leaves; style-crests 0.5 mm. long; inner tepals oblanceolate, 8 mm. long; Argentina..... 1. *M. Cabrerae*.
 - c. Spathes subtended by 1 cauline leaf; style-crests 1-2.5 mm. long; Bolivia.
 - d. Style-crests 1 mm. long; inner tepals linear or narrowly elliptic, 7 mm. long, not over 1 mm. wide. 2. *M. brevicaulis*.
 - d. Style-crests about 2.5 mm. long; inner tepals ovate, 5.5 mm. long, 2.5 mm. wide. 3. *M. potosina*.
 - b. Spathes not subtended by cauline leaves. 4. *M. Johnstonii*.
- a. Length of style, style-arms and -crests more than 15 mm.
 - e. Spathes subtended by cauline leaves, the plants appearing acaulescent. 5. *M. Hoppii*.
 - e. Spathes not subtended by cauline leaves, the plants obviously caulescent.
 - f. Style-crests more or less flagelliform, more than 2 mm. long.

- g. Spathes ventricose; inner tepals to 1.4 cm. long.
..... 6. *M. cyrtophylla*.
- g. Spathes not ventricose; inner tepals shorter.
- h. Outer tepals obovate-spatulate, 3 cm. long; inner tepals
oblanceolate.
- i. Basal leaves to 50 cm. long, 4 mm. wide; inner tepals
1 cm. long. 7. *M. gracilis*.
- i. Basal leaves to 29 cm. long, 1-2 mm. wide; inner tepals
7 mm. long. 8. *M. Joergensenii*.
- h. Outer tepals oblong, to 2.2 cm. long; inner tepals narrowly
elliptic. 9. *M. peruviana*.
- f. Style-crests elliptic-lanceolate, 2 mm. long. .. 10. *M. Cardenasii*.

1. ***Mastigostyla Cabrerae*** R. C. Foster in Contrib. Gray Herb. no. 171: 25 (1950). Bulb ovoid, about 2.5 cm. high and 1.5 cm. wide, the outer tunics thin, dark-brown. Stem for the most part subterranean, 3-7 cm. long, simple. Basal leaves mostly reduced to brown sheaths, rarely 1 produced, filiform, acute, to 10 cm. long and 0.5 mm. wide; cauline leaves 2, subtending the spathes, the lower one 12-22 cm. long, 2 mm. wide, linear, long-attenuate, acute, glabrous, the upper similar but shorter, to 6 cm. long. Spathes subequal or the outer longer, 2.5-3 cm. long, the outer one acuminate, obtuse, the inner one suboblong, broad at the apex, obtuse, 1-2-flowered. Ovary oblong-ellipsoid, glabrous, 7 mm. long. Flowers lilac-colored, obscurely spotted; outer tepals obovate-spatulate, to 2 cm. long and 5 mm. wide, long-unguiculate, rounded at the apex; inner tepals oblanceolate, 8 mm. long and about 1 mm. wide, the base of the claw glandular-tumescens. Stamen-column 8 mm. long; anthers linear, 4 mm. long. Style equal to the column in length; style-arms ca. 3 mm. long, bifid for about 1.5 mm., the style-crests much reduced, about 0.5 mm. long. Capsule and seeds not seen.

Known only from ARGENTINA. SALTA: San Antonio de los Cobres, Jan. 29, 1944, A. L. Cabrera, no. 8255 (type, GH).

The great reduction of the style-crests is a notable feature of this species. Other species with flowers of about the same size, *M. brevicaulis*, for instance, have very much longer style-crests.

2. ***M. brevicaulis*** (Baker) R. C. Foster in Contrib. Gray Herb. no. 161: 16 (1946). *Nemastylis brevicaulis* Baker, Handbk. Irid. 113 (1892). Bulb ovoid, to 2.5 cm. high, about 1 cm. in diameter, the tunics brown, membranous. Basal leaves 1-2, 20-30 cm. long, 3-4 mm. wide, linear, plicate, acute, glabrous; cauline leaves 1-2, 8-30 cm. long, 2-4 mm. wide, the uppermost usually subtending the spathes. Stem simple, to 20 cm. tall, terete, glabrous. Spathes herbaceous, subequal, to 3 cm. long, the outer acute, 1-3-flowered; pedicels filiform, not exerted at anthesis. Ovary ellipsoid-turbinate, to 5 mm. long, glabrous. Flowers blue; outer tepals long-unguiculate, oblanceolate, somewhat acute, to 1.8 cm. long and about 5 mm. wide; inner tepals 7 mm.

long, 0.75-1 mm. wide, glandular-tumescens at the base, linear or lance-linear, acute. Filament-column 6 mm. long; anthers 4 mm. long, deeply retuse at the apex. Style 7 mm. long; style-arms 2 mm. long, bifid for 1 mm. below the stigmas, the style-crests petaloid, rather than flagellar, 1 mm. long. Immature capsule turbinate, about 8 mm. long; seeds not seen.

Known only from BOLIVIA. LA PAZ: LARECAJA: vic. Sorata; colle Ullontiji, 2700 m. alt., Jan.-Apr., 1859, *Mandon* 1224 in part (isotype, NY); MURILLO: near La Paz, 3000 m. alt., Jan. 14, 1907, *Buchtien* no. 819 (US).

As explained when the transfer was originally made, the type-number contains a mixture of *Cypella* and *Mastigostyla*. The isotype at New York agrees well with the original description and, for that reason, the name has been limited to the *Mastigostyla* element.

3. *M. potosina*, spec. nov. Bulbus ovoideus, 2 cm. altus, 1 cm. latus, tunicae brunneae, tenues. Folia basalia 2 (in specimine incompleta), 2 mm. lata; folia caulina ad 10 cm. longa, 2 mm. lata, acuta, glabra. Caulis simplex, glaber, 3-6 cm. altus. Spathae subaequales vel exterior parum brevior, ad 3.5 cm. longae, acutae, herbaceae, 2-fl., pedicelli glabri, filiformes, anthesin non exserti. Ovarium oblongum, ad 6 mm. longum, glabrum. Flores caerulei, perianthii tubus ad 1 mm. longus; tepala exteriora longe unguiculata, obovata, 1.8 cm. longa et 6 mm. lata, apice truncato-obtusa, breve mucronulata; tepala interiora ovata, 5.5 mm. longa et 2.5 mm. lata, acute vel subacuta. Staminum columna circa 9 mm. longa; antherae 4.5-5 mm. longae, connectivus latus et pertenuis. Stylus columnam longitudine aequans; styli rami et cristae ad 1.4 cm longi, 2.5-3 mm. bifidi. Capsula seminaque ignota.

BOLIVIA: POTOSÍ: between Potosí and Camargo, in sandy, rocky soil, 3800 m., Feb. 1949, *Cárdenas* no. 4265 (type, GH).

This species is most closely related to *M. brevicaulis* but can be readily distinguished by longer style-crests and shorter and broader inner tepals.

4. *M. Johnstonii* R. C. Foster in *Contrib. Gray Herb.* no. 155: 25 (1945). Bulb ovoid, 1-2.5 cm. high, 6-10 mm. in diameter, the tunics dark-brown, membranous. Basal leaves absent, or 1 rudimentary sheath at the base of the stem; cauline leaf borne on the stem about 4-8 cm. below the inflorescence, lance-linear, attenuate at base, acute, plicate, glabrous, at least 15 cm. long and 3-5 mm. wide. Stem simple, terete, glabrous, 10-20 cm. long. Spathes herbaceous, the outer 3.4-4.4 cm. long, acuminate, acute, the inner 3.2-4 cm. long, rather obtuse, retuse, 1-3-flowered, the pedicels 2.5-3.5 cm. long. Ovary ellipsoid, glabrous, to 8 mm. long. Flowers violet; outer tepals at least 1.8 cm. long and 6 mm. wide, long-unguiculate, obovate; inner tepals much reduced, 5-6 mm. long, about 2 mm. wide, ovate-oblongate, acute, the very short claw tumescens, apparently glandular. Stamen-column

6 mm. long; anthers nearly sessile on the column, 5 mm. long. Style as long as the column; style-arms and appendages 6 mm. long, the arms entire for 3 mm. and then bifid. Mature capsule and seeds not seen.

Known only from ARGENTINA. TUCUMÁN: CHICLIGASTA: Estancia Las Pavas, 3200 m. alt., Dec. 3, 1926, *Venturi*, no. 4636 (type, GH; isotype, US); Estancia Santa Rosa, 3600 m. alt., Dec. 13, 1925, *Venturi*, no. 6500 (US).

In habit, this species most closely resembles *M. brevicaulis*, but by the technical details of the flower it can readily be separated. The inner tepals are ovate to oblanceolate, rather than linear to lance-linear, and the style-arms and style-crests are much longer, with the crests more nearly flagelliform. From *M. brevicaulis* it differs further in that the spathes are not immediately subtended by cauline leaves.

5. *M. Hoppii* R. C. Foster in Contrib. Gray Herb. no. 155: 24 (1945). *Cypella Hoppii* Diels ex Macbride in Field Mus. Pub. Bot. 13: 717 (1936), *nomen invalidum* (without Latin diagnosis). Bulb ovoid to subglobose, 1.5-2 cm. high, 1-1.5 cm. wide, the tunics dark-brown. Basal leaf solitary, shorter than the stem, 3.5-5 cm. long, mostly sheathing; cauline leaves 2, immediately subtending the inflorescence, the lower to 18 cm. long, spathiformly clasping at the base, the linear-attenuate blade acute, 1-2 mm. wide, the upper leaf similar, 2.5-7 cm. long, 1-1.5 mm. wide. Stem simple, terete, glabrous, 3-7 cm. tall. Spathes herbaceous, subventricose, the outer to 2 cm. long, acute, the inner to 2.5 cm. long, obtuse, 2-4-flowered, the pedicels shorter than the spathes, even in fruit. Ovary oblong, glabrous, about 5-6 mm. long. Flowers violet; outer tepals to 2.5 cm. long, the blade about 8-10 mm. wide, obovate, obtuse, unguiculate; inner tepals reduced, much smaller than the outer. Stamen-column to 1 cm. long, anthers 4-5 mm. long. Style as long as the column; style-arms and appendages about 7 mm. long. Capsule oblong-ellipsoid, rather sharply trigonous, about 1 cm. long; seeds dark-brown, angulate, 1.5-2 mm. long.

Known only from PERÚ. AREQUIPA: Arequipa, *Hopp* (type, Berlin, not seen; photo GH, F); open gravelly soil above Arequipa, 2500-2600 m. alt., Apr. 7-16, 1925, *Pennell*, no. 13173 (GH, NY); above Arequipa, 2500 m. alt., Apr. 7-16, 1925, *Pennell*, no. 13180 (F, PHIL).

No flowering material has been seen by me. The description given has been drawn up from the excellent photograph of the type and from fruiting material collected by Pennell.

6. *M. cyrtophylla* I. M. Johnst. in Contrib. Gray Herb. (n. s.) no. 81: 85 (1928). *Cypella cyrtophylla* (I. M. Johnst.) Diels in Engler & Prantl, Nat. Pflanzenfam. (ed. 2) 15a: 498 (1930); Macbride in Field Mus. Pub. Bot. 13: 716 (1936). Bulb ovoid, to 3 cm. high, 1.5-2 cm. wide, the membranous tunics dark-brown. Basal leaves 1-2, re-

duced to brownish sheaths, or if produced, to 30 cm. long, 1 mm. wide, linear, acute, glabrous; cauline leaves 1-2, to 30 cm. long, 2-4 mm. wide, exceeding the inflorescence, the uppermost reduced. Stem occasionally simple, but usually 1-2-branched well above the base, terete, glabrous, to 30 cm. long. Spathes herbaceous, drying with a purplish tinge, somewhat ventricose, subequal or the outer shorter, to 4 cm. long, several-flowered, the filiform pedicels not exerted at anthesis. Ovary oblong, glabrous, 4 mm. long. Flowers clear blue or violet, sometimes with darker spots; outer tepals long-unguiculate, the blades spreading, to 3 cm. long, 1.2 cm. wide, obovate, the apex obtuse; inner tepals more or less linear-oblongate, to 1.4 cm. long, 1.5 mm. wide, acute. Filaments entirely united, 8 mm. long; anthers to 6 mm. long. Style as long as or a little longer than the stamen-column; style-arms 5 mm. long, bifid for about 3 mm. below the stigmas, the flagelliform crests to 8 mm. long. Capsule and seeds not seen.

Known only from PERÚ. AREQUIPA: southern slopes of Chachani Mt., north of Arequipa, 2440-3660 m. alt., March, 1920, *Hinkley & Hinkley*, no. 16 (type, GH); open sandy soil above Arequipa, 2500-2600 m. alt., Apr. 7-16, 1925, *Pennell*, no. 13172 (GH, NY), and *Pennell*, no. 13173a (PHIL, F); alrededores de Arequipa, 2400-2500 m. alt., Mar. 31, 1949, *Vargas*, no. 8102 (GH); cerros de Tura, 2575-2620 m. alt., Mar. 28, 1949, *Vargas*, no. 7962 (GH); Yura, 2700 m. alt., Mar. 8, 1914, *Weberbauer*, no. 6838 (GH, F, US, NY).

Although the original description of this species gave details of capsule and seeds, these details were taken from *Pennell*, no. 13173, a specimen which I now consider to belong to *M. Hoppii*. The very long flagelliform style-crests of *M. cyrtophylla* represent the most extreme development of that structure in the genus.

7. *M. gracilis*, spec. nov. Bulbus ovoideus, 2.5 cm. altus, 1.5 cm. latus, tunicae atrobrunneae, membranaceae. Folia basalia 1-2, ad 50 cm. longa et 2-3 mm. lata, glabra, acuta, plicata; folia caulina 1-2, 4-14 cm. longa, 2 mm. lata. Caulis simplex vel 1-ramosus, teres, glaber, ad 26 cm. longus. Spathae subaequales, vel exterior parum brevior, ad 4 cm. longae, exterior acuminata, acuta, herbacea, interior apice obtusa et membranacea, 2-4-fl., pedicelli filiformes, glabri, anthesin non exserti. Flores caerulei, perianthii tubus ca. 1.5 mm. longus; tepala exteriora longe unguiculata, obovato-spathulata, subobtusa, ad 3 cm. longa et 8 mm. lata; tepala interiora oblanceolata, acuta, ad 10 mm. longa et 2 mm. lata. Staminum columna ad 1 cm. longa; antherae ad 6 mm. longae. Stylus columnam longitudine aequans; styli rami et cristae ad 9-10 mm. longae, rami 4 mm. bifidi. Capsula immatura oblongo-ovoidea, 1.3 cm. longa; semina non visa.

BOLIVIA: COCHABAMBA: MIZQUE: Chaguarani, in sandy red clay, 2700 m. alt., Mar. 31, 1939, *Eyerdam*, no. 25081 (type, UCAL; isotype, F).

Most closely related, probably, to *M. Joergensenii*, *M. gracilis* has a habit of growth which is much more open than that of its rather stiff congener. Its basal leaves are longer and wider, and the inner tepals longer than those of *M. Joergensenii*.

8. *M. Joergensenii* R. C. Foster in Contrib. Gray Herb. no. 171: 26 (1950). Bulb small, ovoid, to 2 cm. high, 9-10 mm. wide, the tunics brown, membranaceous. Basal leaves usually reduced, with 1 produced, to 28 cm. long and 1-2 mm. wide; cauline leaves 2, to 15 cm. long and 2 mm. wide, linear, acute, glabrous. Stem 1-2-branched well above the base, terete, glabrous, to 22 cm. long. Spathes herbaceous, subequal or the outer more or less shorter, to 4.8 cm. long, 3-4-flowered the filiform pedicels not exerted at anthesis. Ovary oblong-ellipsoid, to 5 mm. long, glabrous. Flowers blue or purple; outer tepals long-unguiculate, to 3 cm. long, the blade about 8 mm. wide, narrowly obovate or spatulate, obtuse; inner tepals to 7 mm. long, 2 mm. wide, oblanceolate, subacute, the base glandular-tumescens. Filaments almost entirely united, 1.2 cm. long; anthers linear, 8 mm. long. Style about 1.4 cm. long; style-arms 5 mm. long, bifid for 2 mm. below the stigmas; style-crests about 4 mm. long, subflagelliform. Capsule and seeds not seen.

Known only from ARGENTINA. CATAMARCA: Andalgalá [no further data available], *Jörgensen* (type, US no. 921640). LA RIOJA: Chilecito: Sierra de Famatina, camino a La Mejicana, 2550 m. alt., Feb. 5, 1927, *Parodi*, no. 8012 (GH).

In its size, this species suggests *M. Cardenasii*, but it is easily distinguished by its more or less flagelliform style-crests, narrower outer tepals, and by being branched well above the base.

9. *M. peruviana* R. C. Foster in Contrib. Gray Herb. no. 171: 25 (1950). Bulb ovoid, to 2 cm. high and 1.5 cm. wide, the thin smooth tunics dark-brown or blackish-brown. Basal leaves 1-2, 8-19 cm. long and 1-3 mm. wide, linear, acute, glabrous; cauline leaf 1, exceeding the inflorescence, 6-12 cm. long, to 2 mm. wide. Stem simple, terete, glabrous, 2-9 cm. long. Spathes subequal, 3 cm. long, not ventricose, 2-flowered; pedicels to 2.5 cm. long. Ovary obovoid, 8 mm. long, glabrous. Flowers blue; outer tepals about 2.2 cm. long, 6-7 mm. wide, long-unguiculate, the blade oblong, the apex obtusely rounded; inner tepals 8-9 mm. long, 2 mm. wide, narrowly elliptic, acute, the claw basally tumescent. Filaments united for 9 mm., free for 1 mm.; anthers 5 mm. long. Style 1 cm. long; style-arms 4 mm. long, bifid for 2 mm.; style-crests flagelliform, about 6 mm. long. Capsule and seeds not seen.

Known only from PERÚ. APURIMAC: ANDAHUAYLAS: quebrada 2 km. east of Andahuaylas, among grass, sand and clay, 3050 m. alt., Feb. 23, 1939, *Stork & Horton*, no. 10726 (type, F; isotype, UCAL).

Since *M. peruviana* is obviously caulescent and the single cauline leaf does not immediately subtend the spathes, it can readily and quickly be distinguished from the dwarf *M. Hoppii*. From *M. cyrtophylla* it is distinguished by its short unbranched stem, smaller flowers, and nonventricose spathes.

10. *M. Cardenasii* R. C. Foster in Contrib. Gray Herb. no. 155: 23 (1945); Foster in Contrib. Gray Herb. no. 161: 16 (1946). Bulb ovoid, 2-2.5 cm. high, 1.5 cm. in diameter, the dark-brown membranous tunics prolonged upwards in a collar around the base of the stem and leaves. Basal leaves 1-2, to 15 cm. long, 1.5 mm. wide, linear, acute, glabrous, finely ribbed; cauline leaf 1 (or none), the base spathiformly sheathing the stem, equaling or exceeding the inflorescence. Stem simple or branched near the base, 5-30 cm. long, terete, glabrous. Spathes herbaceous, firm-textured, to 4.5 cm. long, the outer with the margins basally united for 6-7 mm., acuminate, acute, the inner spathes equal to or longer than the outer, with broad hyaline margins, acute, 2-4-flowered; pedicels filiform, shorter than the spathes at anthesis. Ovary obovoid-ellipsoid, glabrous, about 8 mm. long. Flowers dark-blue, with darker spots; outer tepals long-unguiculate, obovate-spatulate, obtuse, to 3 cm. long and 1.5 cm. wide; inner tepals 5 mm. long, 1 mm. wide, narrowly elliptic-lanceolate, acute. Stamen-column to 1.2 cm. long, the filaments then free for 1-2 mm.; anthers linear, 6 mm. long. Style about as long as the stamen-column; style-arms and style-crests 1 cm. long, bifid for 5 mm., the stigmatic projections about 1.5 mm. long, the elliptic-lanceolate petaloid crests about 2 mm. long. Immature capsule ellipsoid-obovoid, to 1 cm. long; seeds not seen.

PERÚ: CUZCO: Saxaihuaman, 3400 m. alt., March, 1943, *Cárdenas*, no. 2337 (type, GH). BOLIVIA: COCHABAMBA: TARATA: Huayrapata, near Anzaldo, 3900 m. alt., in open sandy loam, April, 1944, *Cárdenas*, no. 2491 (US).

On the basis of present knowledge, the other species of this genus seem to be rather narrowly endemic. Consequently, it is of interest to find this species occurring in Perú near Cuzco and in the department of Cochabamba in Bolivia.

2. CARDENANTHUS R. C. FOSTER

Although much of the material seen was originally determined as *Nemastylis*, *Cardenanthus* differs from that genus, as well as from all but two other American bulbous genera, in having a definite perianth-tube. Usually short in itself, in relation to the size of the flowers, the tube is a rather marked element of the floral morphology. From *Eurynotia*

it differs not only in size but also in having divided style-arms, not simple style-arms as is true of that genus. From *Mastigostyla*, which it closely resembles in habit and vegetative characters, it differs in having the stigmatic area apical or lateral downward from the apex, not transverse at the base of style-crests. The general structure of the style and stamens associates the genus unmistakably with *Tigridia* and its allies.

Cardenanthus R. C. Foster in Contrib. Gray Herb. no. 155: 3 (1945) and no. 161: 13-15 (1946).

Plants small, bulbous, subacaulescent or appearing so. Leaves few, narrowly linear. Inflorescence subsessile, the spathes terminal, flowers shortly pedicellate. Flowers basally infundibuliform, perianth-tube present, short, the tepals very unequal in size and shape, the outer much larger. Stamens opposite the style-arms, the filaments united in a column inserted at the apex of the perianth-tube; anthers sessile or subsessile on the column. Style filiform, three-branched, the branches bifid, canaliculate, apically stigmatose. Capsule oblong-ellipsoid; seeds small, numerous.

Type-species: *C. boliviensis* R. C. Foster.

KEY

- a. Inner tepals glandular-tumescient at base or apex of claw; perianth-tube over 3 mm. long
 - b. Inner tepals 6 mm. long or less, 1 mm. wide, or less.
 - c. Perianth-tube 4 mm. long.
 - d. Inner tepals oblanceolate, 1 mm. wide; style-arms 2 mm. long, bifid for 1 mm. 1. *C. orurensis*.
 - d. Inner tepals linear, less than 0.5 mm. wide; style-arms 3.5 mm. long, bifid ca. 2 mm. 2. *C. boliviensis*.
 - c. Perianth-tube 7-8 mm. long 3. *C. longitubus*.
 - b. Inner tepals more than 6 mm. long, the narrowly linear or oblanceolate blade 1.5 mm. wide.
 - e. Staminal column ca. 1 cm. long; outer tepals 8 mm. wide. 4. *C. peruvianus*.
 - e. Staminal column ca. 7 mm. long; outer tepals ca. 4 mm. wide. 5. *C. Shepardae*.
 - a. Inner tepals not glandular-tumescient; perianth-tube not over 2 mm. long.
 - f. Inner tepals to 3.5 mm. long, widest at the base. 6. *C. tunariensis*.
 - f. Inner tepals to 8 mm. long, widest above the middle.
 - g. Inner tepals narrowly oblanceolate, 1 mm. wide. 7. *C. Venturii*.
 - g. Inner tepals obovate-spatulate, 3 mm. wide. 8. *C. Vargasii*.
1. *Cardenanthus orurensis* R. C. Foster in Contrib. Gray Herb. no. 161: 14 (1946). Plant nearly acaulescent, the bulb ovoid, 2-2.5 cm.

high, 1-2 cm. wide, the tunics brown or blackish-brown, rather thin. Basal leaves 1-2, much reduced, 2-4 cm. long, little more than fuscous or straw-colored sheaths, rarely 1 produced basal leaf present, to 12 cm. long, 1 mm. wide; cauline leaves 2, subtending the spathes, the lower one 13-15 cm. long, 1.5-2 mm. wide, linear, acute, several-nerved, glabrous, the upper leaf similar, 3.5-5 cm. long, 1 mm. wide. Outer spathe to 2 cm. long, herbaceous or submembranaceous, acute, the inner spathe to 2.4 cm. long, apically truncate, 1- (rarely 2-) flowered; pedicels to 6 mm. long. Ovary oblong, glabrous, 5-7 mm. long. Flowers blue or blue-purple; perianth-tube 4 mm. long; outer tepals to 1.2 cm. long and 6 mm. wide, shortly unguiculate, obovate, apically somewhat obtuse; inner tepals to 4-4.5 mm. long, 1 mm. wide, narrowly elliptic or oblanceolate, acute, the base of the claw glandular-tumescens. Staminal column 5 mm. long; anthers linear, 3 mm. long. Style as long as the column; style-arms 2 mm. long, bifid for 1 mm. Capsule and seeds not seen.

Known only from BOLIVIA. ORURO: CERCADO: Hacienda Huanca-roma, near Eucaliptus, 3000 m. alt., Feb. 19-27, 1934, *Hammarlund*, no. 94 (type, NY).

A second specimen, in fruit, from which the details of capsule and seeds have been drawn for the generic characterization, may belong here or with the next species. It is *Asplund*, no. 6362 (US), from Uyuni, in the Department of Potosí, collected at 3700 m. alt., Mar. 25, 1921.

2. *C. boliviensis* R. C. Foster in *Contrib. Gray Herb.* no. 155: 4 (1945) and no. 161: 14 (1946). Plant seemingly acaulescent, but with a 2-4 cm. underground stem, the bulb ovoid, 2 cm. high, 1 cm. wide. Basal leaves absent; cauline leaves 2, immediately subtending the spathes, the lower to 9 cm. long, 1 mm. wide, the upper to 4 cm. long, 1 mm. wide, linear, acute, glabrous. Spathes herbaceous, the outer 1.5-2 cm. long, the inner 2-2.5 cm. long, obtuse, retuse, 2-3-flowered, the flowers subsessile. Ovary ellipsoid, glabrous, about 3 mm. long. Flowers blue; perianth-tube to 4 mm. long; outer tepals to 1.4 cm. long, 4-5 mm. wide, ovate, acuminate to the subobtuse apex; inner tepals to 5 mm. long, linear, the base of the claw glandular-tumescens, the enlarged portion to 0.75 mm. long, the blade about 0.33 mm. wide, not acuminate, blunt at the apex. Staminal column 5 mm. long; anthers 5 mm. long. Style about 8-9 mm. long; style-arms 3.5 mm. long, bifid for more than half their length, the stigmatic area ciliate. Capsule and seeds unknown.

Known only from BOLIVIA. POTOSÍ: Potosí, 4000 m. alt., Jan. 1932, *Cárdenas*, no. 124 (type, GH).

Unlike other members of the genus, in this species the blade of the inner tepals seems to be completely linear, with a blunt apex.

3. *C. longitubus* R. C. Foster in *Contrib. Gray Herb.* no. 171: 23

(1950). Bulb ovoid, to 1.5 cm. high, 1 cm. wide, the thin tunics dark-brown. Leaves basal, several, the outermost reduced to ventricose cataphylls, the inner 3-4 long-sheathing, the narrowly linear, strongly recurved, glabrous, acute blades to 10 cm. long, 1 mm. wide (or less), the midrib and edges thickened. Stem mainly subterranean, simple, terete, glabrous, to 3 cm. long. Spathes equal or unequal, the outer to 2.2 cm. long, abruptly acuminate, the inner nearly as long, or somewhat shorter, obtuse, 1-2-flowered, pedicel filiform, glabrous, to 6 mm. long. Ovary narrowly ellipsoid, 6 mm. long, glabrous, trigonous. Flowers light purple, sometimes with darker streaks; perianth-tube to 7-8 mm. long, narrowly cylindrical, abruptly ampliate at the apex; outer tepals long-clawed, obovate, to 1.5 cm. long, the somewhat acute blade to 6 mm. wide; inner tepals linear, acute, to 6 mm. long, slightly less than 1 mm. wide, with a tumescent patch about 1.5 mm. above the base. Staminal column 5 mm. long; anthers linear, 4-5 mm. long. Style 1.4 cm. long; style-arms 1 mm. long, bifid for 0.5 mm. Mature capsule and seeds not seen.

Known only from BOLIVIA. LA PAZ: PACAJES: Rosario, 4100 m. alt., Jan. 13, 1921, *Mrs. R. B. Shepard*, no. 235 (type, GH; isotype, US).

Growing in wet sandy soil, this species can be distinguished from its congeners by the longest perianth-tube and the longest style in the genus.

4. *C. peruvianus* R. C. Foster in Contrib. Gray Herb. no. 171: 24 (1950). Bulb ovoid, to 2 cm. high, 1.5 cm. wide, the thin tunics dark-brown. Basal leaves 1-2, to 28 cm. long and 0.5-1.5 mm. wide, plicate, glabrous, very acute; cauline leaves 1-2, to 25 cm. long, 1.75 mm. wide, immediately subtending the spathes. Stem simple, mostly subterranean, 2.5-4 cm. long. Spathes about equal, or the outer somewhat longer, to 3 cm. long, obtuse, 1-2-flowered, the glabrous pedicels to 7 mm. long. Ovary truncately ellipsoid, glabrous, to 7 mm. long. Flowers pale violet with darker spots; perianth-tube 4 mm. long; outer tepals to 1.8 cm. long, 8 mm. wide, obovate-spatulate, somewhat obtuse; inner tepals to 8 mm. long, 1.5 mm. wide, oblanceolate, acute, the claw short and glandular-tumescent. Staminal column to 10 mm. long; anthers 3-3.5 mm. long. Style to 1.1 cm. long; style-arms 2.5 mm. long, bifid for 1.5 mm., wide, conduplicate. Capsule and seeds unknown.

Known only from PERÚ. TACNA: TARATA: Candarave, 2900-3000 m. alt., Mar. 11-13, 1925, *Weberbauer*, no. 7387 (type, F).

Growing in open shrubbery, this close relative of *C. Shepardae* can be distinguished from it by the longer style, longer staminal column, less bifid style-arms, and broader outer tepals.

5. *C. Shepardae* R. C. Foster in Contrib. Gray Herb. no. 155: 5 (1945). Bulb ovoid, 1.5 cm. high, 0.5-1 cm. wide. Basal leaves 1-2, to 4 cm. long, 1 mm. wide, glabrous; cauline leaf single, subtending

the spathes, itself somewhat spathiform, to 2.7 cm. long, 1 mm. wide, subfalcate. Stem mostly underground, 1-1.5 cm. long. Spathes herbaceous, the outer to 2.2 cm. long, acuminate, acute, the inner to 2.5 cm. long, tapering to a blunt retuse apex, 2-flowered, the pedicels about 4 mm. long at anthesis. Ovary about 5 mm. long, ellipsoid, glabrous. Flowers light purple; perianth-tube to 4 mm. long; outer tepals ca. 1.5 cm. long, ca. 4 mm. wide, oblanceolate-spatulate; inner tepals ca. 1 cm. long, 1.5 mm. wide, linear or narrowly oblanceolate, with an oval glandular patch on the claw 4 mm. above the base. Staminal column ca. 7 mm. long; anthers 4 mm. long. Style as long as the column; style-arms 2.3-4 mm. long, bifid nearly to the base. Capsule and seeds unknown.

Known only from eastern PERÚ. PUNO: HUANCANÉ: Umuchi, in sandy places, 3125 m. alt., Dec. 10, 1919, *Mrs. R. S. Shepard*, no. 99 (type, GH).

Through an unfortunate error, presumably in typing the manuscript, the original description stated that the length of the staminal column was 1.1 cm.; this has been corrected in the description given above.

6. *C. tunariensis* R. C. Foster in *Contrib. Gray Herb.* no. 155: 5 (1945) and in no. 161: 15 (1946). *Nemastylis nana* sensu Rusby, non S. Watson, in *Mem. Torr. Bot. Club*, 6(1): 125 (1896), in part. Plant subcaulescent, the ovoid bulb to 2 cm. high, about 1 cm. wide. Basal leaf solitary, 7-12 cm. long, 1 mm. wide; cauline leaf solitary, subtending the spathes, 4-8 cm. long, 1 mm. wide, acute, glabrous. Spathes herbaceous, the outer to 3 cm. long, acute, acuminate, the inner 1.7-2.6 cm. long, subobtuse, 2-flowered, the pedicels to 1.3 cm. long. Ovary ellipsoid, glabrous, 4 mm. long. Flowers blue or purple; perianth-tube to 2 mm. long; outer tepals 1 cm. long, the blade 4 mm. wide, oblanceolate; inner tepals to 3.5 mm. long, 1 mm. wide at the base, narrowly lance-deltoid, acuminate, acute, eglandular. Staminal column 5 mm. long; anthers 3-3.5 mm. long, nearly sessile on the column. Style as long as the column; style-arms 1.5 mm. long, bifid almost to the base. Capsule and seeds unknown.

Known only from BOLIVIA. COCHABAMBA: CERCADO: near snow-line, Mt. Tunari, 1891, *Bang*, no. 1042 (type, GH; co-types US, MBG).

Although the available material of this species is scanty and poor, it seems established that the inner tepals lack the glandular-tumescient area and are broadest at the base.

7. *C. Venturii* R. C. Foster in *Contrib. Gray Herb.* no. 155: 6 (1945). Bulb ovoid, 1.5-2 cm. high, 1-1.5 cm. wide. Basal leaves 1-2, to 10 cm. long, 1 mm. wide, acute, glabrous; cauline leaf solitary, subtending the spathes, to 6.5 cm. long, 1 mm. wide. Stem mostly underground, 1-2 cm. long. Spathes herbaceous, to 2.5 cm. long, subequal or the inner somewhat shorter, the outer acute, the inner obtuse, 2-flowered, the pedicels to 5 mm. long at anthesis. Ovary ellipsoid, glabrous, about

4 mm. long. Flowers blue; perianth-tube 2 mm. long; outer tepals to 1.5 cm. long, 3 mm. wide, oblanceolate-spatulate, subobtuse; inner tepals 8 mm. long, 1 mm. wide, narrowly oblanceolate, acute, not glandular-tumescens. Staminal column 7 mm. long; anthers sessile on the column, 2.5 mm. long. Style as long as the column; style-arms 1.5 mm. long, bifid for 0.5 mm. Capsule and seeds unknown.

Known only from northern ARGENTINA. JUJUY: HUMAHUACA: Cerro La Soledad, 3500 m. alt., Jan. 25, 1928, *Venturi*, no. 9025 (type, GH; isotype, US). TUCUMÁN: CHICLIGASTA: Estancia Santa Rosa, 4600 m. alt., Dec. 13, 1925, *Venturi*, no. 4065 (US).

Since the original publication of this species, another collection has been seen, which strengthens my feeling of its distinctness.

8. *C. Vargasii* R. C. Foster in *Contrib. Gray Herb.* no. 171: 24 (1950). Bulb small, more or less globose, about 1 cm. in diameter, the brown, thin membranous coats prolonged upward in a collar. Basal leaves several, basally long-sheathing, the sheaths reaching nearly to the middle of the spathes, the blades sharply reflexed outward above the sheaths, to 6 cm. long, 2 mm. wide, plicate, lance-linear, acute, glabrous. Stem mostly subterranean, simple, to 1.5 cm. long, cauline leaves apparently absent. Spathes subequal, to 1.8 cm. long, acute, or the inner subobtuse, 1- (rarely 2-) flowered, the flowers shortly pedicellate, the pedicels only a few mm. long. Ovary oblong-ellipsoid, glabrous, to 5 mm. long. Flowers white, with violet lines; perianth-tube to 1.5-2 mm. long; outer tepals spatulate, to 1.2 cm. long, the obtuse, retuse blade 6 mm. wide, the apical indentation crenulate; inner tepals unguiculate, the claw 2 mm. long, not glandular-tumescens, the obovate-spatulate blade 6 mm. long, 3 mm. wide, obtuse. Filaments completely united, the tube 4 mm. long; anthers 2.3 mm. long. Style 6 mm. long; style-arms 1.5 mm. long, bifid almost to the base, broad, conduplicate, with an internal central ridge and a minute tubercle at each secondary sinus. Capsule and seeds not seen.

Known only from PERÚ. PUNO: CARABAYA; pampa de Lacka, Macusani, 4360 m. alt., Feb. 15, 1948, *Vargas (leg. E. P.)*, no. 7135 (type, GH).

The broad inner tepals and the lack of cauline leaves serve to distinguish this species from its relatives. The most noteworthy difference, aside from the color of the flower, is the presence of small tubercles at the secondary sinuses of the style-arms. These have not been noted in other members of the genus.

3. ANOMALOSTYLUS R. C. FOSTER

Until recently, the species treated here as belonging to *Anomalostylus* have been considered to belong to *Cypella*.

The principal difference between the two genera is the strange development of the style in *Anomalostylus*. Not only are the style-arms suppressed, as is rarely true in *Cypella*, but the style-crests are fused in such a manner that three apical lobes, alternate with the stamens, are produced. Actually, however, the stamens are opposite the transverse stigmatic areas, so that there can be no question of the relationship of *Anomalostylus* and *Cypella*.

Anomalostylus R. C. Foster in Contrib. Gray Herb. no. 165: 110 (1947).

Bulbous, perennial, caulescent herbs, the bulbs probably rather large. Basal leaves several, cauline leaves few. Inflorescences terminal on the main axis and branches, the flowers long-pedicellate in herbaceous spathes. Flowers crateriform, the tepals basally connate, but a perianth-tube absent, the two series of tepals dissimilar in size and shape. Filaments free or slightly united at the base; anthers apically and adaxially adherent to the style-wings below the stigmatic areas. Style long-cyathiform, strongly tripartite, style-arms completely obsolete, the three sides of the style produced above the stigmas as low, semi-orbicular, or truncately deltoid, retuse lobes, these alternate with the stamens; stigmatic tongues two above each stamen, transverse, small, falcate, fimbriate-papillate, the stigmatic area apparently continued along the inner edge of each lobe to the retuse apex. Capsule and seeds unknown.

Type-species: *A. crateriformis* R. C. Foster.

KEY

- a. Leaves and spathes densely pruinose. 1. *A. grandis*.
 - a. Leaves and spathes not pruinose.
 - b. Basal leaves to 80 cm. long and 1.8 cm. wide; pedicels shorter than inner spathe at anthesis; filaments 5-6 mm. long. 2. *A. crateriformis*.
 - b. Basal leaves to 40 cm. long and 4-5 mm. wide; pedicels equaling the inner spathe at anthesis; filaments 3-4 mm. long 3. *A. coriifolius*
1. ***Anomalostylus grandis*** (Kränzl.), comb. nov. *Cypella grandis* Kränzl. in Fedde, Rep. Spec. Nov. 14: 295 (1916). Bulb large, ovoid, 7-8 cm. high and 4 cm. wide, the tunics verrucose (*fide* Kränzlin). Basal leaves about 4, linear-attenuate, acute, stiff, with numerous fine veins, pruinose, to 60 cm. (80 cm. *fide* Kränzlin) long, to 1.8 cm. wide; cauline leaves 3-4, appressed against the stem, overlapping or subimbricate, pruinose, acute, thick, very firm-textured, the lowest to 20 cm. long (45 cm. *fide* Kränzlin), two-thirds sheathing, the upper leaves reduced to more or less sheathing, spathiform, carinate bracts. Stem terete, glabrous, branched, nearly 70 cm. tall. Spathes pruinose, nearly equal, the outer a few millimeters shorter

than the inner, to 6 cm. long (8 cm. *fide* Kränzlin), broad, rather abruptly acute, carinate, rigid, finely veined, the inner similar but truncate at the somewhat membranous apex, 2-3-flowered; pedicels stoutish, glabrous, well-exserted from the spathes at anthesis. Ovary oblong-clavate, to 2 cm. long, glabrous. Flowers yellow (*fide* Kränzlin); outer tepals oblong-obovate, without marked differentiation between blade and claw, the inner face of the lower portion rather sparsely glandular-pubescent, about 4 cm. long and 1.8 cm. wide (6 cm. x 2.5 cm., *fide* Kränzlin), the rather blunt apex somewhat penicillate; inner tepals about 2 cm. long and 1 cm. wide (3 cm. x 8 mm., *fide* Kränzlin), with a well-marked, long, spatulate-naviculate claw, the margins more or less densely glandular-ciliate, somewhat erect or spreading, but inflexed and with a broad pubescent arc at that point, the oblong-ovate blade strongly deflexed, not glandular-ciliate, with a broad pubescent patch in the center. Filaments very slightly united at the base, 4 mm. long; anthers linear, 8-9 mm. long, adnate to the style about 2 mm. below the sinuses. Style 1.5 cm. long, filiform for about 4 mm., then dilating and becoming oblong-cyathiform upward, the three apical lobes rounded, about 5 mm. broad at the base and 2 mm. high.

Known only from PARAGUAY. Sierra de Amambay, January, *Hassler* (coll. *Rojas*) no. 10,001 (type, not seen; photo, GH, F); in the neighborhood of the Río Alto Paraná, 1909/10, *Fiebrig*, no. 6273 (GH, US); Cordillera de Altos, Oct. 8, 1902, *Fiebrig*, no. 224 (F).

This stiff erect plant with firm-textured leaves is easily distinguished from the other two species by the heavily glaucous or pruinose leaves and spathes, by the sheathing cauline leaves, which conceal most of the upper portion of the stem, and by the very thick texture of the flowers.

2. *A. crateriformis* R. C. Foster in *Contrib. Gray Herb.* no. 165: 111 (1947). Bulb incompletely known, probably large. Basal leaves several, to 80 cm. long and 1.8 cm. wide, linear, acute, glabrous, not pruinose, striate with numerous fine veins, the central vein distinctly more prominent than the rest; cauline leaves 2-4, the lowermost 12-42 cm. long, basally sheathing, the upper ones successively reduced, but not concealing the stem. Stem 1-3-branched, terete, glabrous. Spathes herbaceous, rather naviculate, the outer striate, carinate, abruptly acute, 3.5-4.5 cm. long, the inner slightly longer, truncate, several-flowered; pedicels shorter than the inner spathe at anthesis, rather slender, glabrous, ultimately elongating. Flowers apparently yellow; outer tepals obovate, to 3.5 cm. long and 2.2 cm. wide, without well-marked differentiation between blade and claw, the basal portion with 8-9 ridges and very sparse puberulence on the inner surface, the apex of the blade retuse with a short, blunt, penicillate apiculus; inner tepals to 2.5 cm. long and 1 cm. wide, the spatulate-naviculate claw flushed and streaked with blue or purple, much darker than the outer tepals (at least in dried material), densely glandular-ciliate,

the inner face glandular-pubescent, erect or somewhat spreading, somewhat inflexed at the apex, the strongly reflexed blade yellow, with a broad U-shaped pubescent patch and 2 round or oval pubescent patches in the center, these sometimes confluent, the apex rather blunt and penicillate. Filaments united at the base for 1 mm., 5-6 mm. long; anthers 7-11 mm. long, adherent to the style 1-2 mm. below the sinuses. Style enlarged upward almost from the base, 1.4-1.5 cm. long, the low, rounded or subdeltoid, apical lobes 3-4 mm. wide at the base and 1.5 mm. high.

BRAZIL: PARANÁ: Serrinha, ad marg. viae ferreae, Oct. 14, 1909, *Dusén*, no. 8705 (type, US; isotype, NY); MINAS GERAIS: 1865-66, *Regnell*, III, no. 1214 (US); Arceira, Feb. 24, 1951, *A. Macedo*, no. 3212 (US); RIO GRANDE DO SUL: Estancia L. Gomez (Neu-Württemberg), 500 m. alt., Oct. 18, 1904, *Bornmüller*, no. 302 (GH). PARAGUAY: in the campo Estancia Primera, January, 1932, *Jørgensen*, no. 4537 in part (as to NY, PHIL).

As was pointed out in the original description, this plant is almost certainly the one figured by Larrañaga, *Escritos, Atlas*, 1: t. XII (1927). It has been sufficiently distinguished from *A. grandis*, and from *A. coriifolius* it may be separated by its larger size, thicker leaves, pedicels shorter than the spathes at anthesis, longer filaments, and by the much thicker texture of the tepals and style.

3. *A. coriifolius* (Baker), comb. nov. *Cypella coriifolia* Baker in Bull. Herb. Boiss. (ser. 2) 3: 1103 (1903). Bulb incompletely known but apparently large. Basal leaves several, to 40 cm. long, 4-5 mm. wide, linear, acute, glabrous, not pruinose, rather thick and rigid, densely and finely nerved, the mid-nerves hardly more prominent than the rest; cauline leaves 2-3, the lower-most partly sheathing, 7-20 cm. long, 3-7 mm. wide, the upper ones mostly sheathing, spathiform, but not concealing the upper portion of the stem. Stem 2-3-branched, terete, glabrous, to 66 cm. tall. Spathes herbaceous, finely veined, rather stiff, unequal, the outer to 4 cm. long, long-acute, the inner somewhat longer, truncate at the apex, several-flowered; pedicels slender, equaling the inner spathe at anthesis, glabrous. Ovary oblong-ellipsoid, to 7 mm. long, glabrous. Flower pale yellow, tinged or spotted with blue at the base within; outer tepals not well-differentiated into claw and blade, obovate-spatulate, the apex retuse with a very short penicillate mucro, to 3.2 cm. long and 1.5 cm. wide, the basal portion sparsely glandular-puberulent and about 8-ridged on the inner face; inner tepals somewhat shorter, the margin, except the upper half of the blade, glandular-ciliate, the claw narrow at the base, then widening considerably, becoming spatulate-naviculate, the inner face with about 5 ridges and sparsely puberulent, erect or somewhat spreading but inflexed at the apex, with a dense, broadly U-shaped, pubescent blotch at the base of the strongly reflexed,

broadly ovate (8-9 mm. wide) blade, with a semi-lunate patch in the center of the blade, the apex rather blunt and shortly penicillate. Filaments slightly united at the base, 3-4 mm. long; anthers 6-7 mm. long, adnate to the style about 2 mm. below the sinuses. Style 1.2 cm. long, filiform at the base but soon becoming cyathiform, the 3 apical lobes semiorbicular or truncately deltoid, about 2.5 mm. wide at the base and 1.5 mm. high.

Known only from PARAGUAY. In the campo Hiaty, January, 1930, *Jørgensen*, no. 4532 (US, NY, MBG, F, PHIL); in the campo Tapytú, March, 1931, *Jørgensen*, no. 4537 in part (as to US, MBG).

This species is admittedly close to the preceding, but seems distinct. To the points of differentiation mentioned in the discussion of *A. crateriformis*, the increased glandular-ciliation of the inner tepals of *A. coriifolius* may be added.

4. NOTES ON TRIMEZIA

For a number of years, the binomial *Tritonia riparia* Cordemoy, Fl. Île Réunion, 161 (1895), has seemed to me to be a "spook." It seemed highly unlikely that a true *Tritonia* should be found native on the island of Réunion. Dr. E. P. Phillips, Gen. S. Afr. Fl. Pls. (ed. 2) 218 (1951), says of the generic distribution: "between 40 and 50 species in South Africa, found mostly in the southwestern districts of the Cape Province, but extending from Namaqualand through the coastal area into Natal; found also in the Transvaal." But that is a far cry from Réunion. There is in the Gray Herbarium a sheet from Réunion, collected by G. de L'Isle, no. 562, from one of the localities cited in the original publication of the species, "Ravine sèche, St. Benoit." The plant seemed strangely familiar in appearance and dissection soon showed that it is the widespread and common Caribbean irid, *Trimezia martinicensis* (Jacq.) Herb. As a result, the binomial *Tritonia riparia* becomes an additional synonym of *Trimezia martinicensis*, a name already well-burdened with synonyms.

Within the past few years I have had more than one inquiry as to the correct spelling of the generic name *Trimezia*, my correspondents pointing out that the original spelling was *Trimeza*. This is correct. The generic name was spelled *Trimeza* when it was published by Salisbury in

Trans. Hort. Soc. 1: 308 (1812). However, this name was published as a *nomen nudum* and must, therefore, be disregarded. The first valid use of the name known to me is Herbert's in Bot. Reg. 30: Misc. p. 88 (1844), where he used the spelling *Trimezia*. Since Herbert gave a generic character, there can be no question of the validity and legitimacy of the publication. Therefore, Herbert's spelling, *Trimezia*, rather than Salisbury's spelling, *Trimeza*, must be used.

Again in response to inquiry, it should be noted that the binomial *Trimezia martinicensis* (Jack.) Herb. was made in the description of *T. meridensis* Herb. in Bot. Reg. 30: Misc. p. 88 (1844), where Herbert wrote "Caetera ut in *T. Martinicensi*." In the brief English discussion which followed, he referred to "This plant, handsomer than the old species, long called *Iris Martinicensis*. . . ." Consequently, there can be no doubt concerning the basionym of *T. martinicensis*. Since the two binomials, *T. martinicensis* and *T. meridensis*, were thus published simultaneously, as well as simultaneously with the validation of the generic name, it becomes necessary to select one of them as the type-species of the genus. Since *T. martinicensis* is based on the much older and well-understood name of Jacquin, I am designating it as the type-species. The second species, *T. meridensis*, is not well-understood (indeed, there is considerable question as to what it is, as well as to whether it represents merely a local variant of *T. martinicensis* or is a distinct species), and it seems to me ill-advised to select a doubtful concept as the type of the genus.

Trimezia lutea (Klatt), comb. nov. *Cypella lutea* Klatt in Mart. Fl. Bras. 3(1): 522 (1871). *Marica bulbosa* Klatt in Abh. Naturf. Ges. Halle, 16: 374 (1882). *Neomarica bulbosa* (Klatt) Sprague in Kew Bull. 1928: 281 (1928).

It is obvious from an excellent photograph of *Martius*, no. 437, from Minas Gerais, Brazil, which may be chosen as the lectotype, that *Cypella lutea* Klatt is unquestionably a *Trimezia*. It differs from *T. martinicensis* in having the single cauline leaf close to the apex of the stem, with the inflorescence appearing pseudolateral in some instances. The rootstock, however, is completely characteristic of *Trimezia*,

resembling a small bulb or corm, with the outer tunics split into parallel fibers. No other genus of New World irids possesses such a rootstock, and for that reason *Cypella lutea* Klatt is here transferred to *Trimezia*. The name *Marica bulbosa* was merely a renaming by Klatt when he transferred the plant to *Marica*, because of the existence of *Marica lutea* Herb. But Herbert's name was apparently a *nomen provisorium* and must be disregarded. In any case, it could not bar the use of the epithet *lutea* in *Trimezia*.

BRAZIL: MINAS GERAIS: Ouro Preto, *Martius*, no. 437 (lectotype; photo GH). COLOMBIA: META: Rancho Menegua, 100 km. SE of Villavicencio, *Helen Schieffer*, no. 816 (GH).

Trimezia Martii (Baker), comb. nov. *Marica Martii* Baker, Handbk. Irid. 63 (1892). *Neomarica Martii* (Baker) Sprague in Kew Bull. 1928: 281 (1928).

From the description of the rootstock, it seems clear that *Marica Martii* is a *Trimezia*. Since it seems distinct from other species of the *martinicensis*-complex, I am retaining it as a separate species, at least for the present.

Trimezia fistulosa, spec. nov. Perennis, breve rhizomatosa, rhizoma ad 3-4 cm. crassum, foliis vetustioribus vestitum, haec deinde in fibris parallelibus. Folia basalia plura, perfistulosa et tubulosa, perrecurvata, ad 20 cm. longa et 6-8 mm. in diametro, glabra. Scapus ad 15 cm. altus, glaber, folia caulina absentia. Spathae plures, terminales, spatha infima ad 2 cm. longa, acuta, spatha suprema ad 3.5 cm. longa, obtusa, apice hyalina et subcrenulata. Pedicelli 3-4, spathas anthesin aequantes. Ovarium glabrum, oblongum, ad 8 mm. longum. Flores fructus seminaque ignota. BRAZIL: MINAS GERAIS: Serra do Cipó, 1800 m., Aug. 5, 1936, *W. A. Archer*, no. 3675 (type in U. S. Nat. Herb.; isotype in herb. U. S. Nat. Arb.); Serra do Cipó, Santa Luzia, km. 118, Aug. 23, 1933, *Mello Barreto*, no. 3040 (F); Diamantina, *Glaziou* (photo, GH).

To describe a new irid without flowers, fruit or seeds may appear somewhat rash. Yet the rootstock is that of a *Trimezia* (in the *Lansburgia* group), and the leaves are unique in American irids. Thick, firm-textured, strongly recurved and tubular-fistulose, they leave no alternative to describing the plant as a new species. According to a handwritten note on the Glaziou specimen, the flowers are yellow, which accords with the attribution to *Trimezia*. When flowers are available for study, it is possible that this plant may prove

to represent an undescribed genus. For the time being, however, I prefer to leave it in *Trimezia*.

Trimezia Steyermarkii, spec. nov. A *T. martinicensi* foliis longis et latis, caule ramoso, et rhizomate crasso magnoque differt. Rhizome to 4 cm. wide and 4 cm. long. Leaves ensiform, thin-textured, the midrib prominent, to 60 cm. long and 2 cm. wide, occasionally a little wider. Spathes obviously terminal and not pseudolateral, several-flowered, herbaceous, thin-textured, unequal, the outer spathe about 2 cm. long, the inner to 3 cm. long, or a little longer. Pedicels glabrous, equaling the spathes at anthesis. Ovary glabrous, more or less clavate, less than 1 cm. long. Flowers yellow with purple or brown-purple bands, probably not over 3 cm. in diameter. Style and stamens those of *Trimezia*. Fruit and seeds unknown. GUATEMALA: ALTA VERAPAZ: Pansamala, 4100 ft., *J. D. Smith, Pl. Guat.* no. 1786 (US); along Quiché highway about 12 km. west of San Cristóbal, 1100 m., in dense mixed forest, *Standley*, no. 89752 (F, GH); wooded slope near Río Icvolay, near Hacienda Yaxcabnal, 5 mi. NW. of Cubilgüitz, 250-300 m., *Steyermark*, no. 44690 (F, GH); between Hacienda Yaxcabnal alonga Río Icvolay and Río Apia, 6-8 mi. NW of Cubilgüitz, 210-250 m., *Steyermark*, no. 45011 (F, GH); vicinity of Río Dolores, near Dolores, 1-2 mi. NE. of Cubilgüitz, 290-300 m., *Steyermark*, no. 44827 (F, GH); Coban, 1500 m., *von Tuerckheim* in *J. D. Smith, Pl. Guat.* no. 96 (US); Coban, 1400 m., *von Tuerckheim* II, no. 760 (US); *von Tuerckheim* (US no. 933767); Huehuetenango: cafetal of Finca Soledad, 5 mi. SE. of Barillas, Sierra de los Cuchumatanes, 1150 m., *Steyermark*, no. 49539 (type, GH; isotype, F).

No satisfactory material is available at the moment for dissection, and so floral details cannot be given. Bud-dissection shows, however, that the plant is a *Trimezia*. Most of the material cited was originally determined as *Neomarica*.

In addition to the Guatemalan material cited, there are two additional collections from southern Mexico which probably belong here.

OAXACA: Lalana, 1000 m., Chinantla, Teotalcingo, *Galeotti* no. 5380 (US). CHIAPAS: Chicharras, 1000-2000 m., *E. W. Nelson*, no. 3756 (US).

5. MISCELLANEOUS NOTES AND NOVELTIES

In the treatment of the family *Iridaceae* in Macbride's *Flora of Peru* (*Field Mus. Pub. Bot.* 13(1): 707-717 [1936]), the genus *Eleutherine* is not included. Consequently, it was a matter of great interest to discover a sheet of *Eleutherine bulbosa* (Mill.) Urban in a small but important suite of

specimens sent to the Gray Herbarium by Dr. César Vargas C. The data for the specimen are as follows: PERÚ: CUZCO: CONVENCION: Quillabamba, Granja de Misiones, 1040 m. alt., enero-marzo, 1947, *Vargas*, no. 6347.

Through the kindness of Dr. Vargas, an isotype of *Cypella Goodspeediana* Vargas (*Vargas*, no. 2509) has been presented to the Gray Herbarium. Its appearance is not typical of *Cypella* and a bud-dissection showed unmistakably that it is a *Cipura*. The following transfer is thus necessary.

Cipura Goodspeediana (Vargas), comb. nov. *Cypella Goodspeediana* Vargas in *Revist. Univ. Cuzco*, 33 (no. 87): 171 (1945).

During determinative work, over a period of years, three apparently undescribed species of *Sisyrinchium* have been noted. Their descriptions follow.

Sisyrinchium bromelioides, spec. nov. Herba perennis, rhizomatosa, rhizoma subcrassum, breve. Folia basalia ad 110 cm. longa et 2 cm. lata, minute denseque papillosa, marginibus tenuibus; folia caulina nulla. Caulis ad 60 cm. altus (ad 2 m. *fide* Rambo), ancipitus, bractea terminalis ad 8-9 cm. longa. Inflorescentia terminalis non pseudolateralis, ad 30 cm. alta, multiramosa, bracteis acutis, firmis oblecta, bractee usque ad 2 cm. longae; spathae firmae, acutae, ad 1.5 cm. longae, raro longiores, pluriflorae. Pedicelli tenues, spathas anthesin subexcedentes, glabri. Ovarium turbinatum, glabrum, ad 2 cm. longum. Perianthium flavum, atrolineatum; tepala subaequalia, elliptica, acuta, ad 9 mm. longa et 2.5 mm. lata. Filamenta ad 3 mm. longa, 1 mm. basi coalita; antherae lineares, 2.5 mm. longae. Stylus 1.5 mm. longus, styli rami 3 mm. longi. Capsula subglobosa, ad 6 mm. alta; semina complanato-globosa, ad 2.5 mm. lata, brunneo-nigra, sublucentia, irregulariter foveolata. BRAZIL: RIO GRANDE DO SUL: S. Leopoldo, in wet or marshy places, 17 Dec. 1948, *Rambo*, no. 38856 (GH); S. Leopoldo, Nov. 1941, *Leite*, no. 2032 (type, Arnold Arboretum); Vila Oliva, pr. Caxias, 2 Jan. 1946, *Rambo*, no. 33939 (GH).

The closest relatives of this new species are *S. macrocephalum* R. Grah. and *S. Wettsteinii* Hand.-Mazz. From both it differs in its larger size, smaller flowers, and, above all, in the inflorescence, which is very large, open, diffusely branched, with bracts covering most of the branches. The spathe-clusters are extremely numerous, appressed against the branches when young and becoming more divergent in maturity. It is probably the tallest species in the genus, since Father Rambo noted that the flowering stem may reach 2 meters in height. The specific epithet was chosen to show the striking resemblance to some bromeliad inflorescences.

Sisyrinchium deflexum, spec. nov. Herba perennis, tota glabra, rhizomatosa, rhizoma tenue, breve. Folia basalia nulla; folia caulina ad bracteas acutas, spathiformes, convolutas reducta, ad 2.5 cm. longa. Caulis simplex, ad 3.5 dm. altus. Spathae ad bracteas caulinas persimiles, ad 2.5 cm. longae, acutae, 1-florae. Pedicelli spathas anthesin excedentes, in fructu multo elongati et perdeflexi. Ovarium ad 2 mm. longum, turbinatum vel oblongum. Perianthium pallide flavum, non lineatum; tepala subaequalia, elliptica, subacuta, ad 8 mm. longa et 2 mm. lata. Filamenta circa 2.5 mm. longa, ad basin 1 mm. coalita; antherae lineares, 2-2.5 mm. longae. Stylus ad 2 mm. longus, styli rami circa 2 mm. longi. Capsula subglobosa, 3 mm. in diametro; semina immatura 1 mm. lata. PARAGUAY: in campo, Paso Yobay', Dec. 1938, *F. Schade* (type, GH).

Beyond saying that this species is apparently a member of the *Marchio-vaginatatum* complex, it is rather difficult to make any statement about relationships. It is distinctive in the complete similarity of cauline leaves and spathes, the latter being 1-flowered. Nowhere else in the genus have I seen solitary pedicels so strongly deflexed at maturity.

Sisyrinchium Reitzii, spec. nov. Herba perennis, tota dense pubescens, rhizoma tenue, breve vel breve substoloniferum. Folia basalia nulla; folia caulina ad bracteas acutas, spathiformes, convolutas reducta, ad 2.5 cm. longa. Caulis simplex, ad 30 cm. altus. Spathae ad bracteas caulinas persimiles, ad 1.5 cm. longae, acutae, 1-florae, vel raro 2-florae. Pedicelli spathas anthesin aequantes, glabri, in fructu nec elongati nec deflexi. Ovarium glabrum, subglobosum, ad 1.5 mm. longum. Perianthium flavum, non lineatum; tepala subaequalia, ad 8 mm. longa et 3 mm. lata, elliptica, apice breve mucronata. Filamenta ad 2.5 mm. longa, basi 1.5 mm. coalita; antherae lineares, 2 mm. longae. Stylus circa 2 mm. longus, styli rami circa 2 mm. longi. Capsula matura seminaque ignota. BRAZIL: SÃO PAULO: Santo Amaro, 15 Apr. 1932, *Hauff*, no. 18 (GH); SANTA CATARINA: Morro do Iquererim, Campo Alegre, 1400 m., 5 Sept. 1957, *Reitz & Klein*, no. 4872 (type, US), 1500 m., 18 Oct. 1957, *Reitz & Klein*, no. 5228 (US).

Like *S. deflexum*, *S. Reitzii* is a member of the *Marchio-vaginatatum* complex. Superficially, it bears a strong resemblance to *S. deflexum*. It differs, however, in the dense, short, grayish pubescence which covers leaves, stems and spathes. Sometimes the spathes are 2-flowered, rather than 1-flowered, but the pedicels are neither elongate nor deflexed in fruit. It has been named in honor of Father Raulino Reitz, the leading student of the flora of the state of Santa Catarina in Brazil.